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Recognition of Natural Language Processing to Manage Digital Electronic Applications

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***Abstract*:** The Artificial Intelligence is the intelligence that is most using in the computer world. Artificial Intelligence based on the artificial neurons. It processes the input data with the help of artificial Neural Network. Artificial intelligence is the study of how to make a system which can think, behave and act like humans. An artificial intelligence emphasis mainly on the learning, reasoning, understanding, planning capabilities, manipulation, and recognition activities, by which the system can operate in intelligent and efficient manner. In this paper, we emphasizes on the natural language processing that is the technique of artificial intelligence which provides interaction between machine and human to perform the operation according to user input. It follows the machine learning with supervised and unsupervised learning. The machine or computers are not able to recognize the word of different pitches and pronunciation. In this paper, we are proposing the algorithm to improve the learning ability of the machine to recognize speech of natural language. With the help of this algorithm, the machine learning will improve the ability to process the natural language like Hindi, English or other languages. Artificial Intelligence based on the logic board and it has only two conditions to solve the problem in the form of true or false, yes or no and 0 or 1. Sometimes the machine cannot understand the meaning of natural language it automatically processes with similar words and action according to the gathered word like Google voice search techniques. Here is the presentation of artificial intelligence with NLP improvement.

***Keywords*:** Artificial Intelligence, Natural language processing, Voice recognition, Machine learning, Robots.

1. INTRODUCTION

Artificial intelligence is an intelligence that is used to simulate the technologies that permit machine and computers to do work in an intelligent manner. Artificial intelligence is a branch of the computer that includes reasoning and problem-solving activities, perception and learning, natural language processing knowledge representation and utilization of objects.[11] It is the study of how to make a system which can think, behave and perform exactly or better than what a human being can act or react. The base of artificial intelligence has evolved out of from four basic subjects psychology, philosophy, mathematics, and linguistics. They are making a big role and enhancement in the development of artificial intelligence. [2]

In 1950, Alan Turing proposed a test called the Turing test that is used to prove that the system or machine can act like a human being. There are four categories which are used to describe the artificial intelligence:

1. Thinking humanly: We can make a system which can think like humans.
2. Acting humanly: We can develop a system which can perform like humans on the basis of information process
3. Thinking rationally: We can make a system which can think sensibly and wisely on the basis of available facts and available logics.
4. Acting rationally: We can make a system which can act rationally on the basis of available facts and logics.[1][3]

Artificial intelligence emphasis on the ideas and enlargement of the computer system and a machine that able to accomplish various goals such as: [8][1]

- Human intelligence
- Voice recognition
- Pattern recognition
- Computer vision
- Handwriting recognition
- Decision making
- Processing of languages
- Object and activity recognition
- Communication
- Object manipulation
- Safety and security

Artificial intelligence can be classified into two ways;

Weak artificial intelligence: This is also known as narrow artificial intelligence. This intelligence is described and proposed for performing a specific or familiar function. The example of this intelligence is a personal assistant.

Strong artificial intelligence: This is also called as artificial general intelligence. This intelligence has the property to improve itself because it has enough capability to find a solution, thus it can perform unfamiliar and unknown tasks. [8]

2. ARTIFICIAL INTELLIGENCE TECHNOLOGIES

The technologies of artificial intelligence aim to generate the facilities in a computer system that would able to sustain intelligence so that the system can perform like humans. Artificial intelligence includes adaptation and learning, interaction and visual understanding, parameter and procedure optimization, imagination and innovation, extraction of useful information etc [4].

Some artificial intelligence technologies are given below;

Automation: It is also referred as automatic control. Automation is the process of control systems and technologies by which the system can work automatically; hence it reduces the human work. It is used for quality enhancement, reliability improvement,operability and flexibility improvement, perfection and for correctness also.

Robotic Process Automation can be used to perform repeatable and difficult tasks.[10]

Machine vision: Machine vision is the technology that deals with picture based automatic observations and robotic instruction and guidance that are used to solve the problem related to real world. In machine vision, the visual information is captured and analyzed by using the camera, analog to digital converter and digital image processing. The domains of computer vision are biometrics, face recognition, gesture analysis, character recognition, medical imagery, robotics and security, forensics, and surveillance.

Natural language processing: NLP is the branch of artificial intelligence and computer science and it is also referred as computational linguistics. NLP concerns with the strategy which provides interaction and communication between the computer system and human language. It emphasis mainly on the system understanding and analyzation of natural (human) languages [5].

There are three major aspects of natural language processing:

- **Syntax:** It focuses on the arranging of words to make a meaningful sentence and remove the grammatical mistakes.
- **Semantics:** It is related to meaning of sentences, phrases, and sentences and emphasis on how to combine them in a meaningful and proper sequence.
- **Pragmatics:** It deals with understanding and interpretation of the sentence in various situations.[6]

Natural language processing provides computer and human interaction that is used for performing various tasks; [6][9]

1. Text translation
2. Sentiment and syntactic analysis
3. Speech and Voice recognition
4. Segmentation of topics
5. Entity recognition
6. Extraction of information
7. Spam filtering

Robotics: Robotics is the branch of engineering that is used to design, manufacturing and construction of robots. Robots are used to perform difficult tasks and minimize human involvement. In the present scenario, robots are used in industries, companies, car production and automation, military application, medical science and in space for gathering useful information.[1][10]

Machine learning: supervised and unsupervised learning:

Machine learning is the branch of artificial intelligence that provides facilities to the computer to learn and perform without programming. It concerns with the improvement of machines from knowledge, data, interaction, and experiences.

