

A Review on various approaches in Machine Translation for Sanskrit Language

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Abstract

Machine Translation is an emerging field in computer science. It is one of the most significant applications of Natural Language Processing. Aim to focus on Sanskrit in Machine Translation is to come across the language suitability, its morphology and employ appropriate Machine Translation techniques. A review has been conducted on various approaches in Machine Translation in this paper. It begins with introduction to Natural Language Processing and its applications. Different types of ambiguities are discussed. Silent features of Sanskrit language are discussed. Then focuses on Sanskrit is used for Machine Translation and highlights the language features for Machine Translation. Different approaches of Machine Translation are given like Rule based, Statistical based, Direct etc. A survey of the work done on various machine translation systems either developed or under the development. General structure for Sanskrit Machine Translation system (SMTS) is discussed.

Keywords: Machine Translation, Natural Language Processing, Sanskrit, Morphology, Lexical

1. Introduction [2][4][6]

Machine Translation is very important application of Natural Language Processing; it removes the barrier so that humans can transform information, share ideas, know one another cultures, technological discussions etc. Machine translation helps to unite the world socially, culturally and technologically. There is big necessity for inter-language translation for transfer and sharing of information and ideas. Using machine translation one natural language can be translated to other. Natural Language Processing (NLP) involves making computers to perform useful tasks using languages used by humans. NLP have to face a lot of ambiguity during its processing and Sanskrit language overcomes all of these hurdles, because of “formally defined grammar”, to become the best suited natural language for machine translation.

2. Natural Language Processing [6]

Natural language processing is the sub field of artificial intelligence dedicated to make computers understand statements or word written or spoken in human language. Natural language understanding at the input side and the natural language generation at the output side are the two major parts of natural language processing

2.1 Application of Natural Language Processing

Natural language processing provides a better human-computer interface that could artificial intelligence systems to pervade more efficiently into the present day applications like:

- Translate one human language to another using translation program.
- A program for grammatical errors checking in a given text.

- A system for blind people with speech input.
- The chair of Stephan Hawking which converts text into speech.

3. Difficulties in Language Translation [7]

Due to different types of ambiguities Machine translation is a difficult task. For translation, ambiguity needs to be resolved. These difficulties are inbuilt in English but are not fundamental to all natural languages. Scientific Sanskrit is particularly specific i.e. clear and accurate. There are different types of ambiguities which depending upon study meaning of word, problem solving, explanation or understanding and number of meaning of one word etc:

- Language translation in structural form- In this, words in a sentence is interpreted after the sentence combined into groups of words, which are without definite verb.
- Difficulty or ambiguity in problem solving in specific way- This is related to context of sentence.
- Lexical difficulty or ambiguity- when a single word has many different meanings and in this all meanings are potentially valid.
- Difficulty in meaning of words or semantic ambiguity- This is related to sentence

4. Silent Features of Sanskrit Language [4][7]

India is multilingual country with as many as 22 scheduled languages of which Sanskrit is one among them and it's official language of state of Uttarakhand, India. It is considered as the oldest Indo-European language. It is holy and philosophical language in Hinduism, Buddhism, and Jainism. The Sanskrit is mother of most Indian languages. Vedas, Extensive epic, Upanishads, philosophical, mathematical, scientific, dramatic, poetic texts include in Sanskrit work. Grammar of Sanskrit is well organized and ambiguity less compared to other natural languages. Sanskrit grammar is given by Panini as "Astadhyayi". Feature of generating new words is most The most distinctive feature of Sanskrit language is feature of generating new words . 14 sets are given by Panini in Sanskrit language are called "Maheshwara Sutras", which explain Sanskrit in mathematical representation or form. Fibonacci series correlated with mathematical expression of language which explains every natural problem. Fibonacci series is so simple and nature follows it because it generates the patterns. And this theory explained in Sanskrit as regenerative for computation. Context developing is based on language's grammar. Sanskrit language is a set of 14 rules given by Panini. These rules are used to form all sentences in Sanskrit. All these are possible only through object oriented approaches which is available in Sanskrit grammar.

Following are some salient features of Sanskrit language-

- Sanskrits language is promoted as the language of processing for its relatively *unambiguous naturean* and *well laid-out grammatical structure*.
- Sanskrit has a more *strictly defined syntax*, so it is technically more computable.
- Sanskrit is the most *Scientific and Structured* language. There are many hidden algorithms in Sanskrit as a part of its vast scientific treatises, to analyze "Meanings" or "Word sense" from many perspectives.
- The *word representation* in Sanskrit is done *by its property*, not according to the objects. Any object or a thing is named by the property it possesses.
- All Sanskrit *words* are made of *characters*, either *vowels or consonants*. Vowels exist independently, while consonants depend on vowels. The process of *Sandhi* is defined.

- Sanskrit words are composed of two parts, a fixed base part and a variable affix part, both forming an integral unit. The meaning of the word base, depending on a set of given relationships is modified by the variable part.
- Sanskrit is a very *predictable language*. It is easy to formulate sentences and obtain meanings from words. It is easy to make words plural. So that a computer can inherently formulate sentences very easily.
- Words are of either *nominal type or verbal type* i.e. denoting either entities or actions.
- Sanskrit is clearly *differentiate between dual and plural case* and thus we can get an error free NLP.
- *Vibhaktis* (cases) provides an efficient way of *segmenting* the sentences into *logical constructs* for natural language processing (NLP). The splitting of the sentences in Sanskrit is very similar to the semantic net models used for artificial intelligence systems.
- Sentence formation in Sanskrit is done with the help of two well known tools *Vibhakti and Karaka*. Vibhakti assists for making sentence in Sanskrit, there are seven kinds of vibhakti which also provide information on respective karaka. Karaka approach guides for generating grammatical relationship of nouns and pronouns for other words in a sentence.
- Sanskrit has *inflection based syntax* which makes the overall meaning of a sentence independent on the position of its constituent words. An inflection of a word means a different form of that word and is used for enhancing the meaning of the original word.

5. Sanskrit And Machine Translation [4] [5]

Sanskrit has formal defined grammar. For any language to become computationally doable, it should have following features

- Less or Unambiguous Grammar
- Guard against Mispronunciation/ Misspelling Resulting in Misconception
- Total precision
- Co-relation between written and Spoken form of words
- Potential Grammatical Tools

Sanskrit language can be treated as best suited natural language for machine translation as it holds most of these features. The linguistic aspects of Sanskrit language that need to be considered while dealing with complexity in machine translation are as follows-

- *Phonetics and Phonology*—knowledge about linguistic sounds - In Sanskrit it is known as Panini Shiksha shastra which connects to the Grammar and the rules of the grammar also abide by the rules of the Phonetics.
- *Morphology*—knowledge of the meaningful components of words from stems and their generation and utilization - In Sanskrit this is called as 'pada vyutpatti'. In addition the methods for generating words are also explained step-by-step in Panini's Ashtadyayi like a mathematical equation.
- *Lexical*—knowledge of meanings and equivalent words. Every Sanskrit lexical item has a one-one correspondence. So a particular word used in different places is the same from a semantics point of view.

- *Syntax*—knowledge of the structural relationships between words - declensions of nominal forms /stems - In Sanskrit Vibhakti play this role – it has very tight rule thus there is no ambiguity.
- *Semantics*—the meanings of words in a sentence related knowledge. Sanskrit has many ways of sentence meanings and their analysis on a scientific basis.
- *Pragmatics*— knowledge of the relationship of meaning with respect to the context - this is the most complex as meanings change, based on context and many other factors. For pragmatics a wonderful Vyakarana treatise available in Sanskrit called as "Vakyapadiyam" by Maharishi Bhartrhari.

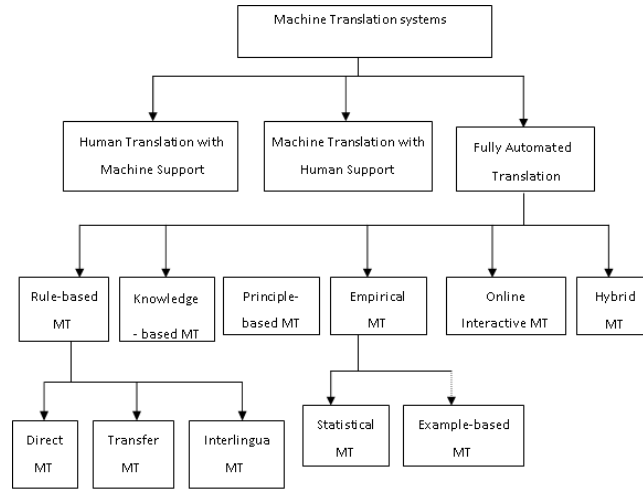
5.1 Comparative View of English and Sanskrit [8]

English and Sanskrit comparitive view on different basis as below :

Basis	English	Sanskrit
Alphabet	26 character	42 character
Number of vowel	Five vowels	Nine vowels
Number of consonant	Twenty one consonant	Thirty three consonant
Number	Two: singular and plural	Three: singular, dual and plural
Sentence Order	SVO (Subject-Verb-Object)	Free word order
Tenses	Three: present, past and future	Six: present, aorist, imperfect, perfect. 1st future and 2nd future
Verb Mood	Five: indicative, imperative, interrogative, conditional and subjunctive	Four: imperative, potential, benedictive and conditional

6. Machine Translation Approaches [2][3]

Machine Translation is classified into seven broad categories: rule-based, statistical-based, hybrid-based, example-based, knowledge-based, principle-based, and online interactive based methods. First three Machine Translation approaches are the most widely used and earliest methods.



7. Sankrit Machine Translation Systems [1][2]

Comparison between some Machine Translation System either developed or under development.

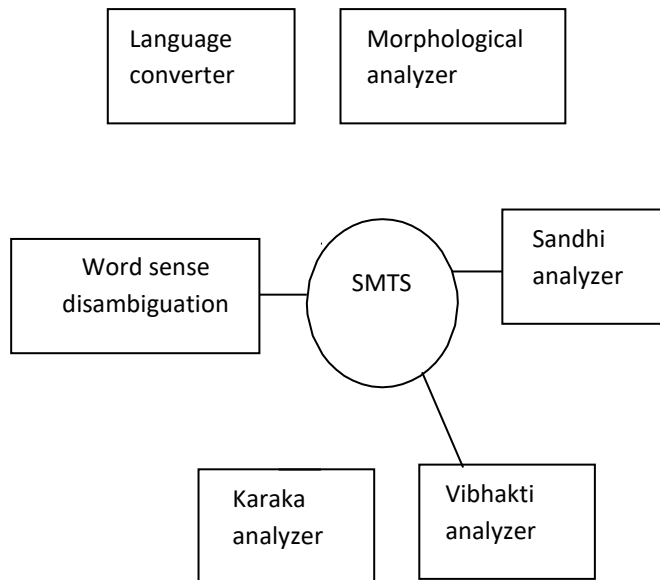
Machine Translation System	Approach	Source- Target Language Pair	Features
DESIKA	Rule based	Sanskrit to Sanskrit	Desika is a Paninin grammar based system which includes Vedic processing and shabdabodha as well
ANGLABHARTI	pseudo-interlingua approach.	English to any Indian Language	English is analyzed only once and creates an intermediate structure called PLIL. Further PLIL is converted to each Indian language through a process of

			text-generation..
GOOGLE TRANS- LATOR	statistical machine translation approach.	English to Hindi/Urdu/Sn askrit	Translation is provided only for Hindi, Urdu and San- skrit.
ETSTS	Rule and Example based	English to Sanskrit	Using Bilingual dictionary and Modular design for converting target sentence to speech output
ESSS	Rule based	English to Sanskrit	English Speech to Sanskrit speech is converted via English and Sanskrit words
E-tranS	Rule based	English to Sanskrit	Synchronous Context Free Grammar (SCFG) is formed and used for language representation of syntax, Lexicon used for Morphological analysis
Sanskrit to English Translator by Subramania m A.	Rule based	Sanskrit to English	Focus on <i>Sandhi Vichheda</i> ,Morphological Analysis.

English to Sanskrit MT by Mishra and Mishra	Example based	English to Sanskrit	POS tagger Module, Uses ANN for verb selection, GNP Module.
English to Sanskrit MT by Warhade S, et al	Statistical based	English to Sanskrit	Phrase based
English to Sanskrit MT by Mane D.T. , et al	Rule based	English to Sanskrit	Use of bilingual dictionary and grammar rules file.

8. Components of Sanskrit Translational System [4]

Developing a Sanskrit Machine Translation System (SMTS) is much more fascinating and challenging task. MT is difficult because words can have several meanings. It is possible only by replacing the words in text by their equivalent words. Then modifying and arranging these words according to grammar. The components of proposed Sanskrit Machine Translation system (SMTS) include the modules as shown in figure



7. Conclusion

Sanskrit language has specific, unambiguous nature and vast literature and vocabulary, which prompt to be used as source language in machine translation. Machine Translation is a difficult task because words

can have several meanings. Sanskrit is used as source or target language for development of Machine Translation systems. Still some systems are particular to specific domain, restricted to short sentences and phrases. Sanskrit language becomes challenging in Machine Translation application using Corpus based Machine Translation techniques due to its rich morphological nature. Systems using different translation techniques, suitable for particular domain are available for converting English to Sanskrit language. Additionally, we tried to describe briefly the different existing approaches that have been used to develop Machine Translation systems and proposed a general structure of SMTS which tried to utilize the salient grammatical features of Sanskrit language.

