Speech Controlled Robot

Abstract

Speech Controlled Bot (SCB) is a differential drive semi autonomous drive bot. SCB accepts the input from the user in the form of speech signal, Bandwidth of which lies between 300Hz to 3.4KHz. The voice signal is processed in the computer and based on the corresponding command the bot makes its move.

Introduction

SCB, the differential drive semi autonomous bot has the ability to work as per the voice command. The Interface between the bot and the user is the computer where the speech recognition and processing takes place. A mic is used to send the voice input into the computer. A software called “PROCESSING” developed by MIT is used in order to process the voice input. The processed output from processing is serially communicated to the micro-controller. Here MSP430 launch pad was used as controller. The controller then commands the actuators of the bot. This is how the basic working principle of the SCB can be put in a nut shell.

Working Principle:

Speech-recognition (SR) systems use either "speaker-independent speech recognition" or "training" where an individual speaker reads sections of text into the SR system. These systems analyze the person's specific voice and use it to fine-tune the recognition of that person's speech, resulting in more accurate transcription. Systems that do not use training are called "speaker-independent" systems. Systems that use training are called "speaker-dependent" systems.

This uses the HMM algorithm. HMM stands for Hidden Markov Models. These are statistical models that output a sequence of symbols or quantities. HMMs are used in speech recognition because a speech signal can be viewed as a piecewise stationary signal or a short-time stationary signal. In a short time-scale (e.g., 10 milliseconds), speech can be approximated as a stationary process. Speech can be thought of as a Markov model for many stochastic purposes. For more basics visit

<http://en.wikipedia.org/wiki/Speech_recognition>

In PROCESSING the words that should be spoken to command are defined in the code. When the person speaks the speech processing will take place and it is compared with the pre-defined words. When perfect match is found, based on the word recognized, processing sends the controller a command. Based on this command, the controller controls the actuators of the bot.