The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Final Year Project
School of Computer Science
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Monitoring Heart Disease Using Mobile Applications

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BACKGROUND

Heart disease has the highest mortality rate among all diseases in China and the prevalence is expected to deteriorate within the next decade [1]. Traditional health care system is supply-based and organized around providers (hospitals, medical practices, clinics, etc.). In most parts of the world population is aging and becoming less healthy due to consumerism, unhealthy diet, and sedentary life style. Health care costs are rapidly rising and there is a trend of moving health care services to patient homes as much as possible. New technology makes this possible; technology-enabled infrastructure that connects providers, caregivers and patients and links multiple sources of data. Simple collecting and connecting data is not sufficient, these data need to be coupled with medical knowledge and algorithms that help make timely and correct decisions about patient's health needs. New technologies include sensor systems [2,3], wearables [2,4], personal health records [5], and the connectivity of devices through Internet of Things [6,7]. Although these technologies offer a great promise, to date no system has been shown to accurately collect data [8] and truly integrated systems do not exist yet. We propose to develop and implement a system for monitoring heart disease through integration of wearable devices, medical knowledge and relevant algorithms, and personal health record. This system takes input from continuous activity monitoring device (smart watch), smart devices that are used several times a day (smart scale, blood pressure monitor, breathing rate and blood). The overview of the proposed system is shown in Figure 1.

OBJECTIVES

This project focusses on applied computer science – we will use computer science techniques and methods to perform health monitoring (data collection, management and processing) and provide automated support for medical decision making through application of machine learning approaches [9]. The main aim of this project is to develop and implement a system for online analytics of heart disease monitoring data that can be used to predict various complications and rapidly advise patient about emerging risks. Our application will monitor several basic signs (weight, blood pressure, temperature, physical activity, heart rate, and sleep) and integrate these data into a decision-making system.

DESIGN

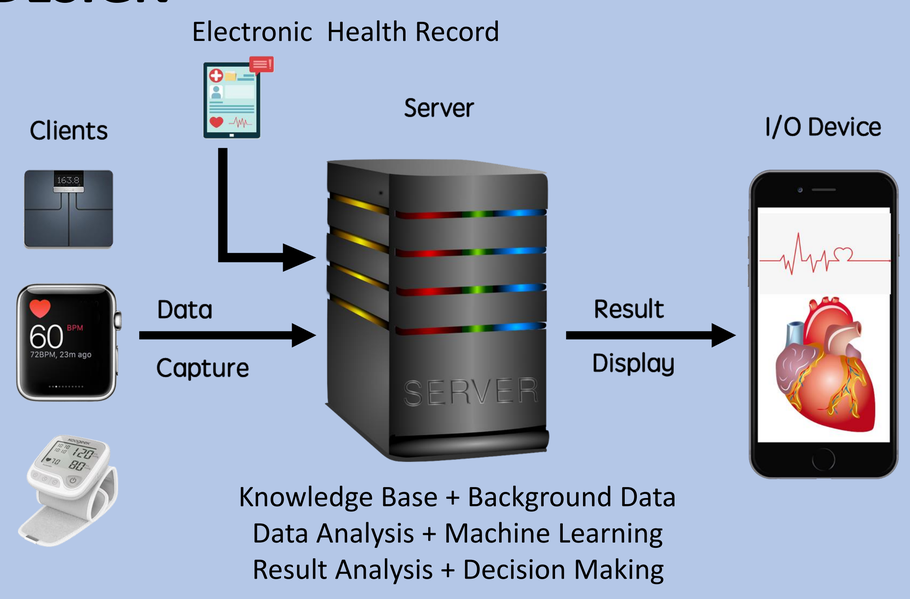

Figure 1. System Overview

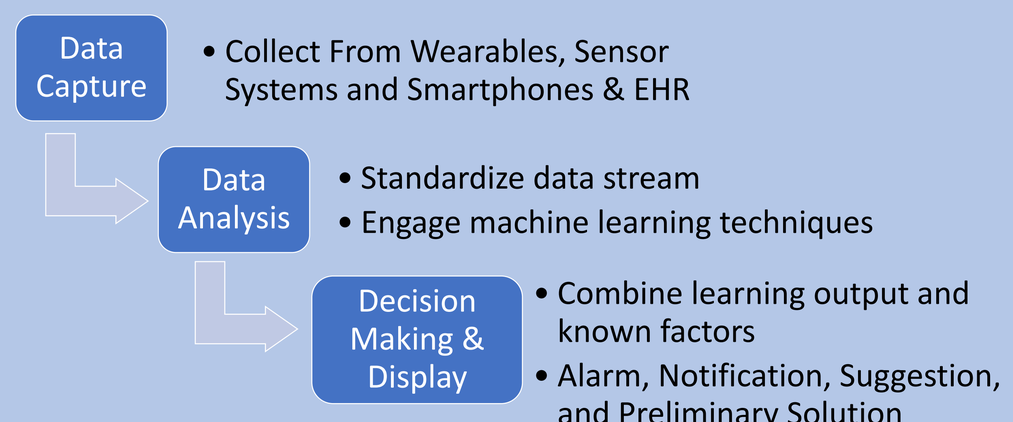

Figure 2. System Workflow

CHALLENGES

1. Existing solution shows insufficient accuracy in heart disease monitoring.
2. Data analysis could be challenging since the cause of heart disease varies and comes from multiple aspects.
3. Machine learning framework should be considered rigorously to meet our requirement of accuracy and efficiency.
4. Software development expected elegant code solution and graceful presentation of final deliverable.

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