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A Review Paper on Routing Protocols for Aeronautical Ad hoc Network

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Abstract

AANET-Aeronautical Ad hoc Networks are large scale multi hop wireless network of aircraft which provides direct air-to-air communication without ground infrastructure. AANETs aim is building communication link among aircraft. Routing is one of the main challenge that Aeronautical ad hoc networks(AANET) are dealing with. In this paper I am focusing on several routing protocol have already been propose in AANET, classification of routing protocol and performance analysis of some these routing protocol are outlined and comparative studies of the simulation result for different parameters for different protocols have been reported.

Keywords : *AANET, routing protocols, classification, routing models, simulation*

INTRODUCTION

AANET [1] is a form of MANET and similar VANET due to high mobility and dynamic topology . AANET is a large scale multi hop wireless network of aircraft which provide direct air-to-air communication without ground

infrastructure. AANET is define as a selforganized network where airplanes work as a node and Each node has a certain range of communication.

Routing is one of the main challenge that AANET is dealing with because of i) mobility of node ii) Geographical size of network and ii) number of nodes.Find appropriate path between sender and receiver in the network is one of major challenge in AANET .Routing protocol is set of methods are used to solve this problem.

In AANET , airplanes are work as a node and communicates with ground infrastructure and other aircrafts. In this network information becomes available through in-aircraft, aircraft- to-ground and aircraft- to-aircraft communications.

With the help of these networks, traffic between aircraft can be distributed and is regarded to have improved reliability and scalability. Based on this property, the need of aircraft ad hoc networks increases due to an unpredictable increase in air traffic, fuel cost and environmental pollution.

FEACTURES OF AANET

- 1) Most of AANETs are heterogeneous networks, of which different types of links are stringent and the air spectrum resources are limited
- 2) In AANET nodes move continuously but predictably
- 3) The notational environment and node communication radius are large
- 4) Nodes move fast ,the topology is highly dynamic
- 5) Nodes have a strong processing ability
- 6) Design of network routing protocol is effectively supported by a large amount of airborne equipment.

In response to these features, a corresponding routing protocol needs to be designed to maximize the performance of AANET. In this paper AANET routing protocols

CLASSIFICATION OF ROUTING PERFORMANCE OF ROUTING PROTOCOL

In paper [3], author presented various routing protocols specifically designed for ad hoc routing networks like MANET, VANET and AANET. Wireless ad hoc networks made up of wireless mobile nodes which dynamically form networks when required without using any fix ground infrastructure. Each individual node in wireless ad hoc network act as a router, which send and receive data.

Another type of mobile ad hoc network is vehicular ad hoc networks(VANET) for VANET many different protocols are proposed because all standard protocols cannot be used due to high mobility, topology. Some of VANET routing protocol are discuss in this paper are

- 1)Adhoc routing
- 2)cluster base routing
- 3)Geographical routing
- 4)Position base routing
- 5)Broadcast routing

An aircraft ad hoc network[4] is type of AANET in which communication happened amongst remote aircraft without any fix infrastructure. AANET routing protocol classification is based upon network structure of protocol design into two part :

- 1)Topological based routing further devided into Proactive, Reactive and Hybrid
- 2)Ge ographic protocols required

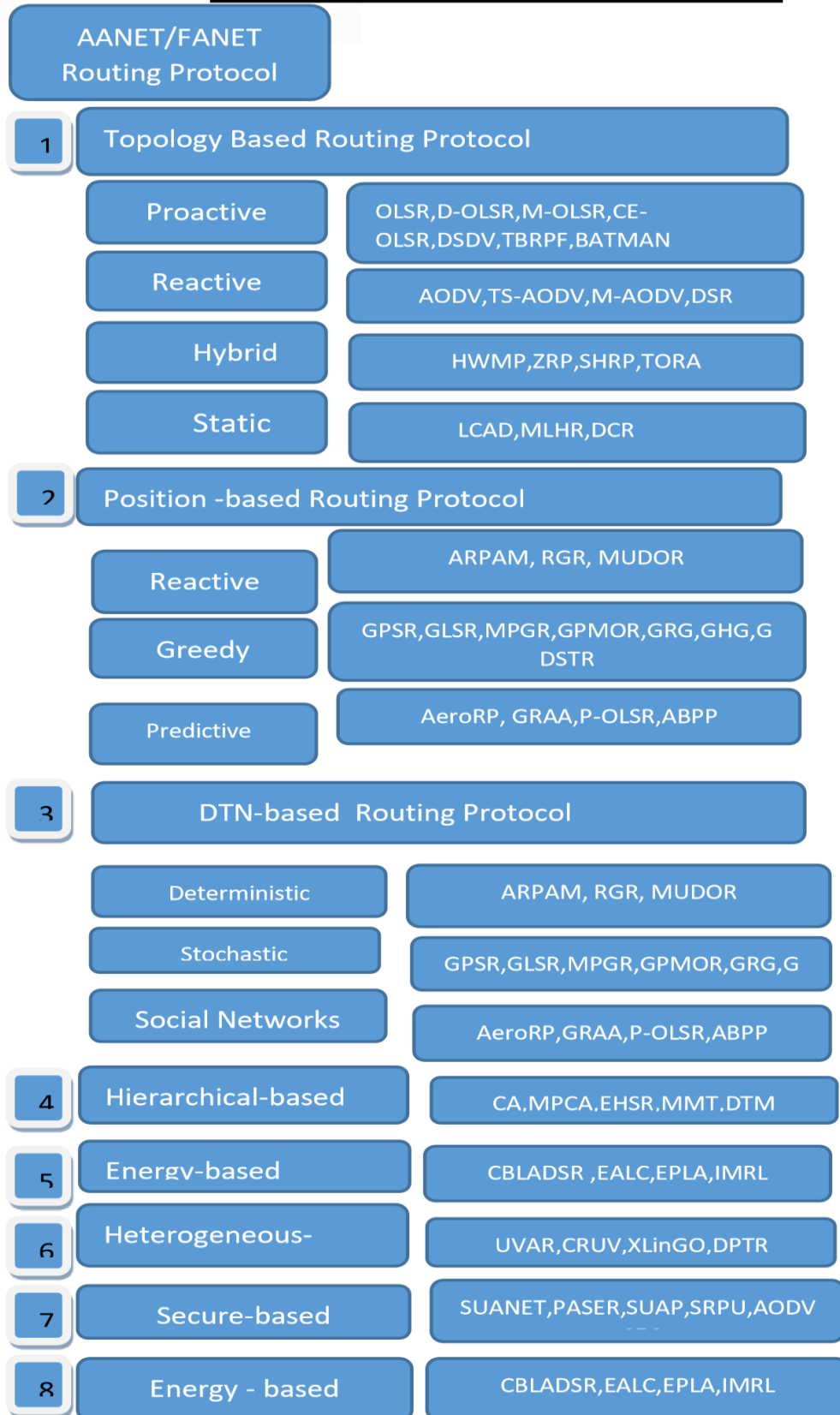
In this work, All these routing protocols are evaluated the performances in terms of Packet Delivery Ratio (PDR), packet delay, throughput, and signalling rate of well-known routing protocols.

- 1)GRAA
- 2)AeroRP
- 3)GLSR

are defined and study conclude that various routing protocol can be used, depending upon the ad hoc network utilization ,communication installation and mission objectives. And this study is useful for the secure transmission of data from source to destination in multi hop network.

In [5] this paper author introduce the term Aeronautical Ad hoc networks and which kind of routing system is suitable is proposed. Communication among the plane can be done in three layers 1)Top layer is the satellite layer 2) Middle layer is the aircraft layer and 3) the bottom layer is ground station layer. In this paper focus is on the middle layer because of plane high mobility, network topology of airplane nodes are taken into account so that durable links are identified and established between nodes in order for the successful transmission and reception of data.

PROTOCOLS IN AANET/FANET [2]



In this paper, Ad hoc routing among planes are define in terms of

- 1) Aeronautical mobility and routing model
- 2) Aeronautical Routing and Define best Path (in multi hop scenario, nodes on the path have velocities very close to each other hence is a most stable path)
- 3) Doppler shift of packets (Each packet is subjected to Doppler shift [6,7] which depend on the relative velocity of the replying aircraft to the receiving aircraft)
- 4) Multipath Doppler routing algorithm (MUDOR)

In this paper two set of simulation are performed

- a)Simulation for single-hop in relation to node density
- b)simulation for multi-hop with regard to communication range for a Real World Scenario

In this set of simulation author had concluded that MUDOR outperforms DSR in terms of number of handoffs during the whole simulation time.

In [6] paper , researcher presented a study for performance evolution of existing typical routing protocols for aircraft ad hoc networks using simulator.

This evolution study figure out what is the impact of high speed movement and spare deployment over well known routing protocols with new mobility pattern for aircraft ad hoc networks.

In this paper, 3 most popular routing protocols are considered 1)AODV 2)DSDV and 3)GPSR. Author demonstrate the suitability of these protocols in AANET in terms of packet delivery ratio, end to end delay and control overhead using simulator.

For this performance analysis author propose how to generate realistic mobility scenarios for each simulator, and how to develop software which makes use of commercial flight simulator, Microsoft Flight simulator.

For this simulator model researcher consider following component

- 1) Topology component
- 2) Object Creation
- 3) Data Record
- 4) Movement Display
- 5) Data Parsing

Using this component and own software along with NS-2 simulator and other parameter for scenarios are describes as follows :

MAC Protocol : IEEE 802.11

Propagation Model : Two ray model

Aircraft Type : F-18

Initial Position : Uniform Distribution Traffic : CBR over UDP

Simulation Results are generated by evaluating three routing protocols by measuring the packet delivery ratio, end to end delay with no of nodes (10,20,50 and 100) and realistic mobility model.

--GPSR shows the better performance than other two protocols in terms of packet delivery ratio. AODV better performance than DSDV.

--GPSR shows the shortest end to end delay and AODV shows the longest end to end delay because it needs to establish the path on demand way.

Finally author conclude that it is necessary to develop new routing protocol based on DTN for aircraft ad hoc networks.

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A Review of Smart Garbage Monitoring and Solid Waste Management System

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Abstract

In current scenario, the cleanliness of public places as well as private places are very necessary to make the environment healthy by spreading some deadly diseases, to avoid such situation smart garbage collection bins or Dust bin monitoring system is required. The collection of solid waste is also a need of common people as increased population growth. The workers who have to collect the garbage from different areas are not able to get correct information when would be the bins are filled. Sometimes it gets overflowed due to improper information, so they used to fix some timing for collecting the wastage or garbage. To overcome such kind of situations efficient garbage monitoring and cleanliness tracker system need to develop to make an effort to manage the waste and each has its advantages and disadvantages. This paper gives a brief literature review and observes previous research on different topics which includes different efficient techniques that can be used to manage the waste efficiently.

Keywords: Garbage monitoring, Cleanliness, Tracker system

INTRODUCTION

Over population in world it leads to increase in waste. People's faces major environmental challenges associated with reduced waste collection, transport and disposal. Hence garbage management is becoming a major problem. Compared to village more wastes are generated in cities and due to this the environment gets polluted and public health is also affected. All the above problems are solved can be solved by implementing the smart garbage collector dust bins and cleanliness tracker system. If in the public places the wastage are there then the corporation workers will get the alert to clean the particular area. So it will be helpful for them to identify whether the dustbins are fully filled or not. With the help of garbage monitoring and tracker system workers can collect the garbage time to time to make the environment healthy. Old system need more man power for waste management; by this system we can reduce the man power with the help of tracking system is interfaced with IOT.

REVIEW OF LITERATURE

In the view of last Ten years (2010-2020) research studies conducted so far on Smart Garbage Monitoring and Cleanliness tracker System.

SR. NO.	AUTHOR	YEAR	TITLE	AREA/COUNTRY	OBJECTIVE	FINDINGS
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1	Mihai T. Lazarescu	2013	Design of a WSN Platform for Long-Term Environmental Monitoring for IoT Applications		This paper presents the functional design and implementation of a complete WSN platform that can be used for a range of long-term environmental monitoring IoT applications.	The researcher addresses all phases of the practical development from scratch of a full custom WSN platform and they guided the specification, optimization and development of WSN platforms for other IoT application domains.
2	Insung Hong, Sunghoi Park	2014	IoT-Based Smart Garbage System for Efficient Food Waste Management	Korea	In this paper, an IoT-based smart garbage system (SGS) is proposed to reduce the amount of food waste. In an SGS, battery-based smart garbage bins (SGBs) exchange information with each other using wireless mesh networks, and a router and server collect and analyze the information for service provisioning.	The researcher implemented the system in Gangnam district for a one-year period as a pilot project and verified the results. The researcher found the adaptive user-oriented charge policy resulted in a reduction of food waste of about 33%, and it is expected that the system will thereby improve the efficiency of food waste management.
3	Dr. N. Sathish Kumar	2016	IOT Based Smart Garbage alert system using Arduino UNO	India	The main theme of work is to develop a smart intelligent garbage alert system for a proper garbage management. The paper also focused on the use of the ultrasonic sensor which is interfaced with arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the	The researcher has developed an embedded based intelligent alert system. This devised for the proper monitoring and maintenance of the garbage also gives the prevents the irregular cleaning of the dustbins by sending alerts to the concerned individual at regular intervals.

					municipal web server once if garbage is filled	
4	Arko Djajadi	2016	Ambient Environmental Quality Monitoring Using IoT Sensor Network	Indonesia	This paper is focused on a small step toward this global issue to help acquiring factual ambient environmental parameters. They provide the solution is in the form of an Internet of Things (IoT) module that can be easily organized in the desired geographical area	The researcher found that the module works well for both indoor and outdoor environment. Coverage area of sensors might be reason why sensors have bigger standard deviation. Temperature and humidity sensor and alcohol sensor give stable result both indoor and outdoor and the result is stable based on its standard deviation and systematic error
5	Vincenzo Catania, Daniela Ventura	2016	An Approach for Monitoring and Smart Planning of Urban Solid Waste Management Using Smart-M3 Platform	Italy	The use of Biometric cryptosystem scheme namely fuzzy vault and fuzzy commitment is used to defend the pattern which is extracted from the Multimodal biometrics and Two-Tier Security	The result shows that a mechanism for collecting “green points” was introduced for encouraging citizens to recycle.
6	Mokshada V. Patil	2017	A Review on Internet of Things Based Garbage Bins Detection Systems	India	The main goal of this paper is to work on environmental issues due to improper waste disposal and solve them for better health and hygiene of the people.	The results of the study integrates different sensing and communication technologies to monitor real time bin information that can enrich the efficiency of solid waste collection and ensure the timely removal of waste resulting in green and pleasant environment using IoT.

