Methodology

Before using the FPGA board and a connected camera, camera equipped with sensor OV5640was to be used for the purpose of environmental profiling which wasn’t available, so after searching various resources, we found out that that the image sensor in Picamera i.e. OV5647 was similar in many aspects. So, for proof of concept, we started with available resources in order to fulfill our objective, using this camera sensor integrated with raspberry Pi board we tried to access, read and modify the internal registers states by varying the sensor parameters of the sensor, by exploring different possibilities using protocols like UART and I2C, but due to OS and library specific restrictions register level information of the image sensor could not be made accessible. After thorough analysis and research, we found out that camera sensor parameters can be modified using command line interface, and that the parameter values ranged between 0 to 100 where 0 represented minimum and 100 maximum value which gave us proof of concept that sensor state is modifiable and is not fixed like traditional and conventional cameras. By using this approach various environments were chosen. With one particular location, the camera was placed in afixed position and was made to generate live stream and capture the images at regular intervals. These imageswere then analysed in MATLAB and their certain parameters were calculated. These image parameters comprised of brightness, hue, saturation, sharpness, and luminance.Studying these parameters and their change that result in images of varying degree ofquality helped determine the most relevant ones which can be later manipulated in pre-processing of the video stream captured by the image sensor used later.