Machine learning techniques can be applied to different aspects such as statics, representation of knowledge, decision making, control and planning, casual interface, computer vision, database, natural language processing, and computer system.

Supervised Learning:

In Supervised Learning, the input variable and output variable are given. The output of the given input is almost correct because here is a teacher available to instruct the process of solving the problem according to the given input. The input variable X and output variable Y exist in the supervised learning. The method of supervised learning is fast and accurate. It has the proper preparation of training, validation and data sets. It is the process of learning and algorithm that is used to make a prediction on the given training data sets and it is corrected by the teacher. This process is stopped when it achieves the expected or acceptable output. Supervised Learning is the most powerful technique to training decision tree and neural networks. [7]

Unsupervised Learning:

In Unsupervised Learning, there is no teacher available and it has only input data variable. It is the process of learning the data without any guidance. Unsupervised learning is a self-evaluation algorithm audits process by a lot of ways, it has corrected and incorrect output achieved from the input evaluation. Unsupervised learning problem divided into two problems first is Clustering and second are Association-means and Apriority Algorithm is the popular algorithm of Unsupervised Learning [3].

3. PROPOSED SYSTEM

The Proposed System is based on the improvement of artificial Intelligence with learning procedures. It is the algorithm that improves the artificial intelligent to recognize the speech of natural language. This Algorithm helps in managing the Home Appliances operation or other Digital Electronic Applications. The Training Component helps in computing operation that is executed by the given Command. The Command will be given in the form of voice to the application.

Algorithm:-

1. Collect the voice data V_N = [V_1, V_2, V_3, V_4,……..,Vn].
2. Collect the natural language words W_N = [W_1, W_2, W_3, W_4 …Wn].
3. Processing of Good Voices with probability from the population of voice data-
   V_N = Population of Voice data
   n = Sample size of voices.
   P (probability) = $1 – (V_N – n)/V_N$
   $P = n / V_N$
4. Deployed End to End (ASR) Automatic Speech Recognition Training Component with HMM model Technique.
5. Initiate the voices with a different pronunciation of same words following with the training components, $S_{db} = V_N \times W_N$.
6. Re-estimation of Voice Recognition from training Component through the threshold.

```
Convergence Threshold = 1
 // An adequate value for the convergence threshold may be 1
MaxNumIteration = 3
// Maximum number of Iteration can be allowed 10.
Reestimate_transition = yes
        [Model Training]
MaxNumIteration = 4
MinInstanceNumber = 20
//Voice observed at least 20 times in the Training Set.
Pruning Threshold = 10e20
```

//using high value of threshold as, for instance, 10^{20} to avoided the problem of elimination of high number of utterances.

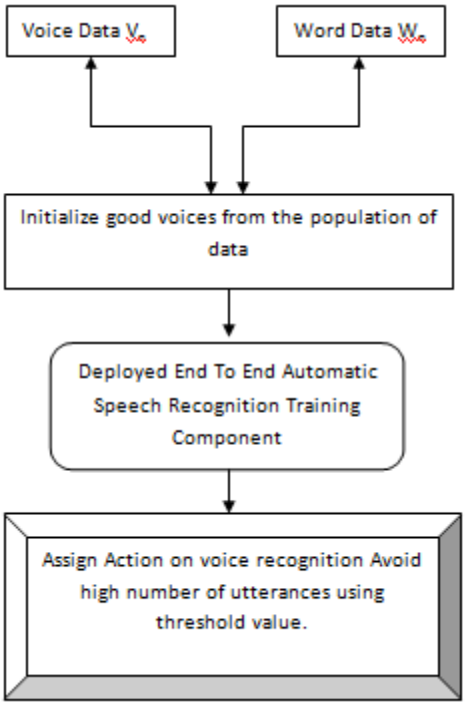
$bk(i) = P(xi+1 \ldots xL \mid \pi i = k)$

//Train the Component through backward algorithm.

7. Assign the task of each natural language word that will improve the artificial intelligence application.
8. Go to step 1 for updating and modification in natural language words and pronunciation.

4. WORKING

The working of the proposed system is based on the above algorithm. This Algorithm implements the advanced system to establish the communication between the human and the computer. Here we can say that human intelligence provides the guidance or direction for the artificial intelligence to execute the operation. First, we collect the voice data of different pitches and collect natural language words of different pronunciations, after that the compiler processes the voices of good pitches from the population of different voice data sets.



Then we are deploying the end to end automatic speech recognition training component. This training component helps to understand and execute the natural language into machine language for providing the proper guidance to the artificial intelligence. It can be make professional artificial intelligence neurons with the help of provided regular correct training data sets. The Re-estimation of voice recognition is done through the threshold that specifies the limits for collecting the voice of different pitches. After that, we assign the task of each natural language word of different pronunciation for proper understanding and improving the artificial intelligence applications. The backward algorithm using for optimization of backward probability by means of the introduction of pruning threshold, even if reduce the computational load, it can eliminate the high number of utterances if we are using too narrow threshold. This problem can be avoided by using very high values of threshold as, for instance, 10^{20}.

5. CONCLUSION

Artificial intelligence is a technology which has the ability to think, behave and perform like humans. It includes processing of information, representation of knowledge, voice recognition, improvement and understanding, pattern recognition etc. This paper describes the natural language processing with the improvement of voice recognition so that natural voice can be recognized easily by the machine and specific operation will be performed with minimum efforts. The proposed methodology can be used to train the robot or machines to perform various tasks with high efficiency and accuracy. Artificial intelligence enhances the learning ability and efficiency and capacity of the computer system or machines. The future of this domain will be bright for establishing internet of things.

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