7	Somu Satyamani kanta and M.Narayanan	2017	Smart Garbage Monitoring System Using Sensors With Rfid Over Internet Of Things	India	This paper proposing new garbage collecting way to dispose the waste by using the latest technology like some sensors are connecting a some sensors to the bin	The researcher concludes that by using smart garbage monitoring system using RFID over IOT's they can easily dispose the waste present in the garbage bins as early as possible without it affecting to the people and keep the surroundings clean.
8	Pallavi Chaudhari	2017	Comparative analysis of Garbage Management and Tracking System using IOT	India	The paper comparing three proposed garbage systems which are IOT Based Intelligent Bin for smart cities, Smart Garbage Collection Bin Overflows Indicator using Internet of Things, IOT based smart garbage alert system using arduino UNO	The researcher found that each bin should assigned with a unique id and consist of some amount of garbage. The hardware which is the electronic device (ie.Node MCU) is already connected to the dustbin, later each time the garbage is added to the bins the sensors identify the level and if the bin is 80% full, the unique id of the bin is transmitted to the controller.
9	Nirde and Muley,	2017	IoT Based Solid Waste Management System for Smart City,	India	Researcher focused on to enhance the practicality of IOT based Wireless Smart Wastage Management system	Researcher develops the practicality of internet of things based solid waste management and collection system for smart city.
10	Trushali Vasagade,	2017	Dynamic Solid Waste Collection and Management System Based On Sensors, Elevator and GSM	India	The study describes the concept to implement and provides optimum solution for the major issue of managing solid waste properly in terms of collecting it and cleaning waste thrown	The result analysis of system proposed can be given in two forms: A. Accuracy of system in terms of cleaning garbage present outside the system B. Real time alert message sending based on sensor data.

					outside the dustbin.	
11	Sharaaf N. A. Hijaz A	2017	Easy Clean – A Smart Solution for Garbage Finding and Collecting	Shri Lanka	This paper focused on the use of various sensors such as load cell sensors, ultrasonic sensors and Global Positioning System (GPS) module to track location and status of bins, GSM/GPRS shield for data transmission and arduino MEGA 2560 to interface the hardware units	Author provides the comprehensive solutions to the people that the system could read and transmit current status of the bin to the server. And also send required information of solid waste management using a centralized system. They are Developing the mobile applications to assisted driver with the collection.
12	T.G.Dhaarani, G.Ramya Shree	2018	Automated self-navigating smart dustbin using IOT	India	The paper is highlighted; the level, rain and gas sensors are used to detect the respective parameters and garbage level is monitored by using IoT system and take necessary steps. Also focused on automatically opens the lid when it detects the people who want to throw out their trash.	The researcher has developed an efficient waste management system and IOT based technology is used to provide better garbage disposal methods in urban areas. They used sensors to indicate the level of garbage in the bin.
13	Dr. P. Premkura m, P. Jeeva	2018	Smart Garbage System Using Internet of Things	India	The paper focused on the use of ultrasonic sensor and infrared sensor for automatic open closing of lid also with level detection, which became a hygienic and healthier way to use trash.	The results summarized the adaptive user-oriented charge policy is used to motivate residents to reduce their waste, and Web-based services are provided to achieve more efficiency in the disposal and collection processes.

14	Dr. Jittendranath Mungara, Shobha	2018	Survey on Smart Garbage Monitoring System Using Internet of Things (IOT)	India	The paper throws light on survey on few of the techniques and methodologies to improve the garbage monitoring system using wireless sensors.	They found that multi-layer waste management system architecture for design of a RFID; Using WIWSBIS, waste management service providers have a chance to track a waste identity, weight, missing/stolen bins quickly and accurately without human intervention.
15	Abdullah Alfarrarjeh	2018	Image Classification to Determine the Level of Street Cleanliness: A Case Study	USA	This paper propose a geo-spatial classification approach to enhance the classification accuracy, also presents a case study of street cleanliness classification using a large real-world geo-tagged image dataset obtained from Los Angeles Sanitation Department (LASAN).	The results found that due to the visual differences in street scenes across geographical regions, researcher proposed a classification scheme with multiple local trained models utilizing the geospatial characteristics associated with the images. The best variant of their approach achieved an F1 score of 0.9
16	S.Loganayagi, C.Jeyabharathi	2019	Development of an IOT System for Efficient Classification and Management of Solid Waste in Indian Cities- A Research	India	The researcher has made detailed survey on solid management system based on Internet of Things is proposed which permits the municipal corporations to supervise the dustbin status over web server remotely and maintain the cities clean by optimizing	The researcher develops the internet of things practicality based on the management and collection of solid waste for smart city. He also designed automatic sensing system i using load cell and ultrasonic sensor to provide an automatic and efficient status of dustbin monitoring system

					time and cost needed for it	
17	M.Vishnu Monishan	2019	Implementation of Novel Optimal Scheduling and Routing Algorithm on IoT-Based Garbage Disposal System	India	The researcher proposes a novel IoT-based system for garbage collection and disposal which integrates house hold bins (HHB) and mobile garbage collector (MGC) which have mobility for automatic garbage collection and disposal	The result indicates the integration of HHB's and MGC's for automating the collection and disposal of house-hold wastes. The author was experimentally evaluated the novel algorithm on trial-run under test-bed environment.
18	Swarna M, K J Anoop	2019	Iot Based Garbage Box Monitoring System	India	This paper focuses on a comprehensive and detailed investigation of waste management models execution of smart procedure as a key enabling technology in contemporary trash management system.	Researcher concluded that the system is so much helpful for monitoring the bins effectively without Over flowing onto the streets
19	Sonali Joshi	2019	Smart Dustbin using GPS Tracking	India	This paper throws light on developed three subsystems: smart waste bin and real-time monitoring system that are interconnected to perform as an efficient waste management system that yields to a green and healthy living environment.	Study indicates that the hardware detects the level of garbage and the application sends the notification of garbage retrieval, it saves effort of garbage collectors by saving their time and cost of fuel of the vehicle.
20	B.Rajapandian,	2019	Smart Dustbin	India	The paper focused on to find a solution	The analysis of results is the usage of

	K.Madhan amohan				by using a Smart Dustbin which is GSM and GPS enabled. They used an 'Ultrasonic Sensor' and a 'Gas sensor' to prevent overflow of dustbin as well as sense of bad odour and ensures timely disposal of the unhygienic contents of the Dustbin	advanced Controller in the form of arduino along with GSM and GPS enabled system enhances the effectiveness of the overall solid waste segregation, collection and disposal system.
21	R. Sureshku mar, S.U.Prabh a,	2019	Smart Garbage Management System Using Gps and Gsm	India	The paper is used to detect the level of bins automatically and the send data to the cloud and display it using user interface. Ultrasonic sensor is gives data based on the bins level in the garbage. arduino is used to process the data from it and the NODE MCU is used to send the data to the cloud by interfacing arduino with NODE MCU	The result identifies automation and embedded system to waste collection and provides a practical solution to help waste management system.

Objectives

The paper primarily aims to present the study of existing cleanliness techniques and improvements in garbage collection to make it more efficient and effective by providing the real time status of the garbage bins.

1. To get the real time data of the garbage bin and sending the status to centralize system.
2. To improve the efficiency of the existing garbage collection system.
3. To achieve the benefits of the timely cleaning of garbage bins and saving of the fuel of garbage collection vehicle.

Conclusion

Authors has studied the number of literatures / Research reviews currently carried out by stated references to get an idea about the research done in various areas of smart garbage monitoring and cleanliness tracker system. The objective of this study was to improve the efficiency of garbage collection system by providing them real time information of the status of garbage collection bins which enables them to take action on the garbage bins located in specific area. In this way time can be managed and solid waste can be monitored effectively hence it is helpful for monitoring the bins effectively without over flowing into the specific areas.

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Role of Information Technology in the performance evaluation of NGOs – A literature review

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Abstract

Over the past few years, the accountability and performance evaluation of non-profit non-government originations (NGOs) has become significant not because of its importance, but also due to its challenges in defining, measuring and implementation. The development of technology is recognized to be the significant driving factor in facilitating performance measurement and evaluation. There is substantial increase in use of technology and information & communication tools (ICT) in the NGO management. Primarily, the current existing research takes into consideration the appropriation of information technology in facilitating the working of NGOs and focuses more on overcoming the challenges in effectively using information technology. Whereas very minimal research is ascertained to exist in exploring the potential of information technology is creating a platform or framework where NGOs goals & outcomes can be defined, measured & evaluated, and comparative study of NGOs can be made. The researcher strives to explore the role of information technology in NGO management and performance evaluation. The paper brings into light the use of information technology for allowing NGOs to define the performance parameters and then measuring these performance parameters that can be further used for quality purposes.

Keywords: NGOs, Accountability of NGOs, Performance of NGOs, ICT, NGO Collaboration

1. INTRODUCTION

This section of the study will broadly include the background of the research, thus discussing the role of information technology in NGO management and focus on models that help defining, measuring and evaluating the performance of NGOs. The study will review: the models currently available that allow defining & measuring the accountability & performance of NGOs in terms of certain measurable parameters, current role of information technology in NGOs, and how information technology can help in defining and quantifying these performance parameters. This section will further highlight the purpose and rationale behind doing this review.

Over the past years, the development and advent of technology, has led to transition of working of almost every organization and NGOs aren't an exception. Technological development has led to exponential increase in the use of information technology and ICT tools in day to day working, internal & external communication, planning and monitoring activities of the NGOs. Use of public forums, blogs, web portals and extensive use of social media for marketing & promotions have now become crucial factor for fund generation to all the NGOs. The use of information technology is not just limited to the above and extends over planning, monitoring and managing the different aspects of NGOs and creating organizational knowledge for them. Moreover, NGOs are not spared from the

issue of accountability for performance. There is a no rigor in the expectations laid down and measures of performance applied to NGOs. They thereby need to define measure and closely monitor the outcomes and performance parameters, to build the internal capability to monitor and evaluate their mission-related performance. It is also important to learn from such strategic assessment in order to produce better results in the future. Though all NGOs may differ in their vision and mission, target different sections of society as well as target different societal problems, but ultimately, they all share the same objective of serving the society with a non-advantage status. Genuine partnerships between NGOs, which emphasize participation, sharing, learning, transparency and reciprocity, may permit the problems that accompany organizational growth, functional specialization, and donor funding to be managed.

2. LITERATURE REVIEW

The concept of accountability in the non-profit organizations is significant in both research as well as practise, not just because of its importance but because of the challenges in defining, measuring and implementation. The nature of accountability is not just complex, but also ambiguous and highly context-dependent. It is important to understand to whom non-profit organizations are accountable, what specific mechanism or structures are employed to ensure that non-profits are accountable and how can the goals of accountability be operationalized and measured. The literature review demonstrates that there are many different ways of viewing accountability and many different frameworks that can be used to organize and describe the concept.

According to Michael Edwards and David Hulme, NGOs have multiple accountabilities - 'downwards' to their partners, beneficiaries, staff and supporters; and 'upwards' to their trustees, donors and host governments. He further states that a great part of the dilemma faced by NGOs lies in the nature of the work they do and the messy and complex world in which they do it. Measuring performance in relation to the kind of development subscribed to by most NGOs is an extraordinarily difficult task, particularly in relation to 'empowerment' and other qualitative changes. As Drucker (1990) has pointed out, 'changed human beings' is the ultimate objective of the NGOs. There are few agreed performance standards available to NGOs in this realm, beyond probity and some quantifiable impact indicators in certain types of NGO activity such as service-provision and economic development. Since there aren't many absolute performance measures available in NGO evaluation, and no single bottom line, negotiation among stakeholders proves to be the essence of accountability in this area. All NGOs thereby have multiple accountability.

Kevin P. Kearns, in his first attempt at a non-profit accountability framework, suggested a four-cell matrix, with reactive and proactive internal response systems on one axis and implicit and explicit mandates for external control on the other, to identify the four dimensions of accountability – negotiated, professional/discretionary, compliance and anticipatory/positioning (1994: 188).

Adil Najam sought to broaden understanding of accountability beyond accountability to NGO donors and on mechanistic project evaluations (1996: 340). He suggested a simple framework, with elements that broadly define and virtually cover the full universe of possibilities as far as NGO accountability is concerned (341).

Alnoor Ebrahim suggested some key insights. First, NGOs must prioritize on accountabilities. They cannot be accountable to everyone and everything. Second, Nonprofits are expected to be accountable for multiple purposes: finances, governance, performance, and mission. These expectations require integration and alignment throughout the organization. Third, there are many mechanisms of

accountability available to nonprofits - including, for example, better information disclosure, evaluation and performance assessment, industry codes and standards, participation, and adaptive learning to name just a few. NGO leaders must adapt all such mechanisms to suit their organization.

