Overview

Tasks to address the grand challenge
• Smart sensor based-monitoring system
• Fundamental science on health data analytics
• Anomaly detection and wellness prediction
• Integration, validation and implementation

Design of living habit monitoring system

Living habit monitoring system with sophisticated design of sensor locations to monitor daily activities of multiple inhabitants for exploring various behavior patterns that are correlated to health and wellness.

Design of tele-monitoring system

Tele-monitoring makes it possible to monitor at-risk patients remotely and flag when care services are required to help reduce the need of chronically ill patients for hospitalization.

Future works

Future research directions include:
• Integration of dynamic screening system and risk-adjustment model for health monitoring
• Fall detection and risk assessment via integration of sensor data and individual factors

Pilot Study

Study 1: Tracking daily activities among elderly using electronic wireless wellness trackers

24-hour real time heart rates, together with lifestyle data including sleeping duration and step counts of the elderly recruited from elderly nursing home and geriatric day care centre were collected with electronic wireless wearable wellness devices. Aggregated measurements showed potential differences on general health conditions and lifestyles of the recruited elderly at centre level while the personalized, continuous variation on heart rate, daily sleeping duration and activity level could also be illustrated.

Study 2: Implementing health monitoring system at the community level

Daily discrete physiological data of the elderly were collected with a station-based all-in-one TMC health monitoring device and the continuous overall activities data were collected with a wearable wellness tracker. The participants were asked to self-evaluate their own daily wellness. The integrated data was used to forecast the one-day-ahead wellness of the elderly.

Preliminary data analysis results

A conceptualized system to provide a clinical decision support for clinicians and community nurses and offer an efficient solution in terms of a decrease in time, human error, and cost.

Elderly sleepy pattern analysis

A personalized approach for detecting unusual sleep by considering personal baseline, thus making the detection more adapted to personal context.