TATA CONSULTANCY SERVICES

TCS Research & Innovation

Future of Digital Health

Current Research in Digital Health

TCS Research & Innovation

Analytics

- **Categorical time-series analysis**
  - Algorithm for categorical time series clustering
- **Synthesis**
  - Algorithm for synthetic PPG generation
- **Time-series analysis**
  - Algorithm for numerical time series clustering by extracting statistical features
- **Text Data Analysis**
  - Feature extraction from text data

Cardiac Screening

Atrial Fibrillation Detection
- From single lead ECG
- Validated on ILR data

Coronary Artery Disease Detection
- Using multiple non-invasive signals
- Under trial with hospital in India

Cardiac Fatigue Analysis
- Smartwatch based correlation of activity and physiology
- Based on NYHA classification of heart-failure patients

Sleep Arousal Analysis using multi-dimensional sleep lab data

Wearable PPG based arrhythmia monitoring

Mobility Research Summary

Gait Monitoring
- Using wearable sensors
- Using Vision

Fall Risk Assessment using Depth Camera

Range of Motion using Depth Camera

Continuous Activity Monitoring

Mild Cognitive Impairment Detection
- Using Behavior Analysis
- Using Instrumented DSST

Medical Imaging

Fundus Image Analysis
- Detection of glaucoma, DR and venal abnormality

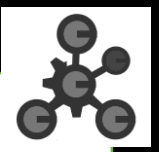
Landmark Detection
- Detect anatomical landmarks from X-Ray images and other modalities

Wound Segmentation
- Wound Size Measurement

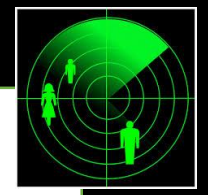
OR Video Analysis
- Tool identification and recognition

Future of Digital Health

TCS Research & Innovation



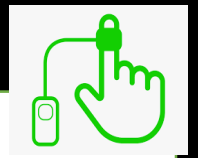
Analysis of Human Volatiles (breath, sweat etc.) for early diagnosis and monitoring of chronic diseases



Ultra-wide band radar for in-body imaging

Hyperspectral sensing for improved pathophysiological analysis like difference of compositions of plaques in coronary arteries, wound moving towards diabetic foot etc.

Digital twin of human cardio-vascular system for personalized intervention through if analysis and simulation of various disease (e.g. CAD, AF, ischemia, valvular stenosis/regurgitation etc.)



Endosomatic imbalance as an objective measure for quantifying chronic and possibly acute pain.

Digital twin of human neuro-motor system for personalized therapy (Deep Brain Stimulation, medicine) and prediction of disease progression in neurodegenerative diseases (e.g. Parkinson’s)

Thank You!