



316 /C

Voice controlled home automation system for disabled people

D S K U Wijesinghe^{1*} and H Pasqual²

Department of Electrical and Computer Engineering, The Open University of Sri Lanka, Nawala

The evolution and development in the home automation systems are moving towards the future in creating the Smart Home Automation environment. Several commercial products are already available in the market and most of them are activated with remote controllers. However, such devices require buttons or touch screen system. Therefore, monitoring and controlling of the appliances need some movement and physical contact. We see this need as a burden to disabled elderly people in society. In today's context speech recognition is considered as a revolutionary concept capable of fully automating consumer centric electronic systems. In this situation, voice based control of electronic devices is being actively explored by many researchers; the users however have been reluctant to employ these devices due to higher initial cost.

In this project, the main objective was to develop a simple and cost-effective voice controlled home automation system for disabled people and to create a user dependent speech recognition system. This system is embedded with the capability of understanding human speech in Sinhala language. In order to achieve this goal, human speech signals are recognized and converted into effective commands to control the on/off status of electrical devices, such as lamps, fans, television etc., in the home. First, the voice command will be captured and its features extracted by using MFCC (Mel-Frequency Cepstral Coefficients) and then fed to a neural network to recognize the command. There are two phases in supervised pattern recognition, training and testing. As a result, home appliances could be turned on or off depending on the voice command given. During the training phase, parameters of the classification model are estimated using a large number of class examples (training data) During the recognition phase, the features of test pattern (test speech data) is matched with the trained model of each and every class. In this project, sixty speech samples were stored in the training model database and each sentence was recorded ten times. After successful identification of the command it will be fed to the microcontroller, which will then activate the corresponding actuator. During the initial voice recording process, it was observed that accuracy of the recognition varied with the length of the voice clip hence the voice clips must be recorded within 3 to 5 seconds. The overall accuracy of the system is approximately 75% and it will be dependent on sample size of Artificial Neural Network (ANN), words used and also the environment when uttering the particular words.