[width=]block$_d$*iagram.pngBlockdiagram*

Dynamic audio system can be simplified as five measure blocks, each serving it's own application in order to provid

Depth estimation unit

../depth$_e$*stimation*$_u$*nit/depth*$_e$*stimation*$_u$*nit.tex*

Micro-processor

Micro-processors acts as middleware between DAC and the hardware to control speakers. In this project we are usi

First we find depth, deviation and height of the listener's face from the reference point using opencv's frontal face h

Above process provides us three real-time variables,

Depth of the listener's face from the reference point.

Deviation of the listener's face from center of the axis.

Height of the center point of listener's face from the origin (reference point).

Further using this real-time variables, and some constants (room dimensions and speaker positionings), using custo

Using panning and tilting angles we can rotate the servos to the required angles to direct the sound field towards th

Mechanical Unit

As discussed in methodology, as the speakers propagates sound in oval. Hence shape we need to align the major ax

Mechanical units assembles with, two servo motors for each speaker (channel) one for panning and second for tiltin

Servos are connected to hardware PWM pins of the RPi and controlled in real time using feedback of the angle alg

Audio Processing Unit

Usually an surround sound system contains two or more speakers in order to generate sound effect of moving objec

Even if we direct the speakers towards listener's direction, it is encessary to adjust the sound levels of each speaker

To genrate best surround sound effect, this Audio processor unit assembles with 4 class AB audio amplifiers driven

Audio amplifier

Basically, audio amplifier is an circuitrary which is designed to increase magnitude of applied signal in order to pow

Sound signals are applied to non-inverting terminal of an amplifier through an voltage devider circuitrary (potentio

For this application we are using LM386N-1 as our amplifier.

Digital potentiometer

Digital potentiometers mimics the analog functions of a mechanical potentiometer. Where the resistance is controll

As we discussed, to adjust the sound output of the audio amplifier we adjust the input voltage given to the non-inv

For this application we are using SPI compatible MCP42010 Digital POT,

Speakers

Speakers serves the 4 channeled dynamically adjusted surround sound to the listener. Usually they are mounted on