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Natural Language processing used in Surgery Implementing with Robot

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Abstract This article liberalize this machine learning features as it is utilizes within the emergingedge and as feature highlighter to speech recognition approaches on present-day surgicalrobots. The desire is to advance the event of medical robots among the machine learningand speech recognition liberal that has opened up from the purpose of view of health careservices in social protection. The machine learning hypotheses and models are used for pattern recognition structures combined with speech synthesis model with advanced robotic options in medical field. Machine learning is displayed within the comprehensionof speech recognition components and its influence in biomedical robots for surgeries. Topical advances of machine learning and intelligent algorithms, further accentuations on their vast hugeness within the improvement of speech recognition in medical surgicalapplications

Keywords: Natural language Processing, *Dynamic Speech Recognition, Hypothesis*

1. Introduction

The Enhancement of dynamic speech recognition system to model different machine learning hypothesis patterns which suits to train data from supervised instructions given to a robotic machine which uses various hypothesis model to classify correct data whichare used for medical applications in which contactless procedure of medication surgeries are done by the training robots by giving series of supervised instruction are learnt from this proposed paper. Further unequivocally, this paper offers different approaches to classify the correct data patterns identified by using different machine learning hypothesis to model the trained data sets by using dynamic speech recognition methods. By grouping different sets of trained data and the same set of supervised instruction are given to robot to perform the instruction task given by the medical supervisor for a contact less and efficient way of performing typical surgeries through the vast models of machine learning. Further machine learning also supports Artificial neural networks forhandling complex data structured patterns which can correctly classifies the trained data embedded into the robotic machine to perform the instructions of medical supervisors.

1.1. Dynamic Speech Recognition

Dynamic speech synthesis model recognizes and interprets exact phonetic structures from which the hypothesis of machine learning capability to train and classify the data accordingly i.e., determined cases of impacts because the ceaseless sound trademark arrangement or maybe solid waves and yields correct form of discrete data because the apparent esteemed mark arrangement (presentation, voice, or articulation) are identified and proceed accordingly to the defined pattern , the goal is to solve complex structure models from a singular to complex structure speech data patterns. This prescience task is often named as order when the consecutive segment limitations of the yield names are comprehended as known.. If not, the prescience task is named ID. For example, phonetic grouping and phonetic recognizable proof are two various tasks: the prior with the limitations given in both preparing and testing information, while the last involves in which the trained data for some complex structure are unpredictable with no result. Correspondingly, confined phrase and continuous speech recognition are executed and classified perfectly by using Machine learning naive bayers sentences classifier which model the data patterns accordingly as given with low noise ratio. Both these techniquesused in speech recognition and machine learning model do hand in hand to solve the complex structure by using Artificial Neural Network techniques. Besides ceaseless, speech recognition is a superb kind of organized ML hypothesis model.

1.2. Other Recommendations

The use of Machine learning hypothesis models the robots in medical surgical applications is new. Robots starting at now help in brain and spinal medicinal technique, with models, as an example, renaissance empowering masters to repairspines with 99 percent accuracy (9 percent higher than conventional strategies).

The popular da Vinci cautious system is used be the surgeon to perform major surgeries to the patients is right applied and implemented successfully over a wide range of complex surgeries such as heart bypass surgery and in oncology surgeries.

In the US, a robot called Watson helps ends and creates the administrators' arrangements for oncology patients by mixing

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information from a huge number of reports, getting records, clinical starters and bulletins. Meanwhile, it is learnt that Henry, was the world'sfirst mechanical surgical specialist, has more than 2,500,000 dialogs reports where consistently trained and embedded into machine. Regardless of the way that experts at the Children's National center in Washington have starting late developed a surgical robot (called STAR) which may suture fragile tissue; experts says we are further can develop C-3PO-style robots in our theaters which solves the manpower used in theater are replaced with robotic advancement . The analysis is that also having far to travel before a patent insignificant exertion with enough skill and affectability in robots are attempted to play out the type of work discussed.

2. Materials and Methods

The initial stage of speech synthesis, is generally called pre-processing or normalization, the speech of the person is characterized accordingly and stemming and stop list normalizes the data content and the appropriate piece of instruction are read which is understandable and correct phonetic structure is interpreted In Pre-processing it's about going through the text and then cleaning it up so the machine makes fewer mistakes when it reads the words aloud. Many patterns like dates, times, abbreviations, acronyms, and special characters need to be turned into word so as to reduce the word error rate.

Pre-processing can implement homographs, and different word end up with different meaning in the same context often the word refers to "field "may refer to different meanings as medical fields ,computer field , science field or it may refer to entertainment field. Normalization process characterizes the text and characterizes to correct phonetic structures of which the user speech instructions are wisely identified through different data structures are used for processing the data

After identification of normalized data the role of speech synthesizer is to identify correct speech sound need to implement by the machine for data processing.