Chao Guo and Juliet Musso, on the other hand, emphasized on five dimensions: substantive, symbolic, formal, descriptive and participatory for evaluating accountability. They suggested that formal, descriptive, and participatory representation are different means of achieving substantive and symbolic representation; the latter being measures of the extent to which organizations “act for” and “stand for” particular constituencies.

George Candler and Georgette Dumont on the other hand suggested a framework that suggested non-profit accountability involves some ninety different components: accounting for ten different resources to as many as nine different types of stakeholders. He suggested that the factor that can lessen the complexity of the framework lies when the accountability for a number of the ninety cells suggested by this framework would intuitively be nil.

With roles and functions of NGOs evolving significantly over past few years, study shows that there is need to transform the operations and structure of NGOs by improving the efficiency of managerial and delivery of service, as well as governance of NGOs. ICT is regarded as an important tool to reengineer NGOs.

According to Saqib Saeed, Markus Rohde, and Volker Wulf, NGOs are still in the early stage of IT adoption in their organizational configuration. Lack of funding, dynamic organizational structures, and diversity in operations are key factors that make IT support play a crucial role.

Study showed that there is awareness among the organizations to use technology in their activities but the complexity of technologies and lack of technological knowledge are big obstacles . A study made by the Association of Progressive Communication revealed that most of civil society organizations are strong in the areas of internet access and e-mail use and rather weak in areas such as running internet advocacy campaigns and holding online meetings.

Goatman and Lewis in 2007 surveyed 1000 UK charities and found that non-profit institutions are positive about use of websites and are interested in improving use of internet technologies in future. From their study it was evident that currently websites are only used to present information about their activities rather finding new collaborators, fund raising and community interaction.

Kellogg Foundation's ePilanthropy 2001 report describes that technology and internet services are far from being integrated into organizational process of voluntary organizations. TBC Research UK in 2001 found that 62% of voluntary organizations have indicated a poor relationship between their mission and information technology strategy. In 2004 Cogburn empirically evaluated computer mediated communication among civil society representatives at United Nations World Summit on Information Society (WSIS) and its preparation phase meetings. He described that the majority of computer mediated communication took place using email lists while other complex tools such as document repositories, wikis, blogs, and Web conferencing, have not been used effectively. In this context, the appropriation of ICT in the management NGOs seems to be an important research area.

Author of The Communication of Communication, suggested that, the Internet could potentially be “the most powerful democratizing medium in the world” (2004). ICT, like the Internet, allows a quick response to changes and opportunities in the global environment, and enables a stable free flow of

communication between organizations (UNDP, 2001). This can preserve culture identities, while also expanding choices. Additionally, use of ICT can add value to most products and services in the form of branding components like logos and design, knowledge databases, and improved customer service (Stafford, 2001). The ability to identify and solve problems by having a brand attached to shared knowledge can result in positive product recognition (2001). This is enough for many organizations to support knowledge-sharing through use of ICT. It is inexpensive way to stay competitive and gain support. With informed use of ICT, organizations and individuals can also build affiliations with like-minded partners and make better quality decisions (Peizer, 2003).

3. FINDINGS AND DISCUSSION

Essentially the role of this paper was to deepen the understanding of role of information technology in performance evaluation of NGOs. As a basis of review, various roles of ICT and information technology were explored and highlighted. Moreover measures of performance evaluation of NGOs were also perceived. Information technology is observed to be playing crucial role in evaluating the NGOs and bringing in better results for them at strategic, operational and managerial front. The study elucidates that there is need to focus on ICT research, design, and implementation on addressing the most pressing human development issues (O' Donnell, 2003; Melver, 2006). As these organizations are spread over vast geographical locations the difference in background, cultural values, infrastructure availability and needs, work practices play an important role in the acceptance of technology. A generic solution to all scenarios will not be effective and these factors make appropriation of technology more complex. NGOs being highly dynamic in nature, it is worth investigating how information technology can overcome existing limitations and help in establishing organizational knowledge. Study also suggests that there is need for developing effective applications to enhance the internal and external communication among NGOs. The technological support by advanced ICT systems can help NGOs in improving their operations and reach.

In common, with the advent new technologies, Non-profit organizations will find success only by choosing and using the right technology at right time. As they learn more about technology, they will better understand its appropriate application.

It is common for NGOs to have partners and collaborate with others who are not always local to where NGO activities are conducted and/or coordinated from. These partners and collaborators are often located all around the world, which in return requires effective and prompt communication for the best results.

It is intuitive, that technology can improve effectiveness in the communication when long distance collaboration is required. However, currently the presence of ICT in NGO activities is very low. Furthermore, research is showing that most NGOs are not using ICT in their activities and initiatives. Combining ICT technologies with real life problems that are mostly dealt by NGOs can also provide tools to contribute to the solution for helping in emergency situations in a timely manner.

By summarizing and analysing literature on non-profit accountability, there are two distinct types of constituent elements. Firstly, there are the real physical entities that exist in the world. These include: stakeholders, the NGOs itself, and specific mechanisms for accountability such as reports, legal constraints, program evaluations or professional standards. Secondly, there are elements that represent abstractions of phenomena. These are the goals of accountability, the various classifications of stakeholders, and the various organizational groupings. A problem inherent in many of the

frameworks is that they do not distinguish between these two constituent elements, and in most cases, blend them together in descriptions.

In common with the views proposed by Ebrahim and Lee (Christensen & Ebrahim, 2006; Ebrahim, 2003a, 2003b, 2005; Ebrahim & Weisband, 2007; Lee, 2004), it is evident that fundamental meaning of accountability is entirely contingent on the stakeholders, and the particular types of mechanisms through which they expect to 'see' accountability. Therefore, stakeholders must be the starting point for any attempt to design a framework and definition.

The second real constituent element that must be considered as part of any framework is the mechanism of accountability. Mechanisms define specifically how accountability will happen, what process will occur and what will be the visible component of accountability. Many authors have used mechanism based approaches. Ebrahim (2003a) classifies five types of mechanisms: disclosures and report tools; performance assessment and evaluation tools; participation processes; self-regulation processes, and social auditing tools. Koppell's (2005) framework presents a familiar and concise way of describing accountability in terms of the overall purposes of transparency, liability, controllability, responsibility, and responsiveness. In addition to Koppell's framework, we must consider the strategic view of accountability presented by Brown and Moore (2001) which described accountability as a strategic balance between value, support and legitimacy, and operational capacity.

4. CONCLUSION

Conclusively, when used properly, technology can provide NGOs with tools that can help people in real life situations. Moreover, ICT does not just have the potential to provide fast access to information, but it can also render the necessary knowledge by bridging the distance and time differences. The strength of collaboration between NGO and ICT will drive the success of incorporating ICT in NGO's activities and initiatives. The study elucidates that development of framework for monitoring the accountability of NGOs is important and will prove to be crucial in success and sustainability of NGOs. The primary purpose of the review paper was to render in-depth analysis of what role information technology will play in NGOs management including the performance evaluation and accountability. More study needs to be made in exploring the potential of information technology is creating a platform or framework where NGOs goals & outcomes can be defined, measured & evaluated, and comparative study of NGOs can be made.

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A Review of NLP Oriented Automated Test Case Generation Framework in Testing

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Abstract

Natural language processing is a branch of computer science and artificial intelligence which is concerned with interaction between computers and human languages. Software testing is an activity to ensure a certain degree of quality in software systems. There are many tools available in the test automation industries that are being used to automate test cases and workflows. Natural language programming techniques are continuously getting researcher's attention to automate various software development activities like test cases generation. This paper focuses a light on literature review of how Natural Language Processing is used in generation of automated test case from functional requirement documents or from manual test cases. and how it will improve accuracy and the performance of the automation testing. NLP in software testing can also help to reduce the manual efforts and time to write the test script.

Keywords: *Software testing, Natural language Processing (NLP), automated test case.*

1. INTRODUCTION

Software testing is an activity to ensure quality in software systems. It is an important but expensive activity of software development lifecycle. It is used to strengthen the quality of the product before delivering it to the client. However, software testing is costly. More than fifty-two percentage of the entire development cost is accounted for testing. Hence, it is necessary to control the cost of the testing process because of its time-consuming nature.

Testers conduct most of the phases of software testing manually. One of the phases is test-case design in which the human tester uses written (formal) requirements, written often in natural language (NL), to derive a set of test cases [1]. There are many approaches proposed in the different literatures to reduce these manual efforts for conversion of natural-language requirements into automated test cases using NLP.

Natural Language Processing (NLP) is a field of computer science, artificial intelligence, and linguistics. Instead of writing test cases manually, it investigates a practical solution for automatically generating test cases using natural language [1]. In this paper we referred papers based on most of the NLP techniques, approaches and tools which could use in software testing to generate automated test case from software requirements.

The paper is structured as follows. Literature review is presented in section 2. Findings and discussions of this literature review in section 3. Conclusion in section 4.

2. LITERATURE REVIEW

The goal of the study is to present the review of the literature done in the era of NLP in software testing based on Methodologies, Types of NLP approaches, and NLP tools used to generate automated test cases.

[3] Anurag Dwarakanath and Shubhashis Sengupta propose a tool called Litmus. It does the auto-generation of Functional Test Cases from FRDs written in English. It works on each requirement sentence and generates one or more test cases. There are five steps in the model the first step analyses the sentence through parser and identify whether it is testable. In second step a complex testable sentence is split into simple sentences. In third step test intents are generate from each simple sentence and mapped to the aspects on which the requirement has to be tested. In fourth step generate positive test cases. In fifth step it also it generates negative test cases if applicable. Parser used for parsing is Link Grammar Parser (LG). Best highlight of the paper is first there is no restriction on the structure of the sentence is imposed other thing is that it is tested over various actual requirement documents from various industry projects viz Pharma, IT and Telecom. And the author mentioned the tool gives 77% accuracy over Industrial project requirements.

[4]In this research paper author proposed an approach to support automatic derivation of manually executable test cases from use cases. Author evaluated this approach on industrial case studies like the oil/gas and avionics domains. They worked only on restricted NL and Restricted Use Case Modelling (RUCM) and Restricted Test Case Modelling (RTCM) approach. The transformation from RUCM specifications to TCSs (Test Case Specifications) in RTCM and test cases in RTCM using a set of transformations implemented in the tool called a Toucan4Test. Author classified their work in requirements-based testing, keywords-based testing and behaviour-based testing.

[5]Author proposed the approach to reduce the time and effort of manual testing. The model makes an automatization of BDD (Behaviour Driven Development) test case to UML Class and diagrams, UML Sequence diagrams and code skeleton. Class diagrams generate code skeleton and sequence diagram which can be used to generate step definitions in the desired language. Overall approach improves the efficiency of Behaviour Development approach. The model has implemented this approach through case study for candy machine (vending machine) on the tool called Cucumber in Ruby and used Stanford parser to process sentences. The model works on the restricted NL.

[6] SRQAS- Using two major techniques Natural Language Processing and Information Extraction author has developed a system Software Requirement Quality Assurance System (SRQAS) which is able to assure the quality of software requirements based on testability and non-testability metrics by performing syntactic and semantic analysis on requirements.

3. FINDINGS AND DISCUSSION

After rigorous literature review, we found that many of the research is focusing on the different aspect of software testing.

[3] We found there are some limitations of the tool, first it cannot handle requirements that span multiple sentences and use cases. Second is the less accuracy.

[4] The best part of model is that it gives 100% accuracy as every artefact in restricted way. And the limitations are first both use cases and test cases are specified in restricted NLs. Second Applicability of this model is only limited to industrial systems from the avionics and oil/gas domains. Third in this paper they have Restricted Test Case Modeling approach (RTCM) focused on “3-transformation”. The editors for RUCM and RTCM have been implemented in a modelling framework called Lightweight Modeling Framework (LMF [4]), similar to Eclipse Modeling Framework (EMF) except that LMF reduces the tight coupling with Eclipse to ease transformations to other platforms. They

have not mentioned about NLP approach. The author studies this approach using some case studies like Banking System, Crisis Management System (to manage car crash crises), Autopilot system (controls and guide and air craft), Sub Sea control system (used in managing the exploitation in oil and gas production field). Author summarizes some benefits of the toucan4 model is 1. Systematic and automated 2. Precise and easy to understand 3. easy test case maintenance, 4. Separation of concerns (as use case repository and test case repositories). Limmitation od this study is it related to industry projects.

[5] Overall approach improves the efficiency of Behaviour Development approach. The model implemented on the tool called Cucumber in Ruby and used Stanford parser to process sentences. The model works on the restricted NL. Sanford parses sentences in different languages and returns a phrase structure tree (PST) representing the semantic structure of the sentence (grammar) and typed dependencies (semantic correlation between words in the sentence)

[6] SQARS is developed using JAPE (Java Annotation Patterns Engine) grammar rules to extract thematic roles and detect non-testability features of software requirements. The model involves phases like text pre-processing, text chunking, thematic roles extraction, and Non-testability application.

In all the above studied survey we found the NLP can be used in software testing. There are different NLP parsers available. NLP can improve the performance and efficiency of manual and automation testing by various ways, we can use NLP in automation testing to write automated test cases.

4. CONCLUSION

With this survey paper we found that NLP based automated tests can improve the performance of automation testing. Further improvement can be done in this era by improving the accuracy of the system; we can also evaluate the accuracy and the performance of the system by using different NLP Tools.

