Automotive Sensor for Object Recognition using RedPitaya and Raspberry Pi

Autonomous Intelligent System

Aamir Muhammad : 1272918

Sardar Eyaan Ahmed : 1273852

User Manual Guide for Real Time Classification between Wall, Human and Car

This is a complete guideline for how to use the *Red Pitaya* and *Raspberry* Pi for real time classification. All the python scripts and required libraries were installed in *Raspberry* *Pi* to execute scripts for *Red* *Pitaya* to show output on the basis real time data receiving from Ultra-Sonic sensor. The device operates on *Plug and Play* feature. Take the following step to execute classification:

**Step 1 :** Turn on *Red* *Pitaya* by connecting it with a power supply of *5V*.

**Step 2 :** Similarly, turn on *Raspberry* *Pi* by connecting it with a power source of *5V*.

**Step 3 :** As soon as *Raspberry* *Pi* boots up first execute service daemon description file controlled by *“systemd”* configuration which first checks for network initialization and then execute *“Shell Script”.*

**Step 4 :** After network initialization (connected to *Red* *Pitaya* *Wi-Fi*) the system executes *Shell Script* containing script for establishing a Secure Shell *(SSH)* connection with *Red* *Pitaya* as well as enabling *Red* *Pitaya* to start data acquisition for real time classification based on extracted features. [Note: *Shell* *Script* enabled to be executed at boot using *“systemd”* configuration].

**Step 5 :** Now real time classification will be started. The classification will be done based on three features (*energy*, *sum* and *standard* *deviation*).

**Step 6 :** Move the *Red* *Pitaya* in front of object any specified object for which model is trained (wall,human,car). Then place *Red* *Pitaya* still on some table or surface to get proper data from acquisition.

**Step 7 :** Following response could be noticed for each object on *Red* *Pitaya*:

* For Wall Led “0” glows on
* For Human Led “1” glows on
* For Car Led “2” glows on

**Note :** The classification can be done using two Classifiers *SVM* or *Naive* *Bayes* *Classifier*, but one classifier can be activated at a time and that could be done in *“Classification.py”* file present in the *Raspberry Pi (home/pi/Desktop/PythonFiles/Classification.py)*