work together to make change for both social and economic benefit. If we are to be successful we must commit to move forwards and make a difference, together.

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SPEECH RECOGNITION USING MACHINE LEARNING
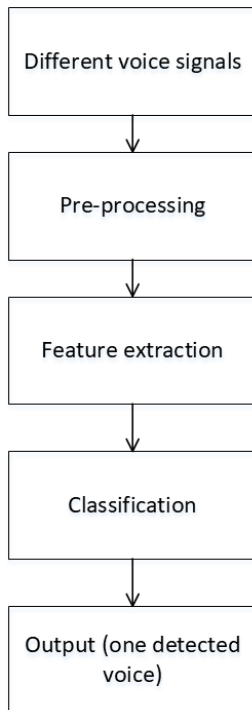
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At the moment recognition of a person's emotional state is an actual topic and can be applied in many sectors such as medicine, psychology, marketing, security. Analysis of the speech signal and the image of the person performing the responsible activity (astronaut, pilot, operator of the nuclear power plant, air traffic controller, etc.) is used to exclude the possibility of error. Moreover, the approaches developed here can be applied in different areas, for example, alcohol intoxication, fatigue, depression, etc.

Neural Networks are a class of models within the general machine learning literature. Neural networks are a specific set of algorithms that have revolutionized machine learning.

The first step in speech recognition is obvious: we need to feed sound waves into a computer. Speech recognition mainly is done in two stages - training and testing.

In this process, the voice of different persons is recorded by a microphone in such an environment where there is no noise. These speech signals are pre-processed by using suitable techniques like filtering, entropy based on endpoint detection and Mel Frequency Cestrum Coefficient, etc. This type of technique makes the speech signal smoother and helps us in extracting only the required signal that is free of noise.

Classification of the speech signal is a very important phenomenon in the speech recognition process. In this project, the neural network is used for classification.

This figure shows the general procedure of the speech recognition process. A typical speech sentence consists of two main parts; speech information carried out by one part and silent and noise carried out by the other part. At the input side, different voice signals are applied. Before applying these signals to the neural network, pre-processing of the signals is done by using filtering. Entropy is based on endpoint detection and MFCC. The next step is to extract the features of the voice signals by the special kind of neural network. A tested signal is detected as the output.

Picture 1 - Block diagram of speech recognition process
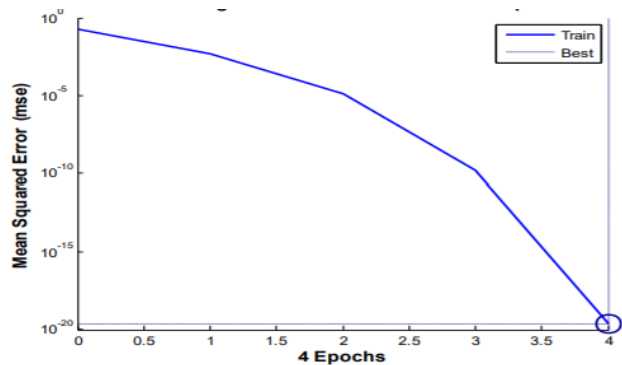
Picture 2 - Best training performance obtained

In our work to implement the project, MATLAB neural network toolbox has been used to create, train, and simulate the network. From 128 samples 70 samples are used for training while the other 58 are used for testing the network. The trained network can also be tested with real time input by a microphone of good quality. Setup of MFCC. They took speech data from a database isolated alphabet. They set the output nodes to nine in order to recognize the nine letters of E-set.

The best result is obtained at epoch 4 in this work. 100% accuracy is not achieved in any case. The best training performance rate is 2.2596-20 at approach

Data is trained using the neural network toolbox and remaining of the 70 samples are simulated against this trained neural network. The performance of neural network is seen when it runs. The mean square error (MSE) is a network performance function. The performance of the network is measured according to the mean square errors. The mean square error is defined as the average square difference between the output and the targets. Taking into consideration the results, we can say that the better percentage of accuracy is obtained on the recognition of speech signals that are recorded in a closed room rather than in an open one.

In the present work we have arrived at the conclusion that neural networks can use very powerful models for the classification of speech signals. The performance of the neural networks is being impacted largely by the pre-processing technique.

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MACHINE LEARNING IN AUTOMATED TEXT CATEGORIZATION

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The paper reveals approaches to the use of machine learning in automated test categorization. The automated categorization of texts into predefined categories has witnessed a booming interest in the last 10 years, due to the increased availability of documents in digital form and the ensuing need to organize them. In the research community the dominant approach to this problem is based on machine learning techniques.

Digitization has changed the way we process and analyze information. There is an exponential increase in online availability of information. From web pages to emails, science journals, e-books, learning content, news and social media are all full of textual data. The idea is to create, analyze and report information fast. This is when automated text classification steps up. Text classification is a smart classification of a text into categories. Moreover, using machine learning to automate these tasks makes the whole process super-fast and efficient. Recently artificial intelligence and machine learning have become the most beneficial technologies in the world.

Text classification is a task of assigning a set of predefined categories to free-text. Text classifiers can be used to organize, structure, and categorize a lot of things. For example, new articles can be organized according to topics, support tickets can be organized according to urgency, chat conversations can be organized according to a language and so on. Text classification can be presented in two different forms: manual and automatic classification. In the former, a human annotator interprets the content of text and categorizes it accordingly. Usually this method can provide qualitative results but it is time-consuming and expensive. The latter applies machine learning, natural language processing, and other techniques to classify text automatically in a faster and more cost-effective way.

Instead of relying on manual crafted rules, text classification using machine learning learns to make classifications based on the past observations. By using pre-labeled examples as training data, a machine learning algorithm can learn the different associations between pieces of a text and; a particular output (i.e. tags) is expected for a particular input (i.e. text).

The first step towards training a classifier with machine learning is a feature extraction. This method is used to transform each text into a numerical representation in the form of a vector. One of the most frequently used approaches is a bag of words, where a vector represents the frequency of a word in a predefined dictionary of words. For example, if we have defined our dictionary to have the following words {This, is, the, not, awesome, bad, basketball}, and we want to vectorise the text «This is awesome», we will have the following vector representation of that text: 1, 1, 0, 0, 1, 0, 0.

Then, the machine learning algorithm is fed with training data that consists of pairs of feature sets (vectors for each text example) and tags (e.g. sports, politics) to produce a classification model (picture 1).