In order to take next step for speech synthesis (text-to-speech) model, it's essential to require considering several criteria. These parameters are the following: the language spoken the sort of speaker, the standard of the voice and therefore the method chosen to embed train the machine with proper parameters with noise free which is important in medical field environment. With this information, it's easier to pick the proper solution that meets the needs and constraints in the specified environment for speech recognition patterns. Indeed, not all fields offering TTS (text to speech) method have equivalent ranges, Next step is to identify , the language and the sort of voice support for a machine to complete the specific task is an important criteria to model machine learning algorithm and speech recognition system , there must be consistency between the voice interface and the machine system to enhance and improve the correct speech patterns to complete the proposed supervised instruction which classify the trained data set properly and efficiently in any field work to support and enhance manpower.

On the mixing side, speech syntheses are technologies that also are supported the notions of cloud, embedded or hybrid (also referred to as "on-premise"). It should be remembered that embedded has technical limits in terms of sentence storage that a cloud won't have, but the embedded voice will work regardless of what happens where the cloud needs a connection. These parameters are to be taken into consideration.

Machine learning is methodology to train a mechanical machine by giving supervised training sets of data accordingly to the need of a machine. The machine is said to be learnt by these supervised instruction being instructed to Machine to solve the purpose.

Different hypothesis are modeled to train different machines for more accurate efficiency to solve the problem space, by orderly classifying the data accordingly so as the target trained data function are classified according to the supervised data set.

Speech recognition is a special case of pattern recognition this figure 1 shows the processing stages involved in speech recognition. There are two important stages for in supervised instruction received through pattern recognition training phase and testing phase). The process of methodology used to implement the features is relevant for

classification of training data sets is same in both the phases. During the training phase, the parameters of the classification model are estimated employing a sizable amount of sophistication exemplars (training data). During the testing or recognition phase, the features of a test pattern (test speech data) are matched with the trained model of every and each class. The test pattern is said to belong there to class whose model matches the best suitable test pattern.

The hypothesis defers as different modeling techniques are used for different needs of machine scenario, in the sense different algorithms are used to solve the new instance or problems encountered by machine to the correct target function .The main modeling technique used in machine learning is the trained data should be matched and classified accordingly, when it classify the data in which the new instance output should be consistent with trained data set and the expected output should match with the trained data set of target output which was given predefined instructions.

The error rate is calculated when there is a mismatch between expected output and target output and accordingly the error rate is determined.

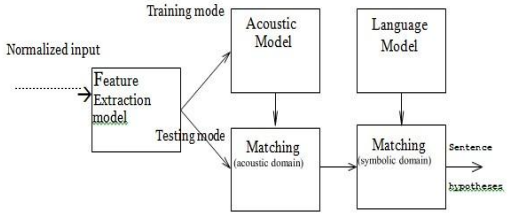

Figure 1: Speech Recognition Procedure steps

The acoustic domains are controlled by HMM (hidden Markov model) to identify the correct data patterns with definite rules and protocols to model the true data pattern with meaningful word recognition which is continuous form without error. Therefore, just in case of speech recognition, the pattern matching stage is often viewed as happening in two domains: acoustic and symbolic. In the acoustic domain, a feature vector like a little segment of test speech (called a frame of speech) is matched with the acoustic model of every and each class. These each frame of segments are well matched with definite class labels with positive

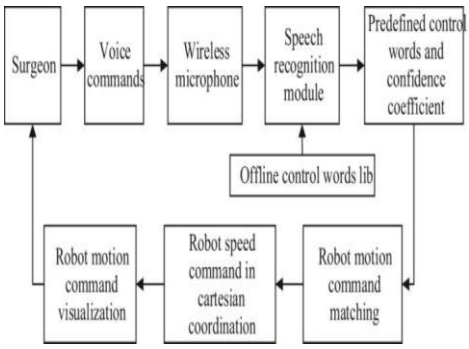

Figure 2: speech and machine model techniques used in surgery

rate of matching is noted for the success estimation of matched segment. This process of label assignment is repeated for each feature vector within the feature vector sequence computed from the test data. The resultant lattice of label hypotheses is processed in conjunction with the language model to yield the recognized sentence.

A machine Learning models can model complex discrete training data sets to train the machine with supervised and unsupervised instruction through which machine can parallel execute set of instructions, various methods and algorithms are used to model the hypothesis to classify a consistent perfect match without put data and target output data of the trained data set ,we term it to be misclassification when the new instance output and trained data set target output is not matched and error rate can be determined by the misclassification and inconsistent data. The Artificial neural network can solve complex and continuous trained data set with the help of perception and delta theory .ANN(Artificial Neural Network) forms with three layers input layer , hidden layer and output layer. Then hidden layer is processing layer which process the input layer and middle layer process the data by delta rule and gradient decent method to give specified output which gives a perfect output match with the trained data set, reducing the error rate.

