Some Projects Using Wearable Devices

Rohan B. Rebello is a senior undergraduate at Faculty of Mechanical Engineering, College of Engineering, Pune. This article was penned down by him during his internship at MIT Media Lab REDx programme

The rising rate of pollution, tardiness and a couple of other issues has led to numerous health issues, in particular, cardiac issues, asthma and dental issues, which are posing to be life threatening and life deteriorating. Besides, we often encounter issues like imbalance in stress levels, emotional outbursts and physiological and emotional breakdown. So the trend is moving towards the creation of heathcare products to ascertain symptoms and preliminary signs of any disease or disorder.

One of the major steps taken in this regard is by Massachusetts Institute of Technology Media Lab's REDx programme, where students and working professionals devote their time and effort towards building prototypes in the healthcare sector. The main aim is to deploy these devices in India, hence the projects worked on by the teams are customised according to the problems faced in India.

Every year MIT REDx camps take place in Mumbai, Hyderabad and Nashik, usually in the month of January. MIT REDx was founded and is being nourished by MIT Media Lab's Camera Culture Group, headed by Prof. Ramesh Raskar and mentors from the institute. Getting inputs from various doctors, hospitals and Internet sources has helped the teams to set goals for their respective projects and work in this regard. A brief of the prototypes being built is outlined in this article.

MIT Health Tech Camp 2015, Mumbai

SkinSpect. This project aims at accurate primary detection of skin cancer. However, its main purpose in India is to spread awareness about skin anatomy, skin topography and various other dermatological domains.

Project DaAnt. It aims at detecting dental issues like pain in gum cavity, eating patterns by recognising facial and chewing patterns and much more.

Project Cardio24. This project is aimed at detecting cardiovascular problems at an early stage. The user wears a belt around chest, which records ECG signals more precisely as it is placed near the source. Data is transferred wirelessly to an online portal accessible by both the doctor and anyone having access to the patient's account. An algorithm then verifies any irregularity in the ECG pattern to indicate various disorders, which is an early-warning sign.

Project LightEar. This project is aimed at providing information regarding detection signs of ENT-related disorders by 3D imaging the ear. Conventionally, the ENT specialist looks into the ear of the patient for check-up. But this method has been proven inaccurate and tedious, especially when it comes to checking a child's ear. This project eradicates such issues as it uses a device that looks like a headphone and is user-friendly.

Project ARAM. The project is aimed at providing data about a person's sleeping patterns and various other parameters that are recorded during a full sleep cycle. This data is crucial in providing information, specifically about heart and lung disorders. Some people suddenly wake up gasping for air during their course of sleep, which is very unhealthy. By using the database created, this project may reveal many things you were not aware of.

Project SenseCam. The project recognises facial expressions and can be used to detect moods, emotional stress levels and physiological and psychological aspects. It can be used in prisons, hospitals and colleges, to name a few places, to study the various factors concerning human behaviour.

The projects mentioned above are under development and could soon be available in the market, and may or may not need approvals based on their use in India.

From my point of view, I think it is very essential to provide basic medical education in all domains such as engineering, commerce and so on. A good example would be Applied Biology course, which has been made compulsory at College of Engineering, Pune. Initially, I felt it was useless but it proved to be a good combination with engineering as health is a primary concern in all areas of life.