Open Sensing Smartphone Framework for Diabetes Management

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MOTIVATION
• Diabetes affects millions of people worldwide
• Traditional methods of management that rely on manual input of data are inefficient
• Smartphones are widely available and they have the capabilities to make diabetes management more effective
  • By utilising built-in functionalities such as access to sensors and other data
  • As well as their capability of accessing and processing data from anywhere and have social connectivity

AIMS
• Create an open sensing smartphone framework for diabetes management that combines smartphones and external sensors to form a sensory system and collect data applicable to diabetes management
• Data analysis and output directly on smartphones to provide guidance information for diabetes management

METHODS

Data input
• Automatic collection
  • FitBit activity tracker
  • Exercise information
  • Sleep monitoring
  • Smartphone sensors
  • Smartphone data
• Manual input
  • Glucose level
  • Diet (Using FitBit food database)
  • Additional exercise activities

Tools
• FitBit
  • Wearable sensor; multiple form factors
  • High compatibility API
  • Extensive food database with nutritional information

Data output
• HealthVault
  • Account authorisation allows external access to data collected by framework
  • Health professionals; family
  • Applications and devices

RESULTS
• Effective collection of data using sensory network
• Data is processed and stored locally and on the cloud for external access
• Information provided to user to assist in the management of diabetes
• User is able to use the framework to input a wide range of information to be processed along with the automatically collected data
• Throughout a day of using the framework, a user will:
  • Input blood glucose levels
  • Record meals eaten
  • Receive processed information and adjust behaviour accordingly for the future

CONCLUSION
• An open sensing framework which captures data automatically from sensors, combined with other data commonly available on smartphones, and outputs essential information for effective diabetes management in the form of a companion smartphone app

FUTURE WORK
• Implement the ability for the framework to recognise trends in the data.
• Discover correlations between the different data types captured by the framework.
• Introduce integration with glucose meters to achieve faster and more convenient input of blood glucose levels
• Undertake clinical trial to evaluate the effectiveness of the framework