Overview

Smart cities are gradually becoming a reality with the proliferation of different types of sensors spread across the city along with high-bandwidth communication infrastructures that provide unlimited network connectivity [3, 5]. With the rich data that is generated by these ubiquitous sensors, there can be innumerable applications that can be envisioned to improve the quality of life of citizens. One key area of application is quality healthcare services, which is a common problem across the globe [1, 2, 4]. This project aims to leverage the smart cities infrastructure to provide a smart health care system, SmartCare. We envision a system that will talk to the city’s infrastructure to provide contextualized health related recommendations/suggestions. Imagine a scenario: “You are walking down the road and you come across an accident situation. The system intelligently detects this situation and alerts the emergency services. Meanwhile, you try to help the victim. You assess what you can do to help by capturing the wounded part of the victim on your phone, that is connected to this citywide healthcare system. The system then provides you with some immediate actions to take. E.g. steps to perform CPR or stop bleeding, or dealing with respiratory issues and so on.”

Intellectual Merit

This futuristic system can have a huge impact in providing immediate assistance to patients or people assisting the patients. In order to make this system a reality, we would need to bring together various city-wide infrastructures together e.g. transportation system, emergency services (such as police, fire, ambulance), hospital networks with access to medical records and so on. Hence, the system development will need to address several challenges across different fields such as computer vision, natural language processing, speech recognition, network planning, machine learning and data science. Moreover, we believe the various sensory information the system will provide to doctors will lead to advances in medical research.

Broader Impact

The SmartCare system will help citizens find appropriate medical care and treatment at the right time while allowing physicians to monitor and better serve their patients. It will limit unnecessary visits to hospitals, thereby leading to better utilization of resources and better service time for patients who actually need hospitalization. Moreover, the various continuously sensed city-wide sensor data and personal health data will continue to help predict any health situations both at the personal and city level, allowing health officials to better manage patients and identify any abnormalities in a timely manner.

Cost, Time, and Risk

This will be a large-scale project which will take three years, with an estimated budget of $250,000 per year. The team will initially consist of five Ph.D. students and several faculty members from the Computer Science department. We hope to create an initiative involving multiple research groups from several universities to make this project a success. Along with CS, the students will also be from other disciplines such as urban planning. The budget will cover costs for acquiring data, both sensory and city-wide patient data (such as database of patients, doctors, pharmaceutical stores, insurance companies, hospitals and EMR managers) and maintaining the system. Also, a portion of the budget will cover the cost of running usability studies. The potential risk of this project is managing the privacy and security concerns involved in handling sensitive medical information. We plan to create a specific security division to handle these aspects.
References


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