Machine learning techniques and dynamic speech synthesis model can work efficiently to train a machine with definite instruction to perform the task with effiency reducing the manpower and time to sort the many problems in various field apart from medical field these technology can be very useful to solve many problems and machine can predict the probability of dieses by taking into consideration posterior data and prior data statistics and accurate prediction are made to solve complex cases in medical field. The robotic advancement in the recent trend are develop gradually according to the requirements of medical needs and many case and operation are performed effectively through the advance technology enhancement of machine learning and speech systems to train the robots to perform discrete continuous task effectively maintaining accuracy and low error rate.

In the figure 2 illustrate the commands of the surgeon where through the speech recognition technique the input supervised instruction is given by surgeon through microphone and the machine recognizes these instruction and works accordingly to the surgeon to perform the operation the surgeon practical can work on three hands, one of which hand is considered as robot hand to solve perform the instruction task according to the medical surgeon requirements

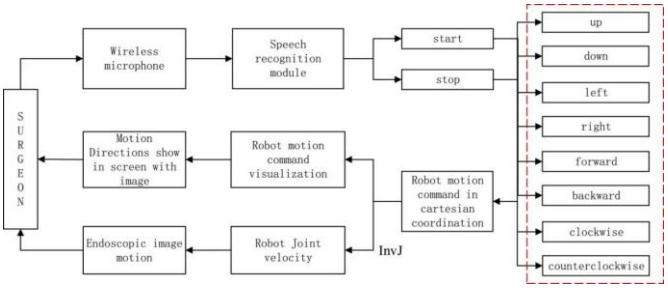

Figure 3: Instruction steps performed by robot machine

The above figure3 shows the instruction movements of machine which is working accordingly with definite instruction given by surgeon to perform the operation. The robot machine can make moves according to the needs of surgeon in the operation to perform the task where the movements in all direction from left to right etc. The input

speech instruction given by microphone is identified and machine makes moves accordingly to instruction given by the surgeon. This figure also illustrate both speech recognition techniques and machine learning techniques in which robot machine classifies the trained data sets consistently according to input given by surgeon through speech system.

Figure4: A trained Surgical Robotic Arm with capabilities of ML and ASR

3. Results and Discussion

Robotic machine arm or system is being trained by machine learning techniques for surgeries by surgeon to reduce high end complications in any operations. This paper focus on the new research developments in medical field for the surgeon to perform surgeries and all the instructions are operated through speech recognition system and robotic machine arm is trained by computer with supervised trained data required according to the specification given by the surgeon the trained data instruction are given to the machine to operate accordingly when needed by the surgeon. The robotic arm acts as another hand of surgeon which is helpful in complex surgeries .figure 1 and figure 2 and 3 specifies the procedure steps for speech identification and how the machine acts accordingly by machine learning techniques.

These figure shows the detailed steps of speech recognition methodology and combined with machine learning models the mechanical machine to work for medical requirements and specification needed by surgeon. The efficacy and accuracy of machine learning with dynamic speech recognition methods are evaluated by word error rate, if the target output classifies consistently with machine then we can expect a low error rate and applying conditional proximities for analysis. and in speech recognition the error can be estimated by hmm and dynamic wrap of the word being recognized.

Table 1. Error rate of Machine learning and speech system by using surgicalrobotic arm

Machine Learning and dynamic speech recoginision	Feature	Word Error Rate (%)
Hypothesis and HMM	Target output and output	8.5
Dynamic Time Warping	Word wrap	6.5
Conditional probability	Feature hypothesis model selection	5

4. Conclusion

To withstand with advancement in recent technology the introducing of robotic machines in the medical fields simplifies the needs of surgeon to perform operation successfully. To implement effective models through machine learning techniques and artificial neural network the machine can perform task similar to human and can solve complex issues in medical related field. The combination of machine learning and dynamic speech recognition system helps the robotic machine to perform the supervised instruction tasks given by the trainer in medical field so as to complete the task as it is instructed to perform. Further in future one can see many such machine trained by experts using Machine learning model and speech system techniques to reduce the complexity of work.

Conflicts of Interest

The authors declare no conflicts of interest.

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He owns A Patent on “Digital Healthcare Patient Records System”, as part of his research work. He Published a Book on “Understanding Cloud Computing” by Walnut Publications in the year 2021 and Published a Book Chapter in Novel Perspective of engineering research with Title “ A Comprehensive Survey on Data Mining Techniques for Logical Analysis of Data in Content Based Image Retrieval System”. In addition to that He published various Papers, Books and Book chapters on Cloud Computing and Image Processing domain in renowned Publications and Indexing Journals. He is the Life Member for various Professional body memberships like CSI, ICSP, IAENG and ISTE.

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