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A Review of Smart Garbage Monitoring and Solid Waste Management System

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Abstract

In current scenario, the cleanliness of public places as well as private places are very necessary to make the environment healthy by spreading some deadly diseases, to avoid such situation smart garbage collection bins or Dust bin monitoring system is required. The collection of solid waste is also a need of common people as increased population growth. The workers who have to collect the garbage from different areas are not able to get correct information when would be the bins are filled. Sometimes it gets overflowed due to improper information, so they used to fix some timing for collecting the wastage or garbage. To overcome such kind of situations efficient garbage monitoring and cleanliness tracker system need to develop to make an effort to manage the waste and each has its advantages and disadvantages. This paper gives a brief literature review and observes previous research on different topics which includes different efficient techniques that can be used to manage the waste efficiently.

Keywords: Garbage monitoring, Cleanliness, Tracker system

INTRODUCTION

Over population in world it leads to increase in waste. People's faces major environmental challenges associated with reduced waste collection, transport and disposal. Hence garbage management is becoming a major problem. Compared to village more wastes are generated in cities and due to this the environment gets polluted and public health is also affected. All the above problems are solved can be solved by implementing the smart garbage collector dust bins and cleanliness tracker system. If in the public places the wastage are there then the corporation workers will get the alert to clean the particular area. So it will be helpful for them to identify whether the dustbins are fully filled or not. With the help of garbage monitoring and tracker system workers can collect the garbage time to time to make the environment healthy. Old system need more man power for waste management; by this system we can reduce the man power with the help of tracking system is interfaced with IOT.

REVIEW OF LITERATURE

In the view of last Ten years (2010-2020) research studies conducted so far on Smart Garbage Monitoring and Cleanliness tracker System.

SR. NO.	AUTHOR	YEAR	TITLE	AREA/COUNTRY	OBJECTIVE	FINDINGS
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1	Mihai T. Lazarescu	2013	Design of a WSN Platform for Long-Term Environmental Monitoring for IoT Applications		This paper presents the functional design and implementation of a complete WSN platform that can be used for a range of long-term environmental monitoring IoT applications.	The researcher addresses all phases of the practical development from scratch of a full custom WSN platform and they guided the specification, optimization and development of WSN platforms for other IoT application domains.
2	Insung Hong, Sunghoi Park	2014	IoT-Based Smart Garbage System for Efficient Food Waste Management	Korea	In this paper, an IoT-based smart garbage system (SGS) is proposed to reduce the amount of food waste. In an SGS, battery-based smart garbage bins (SGBs) exchange information with each other using wireless mesh networks, and a router and server collect and analyze the information for service provisioning.	The researcher implemented the system in Gangnam district for a one-year period as a pilot project and verified the results. The researcher found the adaptive user-oriented charge policy resulted in a reduction of food waste of about 33%, and it is expected that the system will thereby improve the efficiency of food waste management.
3	Dr. N. Sathish Kumar	2016	IOT Based Smart Garbage alert system using Arduino UNO	India	The main theme of work is to develop a smart intelligent garbage alert system for a proper garbage management. The paper also focused on the use of the ultrasonic sensor which is interfaced with arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the	The researcher has developed an embedded based intelligent alert system. This devised for the proper monitoring and maintenance of the garbage also gives the prevents the irregular cleaning of the dustbins by sending alerts to the concerned individual at regular intervals.

					municipal web server once if garbage is filled	
4	Arko Djajadi	2016	Ambient Environmental Quality Monitoring Using IoT Sensor Network	Indonesia	This paper is focused on a small step toward this global issue to help acquiring factual ambient environmental parameters. They provide the solution is in the form of an Internet of Things (IoT) module that can be easily organized in the desired geographical area	The researcher found that the module works well for both indoor and outdoor environment. Coverage area of sensors might be reason why sensors have bigger standard deviation. Temperature and humidity sensor and alcohol sensor give stable result both indoor and outdoor and the result is stable based on its standard deviation and systematic error
5	Vincenzo Catania, Daniela Ventura	2016	An Approach for Monitoring and Smart Planning of Urban Solid Waste Management Using Smart-M3 Platform	Italy	The use of Biometric cryptosystem scheme namely fuzzy vault and fuzzy commitment is used to defend the pattern which is extracted from the Multimodal biometrics and Two-Tier Security	The result shows that a mechanism for collecting “green points” was introduced for encouraging citizens to recycle.
6	Mokshada V. Patil	2017	A Review on Internet of Things Based Garbage Bins Detection Systems	India	The main goal of this paper is to work on environmental issues due to improper waste disposal and solve them for better health and hygiene of the people.	The results of the study integrates different sensing and communication technologies to monitor real time bin information that can enrich the efficiency of solid waste collection and ensure the timely removal of waste resulting in green and pleasant environment using IoT.

7	Somu Satyamani kanta and M.Narayanan	2017	Smart Garbage Monitoring System Using Sensors With Rfid Over Internet Of Things	India	This paper proposing new garbage collecting way to dispose the waste by using the latest technology like some sensors are connecting a some sensors to the bin	The researcher concludes that by using smart garbage monitoring system using RFID over IOT's they can easily dispose the waste present in the garbage bins as early as possible without it affecting to the people and keep the surroundings clean.
8	Pallavi Chaudhari	2017	Comparative analysis of Garbage Management and Tracking System using IOT	India	The paper comparing three proposed garbage systems which are IOT Based Intelligent Bin for smart cities, Smart Garbage Collection Bin Overflows Indicator using Internet of Things, IOT based smart garbage alert system using arduino UNO	The researcher found that each bin should assigned with a unique id and consist of some amount of garbage. The hardware which is the electronic device (ie.Node MCU) is already connected to the dustbin, later each time the garbage is added to the bins the sensors identify the level and if the bin is 80% full, the unique id of the bin is transmitted to the controller.
9	Nirde and Muley,	2017	IoT Based Solid Waste Management System for Smart City,	India	Researcher focused on to enhance the practicality of IOT based Wireless Smart Wastage Management system	Researcher develops the practicality of internet of things based solid waste management and collection system for smart city.
10	Trushali Vasagade,	2017	Dynamic Solid Waste Collection and Management System Based On Sensors, Elevator and GSM	India	The study describes the concept to implement and provides optimum solution for the major issue of managing solid waste properly in terms of collecting it and cleaning waste thrown	The result analysis of system proposed can be given in two forms: A. Accuracy of system in terms of cleaning garbage present outside the system B. Real time alert message sending based on sensor data.

					outside the dustbin.	
11	Sharaaf N. A. Hijaz A	2017	Easy Clean – A Smart Solution for Garbage Finding and Collecting	Shri Lanka	This paper focused on the use of various sensors such as load cell sensors, ultrasonic sensors and Global Positioning System (GPS) module to track location and status of bins, GSM/GPRS shield for data transmission and arduino MEGA 2560 to interface the hardware units	Author provides the comprehensive solutions to the people that the system could read and transmit current status of the bin to the server. And also send required information of solid waste management using a centralized system. They are Developing the mobile applications to assisted driver with the collection.
12	T.G.Dhaarani, G.Ramya Shree	2018	Automated self-navigating smart dustbin using IOT	India	The paper is highlighted; the level, rain and gas sensors are used to detect the respective parameters and garbage level is monitored by using IoT system and take necessary steps. Also focused on automatically opens the lid when it detects the people who want to throw out their trash.	The researcher has developed an efficient waste management system and IOT based technology is used to provide better garbage disposal methods in urban areas. They used sensors to indicate the level of garbage in the bin.
13	Dr. P. Premkura m, P. Jeeva	2018	Smart Garbage System Using Internet of Things	India	The paper focused on the use of ultrasonic sensor and infrared sensor for automatic open closing of lid also with level detection, which became a hygienic and healthier way to use trash.	The results summarized the adaptive user-oriented charge policy is used to motivate residents to reduce their waste, and Web-based services are provided to achieve more efficiency in the disposal and collection processes.

14	Dr. Jittendranath Mungara, Shobha	2018	Survey on Smart Garbage Monitoring System Using Internet of Things (IOT)	India	The paper throws light on survey on few of the techniques and methodologies to improve the garbage monitoring system using wireless sensors.	They found that multi-layer waste management system architecture for design of a RFID; Using WIWSBIS, waste management service providers have a chance to track a waste identity, weight, missing/stolen bins quickly and accurately without human intervention.
15	Abdullah Alfarrarjeh	2018	Image Classification to Determine the Level of Street Cleanliness: A Case Study	USA	This paper propose a geo-spatial classification approach to enhance the classification accuracy, also presents a case study of street cleanliness classification using a large real-world geo-tagged image dataset obtained from Los Angeles Sanitation Department (LASAN).	The results found that due to the visual differences in street scenes across geographical regions, researcher proposed a classification scheme with multiple local trained models utilizing the geospatial characteristics associated with the images. The best variant of their approach achieved an F1 score of 0.9
16	S.Loganayagi, C.Jeyabharathi	2019	Development of an IOT System for Efficient Classification and Management of Solid Waste in Indian Cities- A Research	India	The researcher has made detailed survey on solid management system based on Internet of Things is proposed which permits the municipal corporations to supervise the dustbin status over web server remotely and maintain the cities clean by optimizing	The researcher develops the internet of things practicality based on the management and collection of solid waste for smart city. He also designed automatic sensing system i using load cell and ultrasonic sensor to provide an automatic and efficient status of dustbin monitoring system

					time and cost needed for it	
17	M.Vishnu Monishan	2019	Implementation of Novel Optimal Scheduling and Routing Algorithm on IoT-Based Garbage Disposal System	India	The researcher proposes a novel IoT-based system for garbage collection and disposal which integrates house hold bins (HHB) and mobile garbage collector (MGC) which have mobility for automatic garbage collection and disposal	The result indicates the integration of HHB's and MGC's for automating the collection and disposal of house-hold wastes. The author was experimentally evaluated the novel algorithm on trial-run under test-bed environment.
18	Swarna M, K J Anoop	2019	Iot Based Garbage Box Monitoring System	India	This paper focuses on a comprehensive and detailed investigation of waste management models execution of smart procedure as a key enabling technology in contemporary trash management system.	Researcher concluded that the system is so much helpful for monitoring the bins effectively without Over flowing onto the streets
19	Sonali Joshi	2019	Smart Dustbin using GPS Tracking	India	This paper throws light on developed three subsystems: smart waste bin and real-time monitoring system that are interconnected to perform as an efficient waste management system that yields to a green and healthy living environment.	Study indicates that the hardware detects the level of garbage and the application sends the notification of garbage retrieval, it saves effort of garbage collectors by saving their time and cost of fuel of the vehicle.
20	B.Rajapandian,	2019	Smart Dustbin	India	The paper focused on to find a solution	The analysis of results is the usage of

	K.Madhan amohan				by using a Smart Dustbin which is GSM and GPS enabled. They used an 'Ultrasonic Sensor' and a 'Gas sensor' to prevent overflow of dustbin as well as sense of bad odour and ensures timely disposal of the unhygienic contents of the Dustbin	advanced Controller in the form of arduino along with GSM and GPS enabled system enhances the effectiveness of the overall solid waste segregation, collection and disposal system.
21	R. Sureshku mar, S.U.Prabh a,	2019	Smart Garbage Management System Using Gps and Gsm	India	The paper is used to detect the level of bins automatically and the send data to the cloud and display it using user interface. Ultrasonic sensor is gives data based on the bins level in the garbage. arduino is used to process the data from it and the NODE MCU is used to send the data to the cloud by interfacing arduino with NODE MCU	The result identifies automation and embedded system to waste collection and provides a practical solution to help waste management system.

Objectives

The paper primarily aims to present the study of existing cleanliness techniques and improvements in garbage collection to make it more efficient and effective by providing the real time status of the garbage bins.

1. To get the real time data of the garbage bin and sending the status to centralize system.
2. To improve the efficiency of the existing garbage collection system.
3. To achieve the benefits of the timely cleaning of garbage bins and saving of the fuel of garbage collection vehicle.

Conclusion

Authors has studied the number of literatures / Research reviews currently carried out by stated references to get an idea about the research done in various areas of smart garbage monitoring and cleanliness tracker system. The objective of this study was to improve the efficiency of garbage collection system by providing them real time information of the status of garbage collection bins which enables them to take action on the garbage bins located in specific area. In this way time can be managed and solid waste can be monitored effectively hence it is helpful for monitoring the bins effectively without over flowing into the specific areas.

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Artificial Intelligence and its Application: Review

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Abstract

In the future, intelligent machines will replace or enhance human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. Artificial Intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Study in the area of artificial intelligence has given rise to the rapidly growing technology known as expert system, Natural language processing, Neural Networks, Robotics, Fuzzy logic systems.

Application areas of Artificial Intelligence is having a great impact on various fields of life as expert system is widely used these days to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting. the application areas of this technology.

Keywords: Artificial Intelligence, Neural Networks (computer).

I INTRODUCTION

Artificial intelligence is playing an increasing role in the research of management science and operational research areas. Intelligence is considered as the ability to collect knowledge and reason about knowledge to solve complex problems. In the near Future intelligent machines will replace human capabilities in many areas. Artificial intelligence is the study and developments of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects.

Artificial intelligence is different from psychology because it emphasis on computation and is different from computer science because of its emphasis on perception, reasoning and action. It makes machines smarter and more useful. It works with the help of artificial neurons (artificial neural network) and scientific theorems.

Major Artificial Intelligence areas are Expert Systems, Natural Language Processing, Speech Understanding, Robotics and Sensory Systems, Computer Vision and Scene Recognition, Intelligent Computer Aided Instruction, Neural Computing. From these Expert System is a rapidly growing technology which is having a huge impact on various fields of life.

