PROJECT-1 ( Eyantra)

•I made this project as a part of e-Yantra robotics competition organized by IIT, Bombay.

•Given an audio file, I had to detect all the musical notes, their onset times and the instrument which is being played using a classifier.

Given an audio file,

1)At first, we had to detect ‘silence’ in the file. We had to select a window size. This window was made to slide over the input file. If the mean squared sum of all values in that window was less than a particular threshold, then we classified that window as a ‘silence’.

2)This data was then used to calculate the onset time i.e. the location of the notes.

3)We used DFT to calculate the frequencies and hence the notes in that file.

4)Now, for detecting the instrument being played, various audio features like ZCR, MFCC, RMS etc. were needed to be found. I used a Python package named librosa for this purpose.

5)I trained a SVM classifier which took 8 audio features as input and the instrument as output field.

6)The training data was not available directly. So I has to take around 8000 audio files of trumpet and piano and then form the training data myself by calculating their audio features.

7)The features of our audio that we calculated were then fed into the classifier to get the instruments.

8)Thereafter, this information was used to make a robotic model which tried to replicate that music by playing a piano or a trumpet using robotic arms.