Analysis of Human heart using machine learning and 3-D visualization
Cardiovascular Diseases (CVD)
- Killing 17.3 Million globally every year
- That’s 30% of total deaths.

Early detection and treatment could have saved them
- HOLTER monitor (ECG >=24 Hours) used to detect Arrhythmias, Heart rate variations

Manual analysis
- Next to impossible
- Inefficient in terms of time consumed

Theoretically, Heart beats 72 times per min. That’s over one lakh times a day
Solution

- Automated Monitoring tools
  - Beat to Beat analysis possible
  - Instant and accurate results
  - Detection of abnormalities

- IOT based solutions
  - Remote monitoring possible
  - Unhindered Mobility and activity
  - Compact and cheap
How Solution works
Approach

- Signal acquisition/Noise removal
- Clustering
- Pattern matching
- Smart detection
Signal Acquisition
Clustering/Pattern matching
Smart Detection

Heart rate Variability

Average heart rate

abnormalities

Heart rate abnormalities
3D Model of Heart

Monitoring Summary

Start Time: 16:02:34 on 22-Oct-16
End Time: 15:32:34 on 23-Oct-16
Monitored Period: 24 Hours
Time Analyzed: 23 hours 35 minutes
Artifact Time: 1 hour 45 minutes
Off Time: 30 minutes

Average Heart Rate

Heart rate variability
3D visualisation
3D visualisation
Current Status/Achievements

- **Test Results**
  - ECG – Tested with 300 patients (72 hours/patient). **Accuracy > 98%**.
  - PCG – Physionet tested our algorithm against 3200 recordings – **88% accurate**

- **Publication** – “Monitoring Cardiac Stress from Heart Sounds” at 43rd International Annual Computing in Cardiology conference 2016, Vancouver, Canada