II. AREAS OF ARTIFICIAL INTELLIGENCE

- A. Expert Systems:** The expert system can resolve many issues which generally would require a human expert. It is based on knowledge acquired from an expert. It is also capable of expressing and reasoning about some domain of knowledge. Expert systems were the predecessor of the current day artificial intelligence, deep learning and machine learning systems.

Examples – Flight-tracking systems,
Clinical systems.

B. Natural Language Processing:

Natural Language Processing (NLP) refers to AI method of communicating with intelligent systems using a natural language such as English.

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

The field of NLP involves making computers to perform useful tasks with the natural languages humans use. The input and output of an NLP system can be –Speech, Written Text.

Examples: Google Now feature, speech recognition, Automatic voice output.

C. Neural Networks

Artificial neural networks (ANNs) are statistical models directly inspired by, and partially modeled on biological neural networks. They are capable of modeling and processing nonlinear relationships between inputs and outputs in parallel. The related algorithms are part of the broader field of machine learning, and can be used in many applications

Examples – Pattern recognition systems such as face recognition, character recognition, handwriting recognition.

D. Robotics

Robotics is a branch of AI, which is composed of Electrical Engineering, Mechanical Engineering, and Computer Science for designing, construction, and application of robots. They operate in real physical world, Inputs to robots is analog signal in the form of speech waveform or images. They need special hardware with sensors and effectors.

Examples – Industrial robots for moving, spraying, painting, precision checking, drilling, cleaning, coating, carving, etc.

E. Fuzzy Logic Systems

Fuzzy Logic (FL) is a method of reasoning that resembles human reasoning. The approach of FL imitates the way of decision making in humans that involves all intermediate possibilities between digital values YES and NO.

Examples–Consumer electronics, automobiles, etc.

III Artificial Intelligence Applications

Artificial Intelligence system (AIS) and its semantic neural networks centric and expert systems have browed the applications in all aspects of human exhibited activities of actions. AI has been used to widen the technological advancement of various fields such as machine industries, finance sector, healthcare center, education sector, transportation/Navigation, Weather conjecture and more.

- **In Finance:** Stock analysis algorithmic, stock exchanging information , Market examination and information mining, Personal finance portfolio, Portfolio administration today are, vast extent subject matter to AI.
- **In Heavy machinery industries:** Robots has turned out to be common in many industries and they are frequently given assigned task or those jobs in which humans' perfection is constrain. Many robots have demonstrated successful in employments that are exceptionally redundant in doing those works which may slip by humans due to a lapse in concentration.

- **Hospitals (Facilities) and pharmaceutical:** Artificial neural networks are often used in hospital for critical, clinical emergency decision support systems for medical diagnosis, especially in EMR software. Artificial neural networks schema are even used today for clinical decision support on critical medical diagnosis inbounds diseases. Watson project is another use of AI in this field, a Q/A program that suggest for doctors of cancer patients. In bionic field for artificial arms, legs etc. Today in health sectors 92 Artificial Intelligence start-ups portended machine are used.
- **Transportation:** Most of the automobiles industry are producing and aiming for programmed gearboxes in vehicles. The present automobiles industries now have AI-based driver help highlights, for example, self-stopping and propelled journey controls, self-parking and advanced cruise controls in advance vehicles.
- **Weather Forecasting:** Neural systems of AI are used these days for foreseeing climate conditions. Past information is given to the neural system, which at that point examinations the information for designs and predicts the future climate conditions.
- **Information Mining (Data) or Knowledge Extraction:** Data mining is a fast-growing area. This procedure comprises fundamentally of steps that are performed before completing Data Mining, for example, data choice, data cleaning, pre-handling of data, and data transformation. Data Mining uses computer programmed algorithms to discover hidden patterns and unsuspected relationships among rudiments in a large data set.
- **Accounting Databases:** The use of artificial intelligence is investigated as the basis to mitigate the problems of accounting databases. The following are some difficulties with existing accounting database systems. The needs of decision makers are not met by accounting information. Humans do not understand or cannot process the computerized accounting databases. Systems are not easy to use. There is focus on the numeric data. Integrating intelligent systems with accounting databases can assist (either with the decision maker or independent of decision maker) in the investigation of large volumes of data with or without direct participation of the decision maker. Thus, the systems can analyse the data and assist the users understanding or interpreting transactions to determine what accounting events are captured by the system [5].With the artificial intelligence we store and retrieve knowledge in natural language. There are some artificial intelligence tools or techniques that help in the broader understanding of events captured by the accounting system. There is more emphasis on symbolic or text data rather than just numeric data to capture context. The artificial intelligence and expert system builds intelligence into the database to assist users. Without users direct participation such models help the users by sorting through large quantities of data. Such models also assist the decision makers under time constraints; suggest alternatives in the searching and evaluation of data.
- **Computer Games:** Playing games is one of the most popular uses for computer technology. In the evolution of computer games, they have grown from modest text based to the three dimensional graphical games with complex and large worlds. The systems as graphics rendering, playing audio, user input and game artificial intelligence (AI) when put together provide the expected entertainment and make a worthwhile computer game. Artificial intelligence is the most important part of every computer game and playing the game without artificial intelligence would not be any fun!. If we remove artificial intelligence from computer games, the games will be so simple that nobody will be interested in playing the computer games anymore!. Without the game AI, the winning would not be difficult at all. Artificial intelligence is used to solve common problems in the computer games and provide the features to the games. Specifically, non-playing character (NPC) path finding, decision

making and learning are examined. There are several ways that AI contributes to modern computer games. Most notably are unit movement, simulated perception, situation analysis, spatial reasoning, learning, group coordination, resource allocation, steering, flocking, target selection, and so many more. Even context dependent animation and audio use AI

IV CONCLUSIONS

The field of Artificial intelligence (AI) enables the machine with the rational ability to sense analytically of thinking process, using concepts, systematic logic and reasoning. In the last 2 decades remarkable contributions in these fields are made by humans and machine together for paving new door for technologies.

Artificial Intelligence will continue to play, progressively more important role in the various fields of science and technologies. This paper signifies the present role of concept and existences of Artificial Intelligence and its techniques used in various applications. But when it comes to the question of Artificial Intelligence creating machines, which are more intelligent than human beings, no one seems to have the answer. It is still in embryonic stage and its future depends only on the current bottomless subjects' research of AI technologies, if the researchers solve the mystery of human brain and its neuron in more specific order. Then AI may have human brain features, like learning from experience, cognition and perception. Whether human being consciousness will be integrated in these machines is a still subject of matter, which is totally not known.

We conclude that further research in this area can be done as there are very promising and profitable results that are obtainable from such techniques. While scientists have not yet realized the full potential and ability of artificial intelligence. This technology and its applications will likely have far-reaching effects on human life in the years to come.

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Mediating Role of Career Satisfaction on Relationship between Role Conflict and Work Life Balance

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Abstract

In today's social environment individuals have to play multiple roles in their personal and professional lives. Constant demands coming from various role senders may lead to experience of role conflict for working individuals, giving way to feeling of work life imbalance. The current study focuses on impact of role conflict on work life balance of working individuals and the role of career satisfaction in mitigating this impact. Career satisfaction was expected to mediate on a relationship between role conflict and work life balance. Hierarchical regression analysis was used to test this mediation. The results of this study show strong correlation among role conflict (RC), work life balance (WLB) and career satisfaction (CS). CS was found to completely mediate between RS and WLB. The results focus on the importance of career satisfaction for working individuals. Even though, it is not within the control of organizations (employer) to reduce number of roles individuals have to play and also reduce role demands, organizations can take measures to increase the career satisfaction of individuals. This will certainly help individuals to maintain healthy work life balance.

Key Words: *Career Satisfaction, Role Conflict, Work Life Balance*

Introduction

Role conflict takes place when there are various psychological demands placed upon individuals from personal and professional life role senders. Wherein, they are supposed to make choices and have to opt one at the cost of other. Due to which compliance with both personal and professional life becomes difficult.

Individual feels trapped in a conflict when he tries to run in various directions to respond and satisfy the needs of these both statuses/ roles. This abstract phenomenon is usually connected to situational experiences of life. Satisfying all the obligations/demands simultaneously hampers personal growth, self-motivation, and development. This is because complying with needs of dual role requires high level of mental stability, patience and understanding capacity.

When individuals can satisfy multiple demands coming from various life roles, they experience work-life balance.

Work life balance levels can change as per specific and situational events that take place as people live in a dynamic environment. Individuals have to keep juggling as per the respective needs of roles and adjust themselves accordingly over the period of employment.

It is difficult to numerically specify how much time a particular person should allocate to his work or personal life roles. This is because work life balance is a personal perception and every individual has to; on his own determined how much of his time has to be given to various activities. What is more important is individuals should perceive that their professional and personal lives are balanced and they are happy with it.

Work life balance is important factor for individual as individuals can stick to work commitment when they have healthy personal life and are fully involved in family life when they have healthy professional life. With healthy work life balance individual can play both personal and professional roles satisfactorily.

Career satisfaction is individual's overall satisfaction with his/her current career. It relates to level of happiness one feels in their chosen occupation and with the work they perform as part of the responsibilities of that occupation. The concept of career can be understood as "positive psychological and work-related outcomes accumulated as a result of one's work experiences" (Sieber and Kraimer, 2001).

From the traditional lookout concept of career satisfaction was confined up to only the top professionals and well established personnel. However, contemporary world starts measuring career satisfaction right from the initial stage irrespective of the level of the organizational hierarchy to which a particular individual belongs and it is a long time measurement sequence right up to an individual's retirement (Hall, 2002). Career satisfaction measures the degree to which individuals believe their career development is in harmony with their own personal goals, principals and choices. (Seibert and Kraimer, 2001, Heslin, 2003, Erdogan et al., 2004).

Career satisfaction is an important concept that captures an individual's opinion of their satisfaction with their overall career goals, goals for monetary achievements, goals for advancement and goals for the development of new skills (Greenhaus, Parasuraman and Wormley, 1990).

Therefore, this study was conducted to understand the impact of role conflict on work life balance of working individuals and explore the role of career satisfaction in mitigating this impact.

Literature Review & Hypothesis

An Individual's personal and organization life is equally important to his/her overall satisfaction. Due to role conflict, the individuals lack a sense of taking rational decision and fail to maintain a healthy work life balance. It gives rise to the feeling of dissatisfaction and conflict among personal and professional life.

Therefore we propose that,

H 1- If role conflict is high, work life balance will be low.

Role conflict also causes mental and emotional strain for individuals. It makes it difficult for them to cope up with daily life demands. Further it gives rise to negative emotions such as low content in job, less

dedication and determination. As a result person starts losing interest in everything, giving rise to the feeling of dissatisfaction (Fisher and Gittelsohn, 1983 ; Jackson and Schuler, 1985).

Therefore we propose that,

H2 - If role conflict is high, career satisfaction will be low.

When individuals are satisfied with their career they become less susceptible to the negatives of life like financial instability, low self-confidence, being introvert, not accepting changes, illness etc. They become open to accepting more opportunities and increase their development, allow setting priorities and giving proper time to work and personal requirements.

Therefore it is proposed that,

H3 – If career satisfaction is high, work life balance will be high.

Career satisfaction plays a vital role in maintaining work life balanced by reducing the conflict of roles. When individuals are satisfied with their careers; there is a sense of being successful within them which makes them be high on achievement. Through this feeling of success and achievement they are able to give reasons to their decisions and meaning to his life. Career satisfaction assures mental, financial and psychological stability and thus individuals are able to maintain a proper balance between work and personal life.

Therefore it is proposed that,

H4 – Career satisfaction will mediate between role conflicts and work life balance such that if career satisfaction is high negative impact of role conflict on work life balance will reduce.

Research Model

The proposed research model is presented in Figure 1.

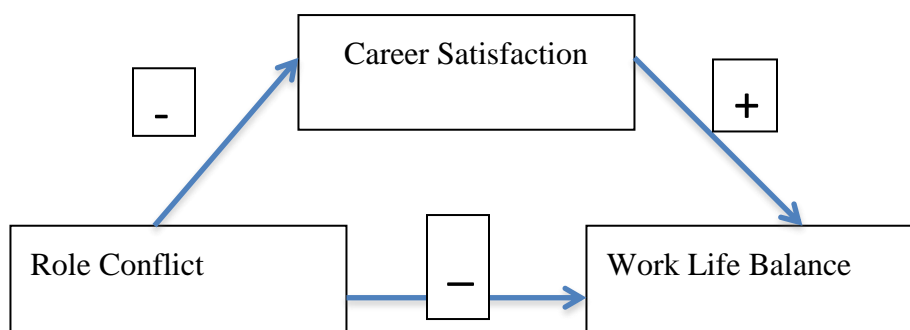


Figure -1: Research Model

Methods

Sample –Survey method was adopted to study the impact of role conflict and career satisfaction on work life balance of employees. Data was collected through a survey of 116 individuals working in IT, Banking and Healthcare sectors in Pune city of Maharashtra state. Respondents were contacted personally and

were explained the purpose of the questionnaire and assured confidentiality of responses. Of the 200 questionnaires that were distributed, 116 usable responses were received by the data analysis deadline.

The sample has 59% male and 41% female respondents with an average age of 32 years. Approximately 47 % of the respondents were married, while 58% are staying in joint family system. Average work experience was around 7 years.

Measures

Role Conflict: Role Conflict will be measured using items from the scale developed by House, Schuler & Levanoni (1983). There will 11 items in role conflict sub-scale. Each item will be rated on 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Sample items include s “*My power matches up the assigned responsibilities*”, and “*I do not know what I am expected to do*”.

Work Life Balance: Work - life balance will be measured with a 15-item scale adapted from an instrument reported by Fisher-McAuley et al. (2003). Respondents will be asked to indicate the frequency with which they have felt in a particular way during the past three months using a seven-point time-related scale (e.g., 1-not at all, 4-sometimes, and 7-all the time). Sample items include “*neglect personal needs because of work,*” “*My work suffers because of my personal life,*” “*My personal life gives me energy for my job,*” “*I am happy with the amount of time for non-work activities.*”

Career Satisfaction: Career Satisfaction will be measured using the career satisfaction scale of Greenhaus et al. (1990). The participating managers will be instructed to indicate to what extent they agree or disagree with given statements. Sample items include, ‘*I am satisfied with the success I have achieved in my career,*’ ‘*I am satisfied with the progress I have made towards meeting my overall career goals*’ etc. Each of the items will be scored on 5-item scale ranging from ‘strongly disagree’ to ‘strongly agree’.

Analysis and Results

Cronbach’s Alpha – The validity and reliability of the survey instruments used was tested with Cronbach’s Alpha. Past studies recommend using Cronbach’s Alpha to validate the survey instruments (Prosad, Kapoor and Sengupta, 2015; Wood and Zaichkowsky, 2004). Cronbach’s Alpha was tested for all the three variables, role conflict, career satisfaction and work life balance. The results in Table 1 show alpha reliability of role conflict as 0.85, career satisfaction as 0.89 and work life balance as 0.76. The alpha reliabilities of scales used in the study are reported along the diagonal in the table. All scales have acceptable reliabilities.

Table 1- Mean, Std. Deviation and Zero Order Correlations among study variables

Variables	M	SD	RC	CS	WLB
Role Conflict	2.58	.88	0.85		
Career Satisfaction	4.73	.79	-.605**	0.89	
Work Life Balance	3.72	.68	-.472**	.652**	0.76

** $p < .01$

Table 2 – Regression Results

* $p < .05$ ** $p < .01$

Control variables – Age, Education, Gender

	Independent Variable	Dependent Variable	Unstandardized β	t	R²	ΔR^2
H1	Role Conflict	Work Life Balance	-.238	-3.482**	.126	.096**
H2	Role Conflict	Career Satisfaction	-.366	-2.752**	.062	.051**
H3	Career Satisfaction	Work Life Balance	.274	6.591**	.276	.270**
H4	Role Conflict Career Satisfaction	Work Life Balance	-.277 .317	-3.980 4.742**	.275	.127**

Mean, standard deviations and correlations for all variables are reported in Table 1. Strong correlations were found between role conflict (RC), career satisfaction (CS) and work life balance (WLB).

Multiple regression analysis was used to test the hypotheses. Variables like age, education and gender were controlled for and were entered into model 1 to nullify any impact these variables may have in prediction of dependent variable. The results in Table 2 (Controlling for age, education and gender) show complete support for H1 to H3 and also for H4.

While testing the mediation of CS on the relationship between RC and WLB, we regressed RC on WLB and added CS to the regression equation. When CS was added, the relationship between role conflict and work life balance became insignificant in this analysis, indicating complete mediation.

Discussion

The present study claims that higher level of role conflicts leads to reduced work life balance. These findings are consistent with the findings of previous research which claims that Higher the role conflict, lower will be the work life balance (Carlson and Frone, 2003).

Role conflict is a complex situation a person finds himself in when he is supposed to take responsibility of two major spheres in life like his personal life and professional life. This makes it difficult for him to focus on one and maintain an equitable balance between them. This is because of presence of difference in each role's then requirement, beliefs, and discord in emotional attachment with the individual (kahn et. al., 1964; katz and kahn, 1978).

Further, it was found that role conflict is significantly negatively related with career satisfaction. This can be justified with the outcomes of prior studies which asserts that role conflict makes room for

contradictory demands from the two statuses simultaneously and also causes a downfall in the sense of belongingness towards one's organisation and job satisfaction (Kecton et. al., 2007)

As expected, it was found that career satisfaction have significant positive association with work life balance.

The prime finding of this study is a full mediation by career satisfaction, which suggests that career satisfaction may help working individuals to deal with the role conflict and reduce its negative impact on work life balance .It is because satisfaction with career gives individuals confidence and sense of self determination that can help them to reduce conflict of multiple roles and its negative impact on work life balance.

Recommendations

The recommendations are based on the key finding of this study which highlights the importance of career satisfaction in minimizing negative impact of role conflicts on work life balance of working individuals.

Many middle aged individuals today are part of paid labour force. And as a result are responsible to carry out multiple roles on personal and professional front. This role accumulation comes with multiple role senders; these role senders have various demands from the role holder. As there are limited resources of time, energy and attention available to individuals, they find it difficult to deal with this incompatible role demands and as a result face role conflicts.

It may be out of the scope of organizations to reduce the role demands that employee face in their lives, organizations can take measures to increase career satisfaction of their employees. As this study claims, increased level of career satisfaction helps individuals deal with role conflict and thus reduces its negative impact on work life experience of individuals.

Individuals need to 'feel a sense of professional and personal fulfilment in his career'. Career satisfaction refers to the aftermath of an individual's professional status, level of income , how much he is content with his work and professional life, whether his expectations of professional goals have been satisfied, and whether his current position is on track and in sync with the his ultimate self-actualization goal (Seibert and Kraimer,2001)

Organizations should provide opportunities for individuals to achieve their goals related to advancement in career, income, learn new skills and opportunities that give them sense of self fulfillment.

Career satisfaction inculcates a sense of fruition in working people, enhances their performance, reduces resignations and increases a sense of organizational devoir among them.(Brown and Peterson,1993) and therefore puts individuals on the front seat and aids them to maintain a healthy balance between work and professional life.

A healthy work life balance depicts minimal role conflict which further paves way for satisfaction of an individual from his corporate position and due to which he shows better performance at work. Healthy work life balance is of great significance for the overall wellbeing of people.

The study thus depicts the mediating role of career satisfaction in mitigating the negative effect of role stress on the work life balance and as per the findings it can be said that if an individual is satisfied with his career the impact of role conflict on the work balance would not be severe.

Conclusion

With increase in the level of education in India and more women opting for professional education, entering the paid workforce and occupying higher level responsibilities in organizations, the number of individuals engaged in paid work has increased drastically. Today both men and women play multiple roles in their lives on personal as well as professional front. This role accumulation leads to creation of conflicts when individuals try to satisfy demands of various role senders. This conflict further leads to imbalance of work and personal life. Career satisfaction gives individual a sense of fulfilment and control over one's life. Therefore, opportunities created by organizations for individuals for career growth will help them achieve not only their career satisfaction but also to reduce role conflict and thereby maintain balance of professional and personal life.

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A Review of Smart Garbage Monitoring and Solid Waste Management System

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Abstract

In current scenario, the cleanliness of public places as well as private places are very necessary to make the environment healthy by spreading some deadly diseases, to avoid such situation smart garbage collection bins or Dust bin monitoring system is required. The collection of solid waste is also a need of common people as increased population growth. The workers who have to collect the garbage from different areas are not able to get correct information when would be the bins are filled. Sometimes it gets overflowed due to improper information, so they used to fix some timing for collecting the wastage or garbage. To overcome such kind of situations efficient garbage monitoring and cleanliness tracker system need to develop to make an effort to manage the waste and each has its advantages and disadvantages. This paper gives a brief literature review and observes previous research on different topics which includes different efficient techniques that can be used to manage the waste efficiently.

Keywords: Garbage monitoring, Cleanliness, Tracker system

INTRODUCTION

Over population in world it leads to increase in waste. People's faces major environmental challenges associated with reduced waste collection, transport and disposal. Hence garbage management is becoming a major problem. Compared to village more wastes are generated in cities and due to this the environment gets polluted and public health is also affected. All the above problems are solved can be solved by implementing the smart garbage collector dust bins and cleanliness tracker system. If in the public places the wastage are there then the corporation workers will get the alert to clean the particular area. So it will be helpful for them to identify whether the dustbins are fully filled or not. With the help of garbage monitoring and tracker system workers can collect the garbage time to time to make the environment healthy. Old system need more man power for waste management; by this system we can reduce the man power with the help of tracking system is interfaced with IOT.

REVIEW OF LITERATURE

In the view of last Ten years (2010-2020) research studies conducted so far on Smart Garbage Monitoring and Cleanliness tracker System.

SR. NO.	AUTHOR	YEAR	TITLE	AREA/COUNTRY	OBJECTIVE	FINDINGS
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1	Mihai T. Lazarescu	2013	Design of a WSN Platform for Long-Term Environmental Monitoring for IoT Applications		This paper presents the functional design and implementation of a complete WSN platform that can be used for a range of long-term environmental monitoring IoT applications.	The researcher addresses all phases of the practical development from scratch of a full custom WSN platform and they guided the specification, optimization and development of WSN platforms for other IoT application domains.
2	Insung Hong, Sunghoi Park	2014	IoT-Based Smart Garbage System for Efficient Food Waste Management	Korea	In this paper, an IoT-based smart garbage system (SGS) is proposed to reduce the amount of food waste. In an SGS, battery-based smart garbage bins (SGBs) exchange information with each other using wireless mesh networks, and a router and server collect and analyze the information for service provisioning.	The researcher implemented the system in Gangnam district for a one-year period as a pilot project and verified the results. The researcher found the adaptive user-oriented charge policy resulted in a reduction of food waste of about 33%, and it is expected that the system will thereby improve the efficiency of food waste management.
3	Dr. N. Sathish Kumar	2016	IOT Based Smart Garbage alert system using Arduino UNO	India	The main theme of work is to develop a smart intelligent garbage alert system for a proper garbage management. The paper also focused on the use of the ultrasonic sensor which is interfaced with arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the	The researcher has developed an embedded based intelligent alert system. This devised for the proper monitoring and maintenance of the garbage also gives the prevents the irregular cleaning of the dustbins by sending alerts to the concerned individual at regular intervals.

					municipal web server once if garbage is filled	
4	Arko Djajadi	2016	Ambient Environmental Quality Monitoring Using IoT Sensor Network	Indonesia	This paper is focused on a small step toward this global issue to help acquiring factual ambient environmental parameters. They provide the solution is in the form of an Internet of Things (IoT) module that can be easily organized in the desired geographical area	The researcher found that the module works well for both indoor and outdoor environment. Coverage area of sensors might be reason why sensors have bigger standard deviation. Temperature and humidity sensor and alcohol sensor give stable result both indoor and outdoor and the result is stable based on its standard deviation and systematic error
5	Vincenzo Catania, Daniela Ventura	2016	An Approach for Monitoring and Smart Planning of Urban Solid Waste Management Using Smart-M3 Platform	Italy	The use of Biometric cryptosystem scheme namely fuzzy vault and fuzzy commitment is used to defend the pattern which is extracted from the Multimodal biometrics and Two-Tier Security	The result shows that a mechanism for collecting “green points” was introduced for encouraging citizens to recycle.
6	Mokshada V. Patil	2017	A Review on Internet of Things Based Garbage Bins Detection Systems	India	The main goal of this paper is to work on environmental issues due to improper waste disposal and solve them for better health and hygiene of the people.	The results of the study integrates different sensing and communication technologies to monitor real time bin information that can enrich the efficiency of solid waste collection and ensure the timely removal of waste resulting in green and pleasant environment using IoT.

7	Somu Satyamani kanta and M.Narayanan	2017	Smart Garbage Monitoring System Using Sensors With Rfid Over Internet Of Things	India	This paper proposing new garbage collecting way to dispose the waste by using the latest technology like some sensors are connecting a some sensors to the bin	The researcher concludes that by using smart garbage monitoring system using RFID over IOT's they can easily dispose the waste present in the garbage bins as early as possible without it affecting to the people and keep the surroundings clean.
8	Pallavi Chaudhari	2017	Comparative analysis of Garbage Management and Tracking System using IOT	India	The paper comparing three proposed garbage systems which are IOT Based Intelligent Bin for smart cities, Smart Garbage Collection Bin Overflows Indicator using Internet of Things, IOT based smart garbage alert system using arduino UNO	The researcher found that each bin should assigned with a unique id and consist of some amount of garbage. The hardware which is the electronic device (ie.Node MCU) is already connected to the dustbin, later each time the garbage is added to the bins the sensors identify the level and if the bin is 80% full, the unique id of the bin is transmitted to the controller.
9	Nirde and Muley,	2017	IoT Based Solid Waste Management System for Smart City,	India	Researcher focused on to enhance the practicality of IOT based Wireless Smart Wastage Management system	Researcher develops the practicality of internet of things based solid waste management and collection system for smart city.
10	Trushali Vasagade,	2017	Dynamic Solid Waste Collection and Management System Based On Sensors, Elevator and GSM	India	The study describes the concept to implement and provides optimum solution for the major issue of managing solid waste properly in terms of collecting it and cleaning waste thrown	The result analysis of system proposed can be given in two forms: A. Accuracy of system in terms of cleaning garbage present outside the system B. Real time alert message sending based on sensor data.

					outside the dustbin.	
11	Sharaaf N. A. Hijaz A	2017	Easy Clean – A Smart Solution for Garbage Finding and Collecting	Shri Lanka	This paper focused on the use of various sensors such as load cell sensors, ultrasonic sensors and Global Positioning System (GPS) module to track location and status of bins, GSM/GPRS shield for data transmission and arduino MEGA 2560 to interface the hardware units	Author provides the comprehensive solutions to the people that the system could read and transmit current status of the bin to the server. And also send required information of solid waste management using a centralized system. They are Developing the mobile applications to assisted driver with the collection.
12	T.G.Dhaarani, G.Ramya Shree	2018	Automated self-navigating smart dustbin using IOT	India	The paper is highlighted; the level, rain and gas sensors are used to detect the respective parameters and garbage level is monitored by using IoT system and take necessary steps. Also focused on automatically opens the lid when it detects the people who want to throw out their trash.	The researcher has developed an efficient waste management system and IOT based technology is used to provide better garbage disposal methods in urban areas. They used sensors to indicate the level of garbage in the bin.
13	Dr. P. Premkura m, P. Jeeva	2018	Smart Garbage System Using Internet of Things	India	The paper focused on the use of ultrasonic sensor and infrared sensor for automatic open closing of lid also with level detection, which became a hygienic and healthier way to use trash.	The results summarized the adaptive user-oriented charge policy is used to motivate residents to reduce their waste, and Web-based services are provided to achieve more efficiency in the disposal and collection processes.

14	Dr. Jittendranath Mungara, Shobha	2018	Survey on Smart Garbage Monitoring System Using Internet of Things (IOT)	India	The paper throws light on survey on few of the techniques and methodologies to improve the garbage monitoring system using wireless sensors.	They found that multi-layer waste management system architecture for design of a RFID; Using WIWSBIS, waste management service providers have a chance to track a waste identity, weight, missing/stolen bins quickly and accurately without human intervention.
15	Abdullah Alfarrarjeh	2018	Image Classification to Determine the Level of Street Cleanliness: A Case Study	USA	This paper propose a geo-spatial classification approach to enhance the classification accuracy, also presents a case study of street cleanliness classification using a large real-world geo-tagged image dataset obtained from Los Angeles Sanitation Department (LASAN).	The results found that due to the visual differences in street scenes across geographical regions, researcher proposed a classification scheme with multiple local trained models utilizing the geospatial characteristics associated with the images. The best variant of their approach achieved an F1 score of 0.9
16	S.Loganayagi, C.Jeyabharathi	2019	Development of an IOT System for Efficient Classification and Management of Solid Waste in Indian Cities- A Research	India	The researcher has made detailed survey on solid management system based on Internet of Things is proposed which permits the municipal corporations to supervise the dustbin status over web server remotely and maintain the cities clean by optimizing	The researcher develops the internet of things practicality based on the management and collection of solid waste for smart city. He also designed automatic sensing system i using load cell and ultrasonic sensor to provide an automatic and efficient status of dustbin monitoring system

					time and cost needed for it	
17	M.Vishnu Monishan	2019	Implementation of Novel Optimal Scheduling and Routing Algorithm on IoT-Based Garbage Disposal System	India	The researcher proposes a novel IoT-based system for garbage collection and disposal which integrates house hold bins (HHB) and mobile garbage collector (MGC) which have mobility for automatic garbage collection and disposal	The result indicates the integration of HHB's and MGC's for automating the collection and disposal of house-hold wastes. The author was experimentally evaluated the novel algorithm on trial-run under test-bed environment.
18	Swarna M, K J Anoop	2019	Iot Based Garbage Box Monitoring System	India	This paper focuses on a comprehensive and detailed investigation of waste management models execution of smart procedure as a key enabling technology in contemporary trash management system.	Researcher concluded that the system is so much helpful for monitoring the bins effectively without Over flowing onto the streets
19	Sonali Joshi	2019	Smart Dustbin using GPS Tracking	India	This paper throws light on developed three subsystems: smart waste bin and real-time monitoring system that are interconnected to perform as an efficient waste management system that yields to a green and healthy living environment.	Study indicates that the hardware detects the level of garbage and the application sends the notification of garbage retrieval, it saves effort of garbage collectors by saving their time and cost of fuel of the vehicle.
20	B.Rajapandian,	2019	Smart Dustbin	India	The paper focused on to find a solution	The analysis of results is the usage of

	K.Madhan amohan				by using a Smart Dustbin which is GSM and GPS enabled. They used an 'Ultrasonic Sensor' and a 'Gas sensor' to prevent overflow of dustbin as well as sense of bad odour and ensures timely disposal of the unhygienic contents of the Dustbin	advanced Controller in the form of arduino along with GSM and GPS enabled system enhances the effectiveness of the overall solid waste segregation, collection and disposal system.
21	R. Sureshku mar, S.U.Prabh a,	2019	Smart Garbage Management System Using Gps and Gsm	India	The paper is used to detect the level of bins automatically and the send data to the cloud and display it using user interface. Ultrasonic sensor is gives data based on the bins level in the garbage. arduino is used to process the data from it and the NODE MCU is used to send the data to the cloud by interfacing arduino with NODE MCU	The result identifies automation and embedded system to waste collection and provides a practical solution to help waste management system.

Objectives

The paper primarily aims to present the study of existing cleanliness techniques and improvements in garbage collection to make it more efficient and effective by providing the real time status of the garbage bins.

1. To get the real time data of the garbage bin and sending the status to centralize system.
2. To improve the efficiency of the existing garbage collection system.
3. To achieve the benefits of the timely cleaning of garbage bins and saving of the fuel of garbage collection vehicle.

Conclusion

Authors has studied the number of literatures / Research reviews currently carried out by stated references to get an idea about the research done in various areas of smart garbage monitoring and cleanliness tracker system. The objective of this study was to improve the efficiency of garbage collection system by providing them real time information of the status of garbage collection bins which enables them to take action on the garbage bins located in specific area. In this way time can be managed and solid waste can be monitored effectively hence it is helpful for monitoring the bins effectively without over flowing into the specific areas.

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Artificial Intelligence and its Application: Review

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Abstract

In the future, intelligent machines will replace or enhance human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. Artificial Intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Study in the area of artificial intelligence has given rise to the rapidly growing technology known as expert system, Natural language processing, Neural Networks, Robotics, Fuzzy logic systems.

Application areas of Artificial Intelligence is having a great impact on various fields of life as expert system is widely used these days to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting. the application areas of this technology.

Keywords: Artificial Intelligence, Neural Networks (computer).

I INTRODUCTION

Artificial intelligence is playing an increasing role in the research of management science and operational research areas. Intelligence is considered as the ability to collect knowledge and reason about knowledge to solve complex problems. In the near Future intelligent machines will replace human capabilities in many areas. Artificial intelligence is the study and developments of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects.

Artificial intelligence is different from psychology because it emphasis on computation and is different from computer science because of its emphasis on perception, reasoning and action. It makes machines smarter and more useful. It works with the help of artificial neurons (artificial neural network) and scientific theorems.

Major Artificial Intelligence areas are Expert Systems, Natural Language Processing, Speech Understanding, Robotics and Sensory Systems, Computer Vision and Scene Recognition, Intelligent Computer Aided Instruction, Neural Computing. From these Expert System is a rapidly growing technology which is having a huge impact on various fields of life.

II. AREAS OF ARTIFICIAL INTELLIGENCE

- A. Expert Systems:** The expert system can resolve many issues which generally would require a human expert. It is based on knowledge acquired from an expert. It is also capable of expressing and reasoning about some domain of knowledge. Expert systems were the predecessor of the current day artificial intelligence, deep learning and machine learning systems.

Examples – Flight-tracking systems,
Clinical systems.

B. Natural Language Processing:

Natural Language Processing (NLP) refers to AI method of communicating with intelligent systems using a natural language such as English.

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

The field of NLP involves making computers to perform useful tasks with the natural languages humans use. The input and output of an NLP system can be –Speech, Written Text.

Examples: Google Now feature, speech recognition, Automatic voice output.

C. Neural Networks

Artificial neural networks (ANNs) are statistical models directly inspired by, and partially modeled on biological neural networks. They are capable of modeling and processing nonlinear relationships between inputs and outputs in parallel. The related algorithms are part of the broader field of machine learning, and can be used in many applications

Examples – Pattern recognition systems such as face recognition, character recognition, handwriting recognition.

D. Robotics

Robotics is a branch of AI, which is composed of Electrical Engineering, Mechanical Engineering, and Computer Science for designing, construction, and application of robots. They operate in real physical world, Inputs to robots is analog signal in the form of speech waveform or images. They need special hardware with sensors and effectors.

Examples – Industrial robots for moving, spraying, painting, precision checking, drilling, cleaning, coating, carving, etc.

E. Fuzzy Logic Systems

Fuzzy Logic (FL) is a method of reasoning that resembles human reasoning. The approach of FL imitates the way of decision making in humans that involves all intermediate possibilities between digital values YES and NO.

Examples–Consumer electronics, automobiles, etc.

III Artificial Intelligence Applications

Artificial Intelligence system (AIS) and its semantic neural networks centric and expert systems have browed the applications in all aspects of human exhibited activities of actions. AI has been used to widen the technological advancement of various fields such as machine industries, finance sector, healthcare center, education sector, transportation/Navigation, Weather conjecture and more.

- **In Finance:** Stock analysis algorithmic, stock exchanging information , Market examination and information mining, Personal finance portfolio, Portfolio administration today are, vast extent subject matter to AI.
- **In Heavy machinery industries:** Robots has turned out to be common in many industries and they are frequently given assigned task or those jobs in which humans' perfection is constrain. Many robots have demonstrated successful in employments that are exceptionally redundant in doing those works which may slip by humans due to a lapse in concentration.

- **Hospitals (Facilities) and pharmaceutical:** Artificial neural networks are often used in hospital for critical, clinical emergency decision support systems for medical diagnosis, especially in EMR software. Artificial neural networks schema are even used today for clinical decision support on critical medical diagnosis inbounds diseases. Watson project is another use of AI in this field, a Q/A program that suggest for doctors of cancer patients. In bionic field for artificial arms, legs etc. Today in health sectors 92 Artificial Intelligence start-ups portended machine are used.
- **Transportation:** Most of the automobiles industry are producing and aiming for programmed gearboxes in vehicles. The present automobiles industries now have AI-based driver help highlights, for example, self-stopping and propelled journey controls, self-parking and advanced cruise controls in advance vehicles.
- **Weather Forecasting:** Neural systems of AI are used these days for foreseeing climate conditions. Past information is given to the neural system, which at that point examinations the information for designs and predicts the future climate conditions.
- **Information Mining (Data) or Knowledge Extraction:** Data mining is a fast-growing area. This procedure comprises fundamentally of steps that are performed before completing Data Mining, for example, data choice, data cleaning, pre-handling of data, and data transformation. Data Mining uses computer programmed algorithms to discover hidden patterns and unsuspected relationships among rudiments in a large data set.
- **Accounting Databases:** The use of artificial intelligence is investigated as the basis to mitigate the problems of accounting databases. The following are some difficulties with existing accounting database systems. The needs of decision makers are not met by accounting information. Humans do not understand or cannot process the computerized accounting databases. Systems are not easy to use. There is focus on the numeric data. Integrating intelligent systems with accounting databases can assist (either with the decision maker or independent of decision maker) in the investigation of large volumes of data with or without direct participation of the decision maker. Thus, the systems can analyse the data and assist the users understanding or interpreting transactions to determine what accounting events are captured by the system [5].With the artificial intelligence we store and retrieve knowledge in natural language. There are some artificial intelligence tools or techniques that help in the broader understanding of events captured by the accounting system. There is more emphasis on symbolic or text data rather than just numeric data to capture context. The artificial intelligence and expert system builds intelligence into the database to assist users. Without users direct participation such models help the users by sorting through large quantities of data. Such models also assist the decision makers under time constraints; suggest alternatives in the searching and evaluation of data.
- **Computer Games:** Playing games is one of the most popular uses for computer technology. In the evolution of computer games, they have grown from modest text based to the three dimensional graphical games with complex and large worlds. The systems as graphics rendering, playing audio, user input and game artificial intelligence (AI) when put together provide the expected entertainment and make a worthwhile computer game. Artificial intelligence is the most important part of every computer game and playing the game without artificial intelligence would not be any fun!. If we remove artificial intelligence from computer games, the games will be so simple that nobody will be interested in playing the computer games anymore!. Without the game AI, the winning would not be difficult at all. Artificial intelligence is used to solve common problems in the computer games and provide the features to the games. Specifically, non-playing character (NPC) path finding, decision

making and learning are examined. There are several ways that AI contributes to modern computer games. Most notably are unit movement, simulated perception, situation analysis, spatial reasoning, learning, group coordination, resource allocation, steering, flocking, target selection, and so many more. Even context dependent animation and audio use AI

IV CONCLUSIONS

The field of Artificial intelligence (AI) enables the machine with the rational ability to sense analytically of thinking process, using concepts, systematic logic and reasoning. In the last 2 decades remarkable contributions in these fields are made by humans and machine together for paving new door for technologies.

Artificial Intelligence will continue to play, progressively more important role in the various fields of science and technologies. This paper signifies the present role of concept and existences of Artificial Intelligence and its techniques used in various applications. But when it comes to the question of Artificial Intelligence creating machines, which are more intelligent than human beings, no one seems to have the answer. It is still in embryonic stage and its future depends only on the current bottomless subjects' research of AI technologies, if the researchers solve the mystery of human brain and its neuron in more specific order. Then AI may have human brain features, like learning from experience, cognition and perception. Whether human being consciousness will be integrated in these machines is a still subject of matter, which is totally not known.

We conclude that further research in this area can be done as there are very promising and profitable results that are obtainable from such techniques. While scientists have not yet realized the full potential and ability of artificial intelligence. This technology and its applications will likely have far-reaching effects on human life in the years to come.

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