An IoT-based Real Time Low Cost Monitoring and Notification System for Aged Care
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Motivations
- The elderly population (person 65 years or older) is growing significantly
  - Approximately 14% of the US population (or 50 million, which is more than the population of 25 states combined) reached retirement age in 2016, and the statistics is expected to double in 2060.
  - Exorbitant cost of nursing homes (~$90500 annually for a private room). Consequently, only 5% of the older population lives there.
  - Most senior citizens live without 24/7 support of caregivers
- Hence, a real time, low-cost and easy-to-implement monitoring and notification system for elderly care will help those senior citizens who lost control of their bladders and bowel movement to get assistance in a timely manner.

Goals
- Develop a monitoring and notification system that can continuously monitor the patients’ body conditions, detect any significant changes and notify the caregivers automatically.
  - This system can monitor multiple patients simultaneously.
  - This system can provide instant notification to caregivers whenever any large fluctuation in the users’ conditions is detected.
  - The solution is affordable for low-income households.

System Architecture
The system consists of:
- A Sensing Unit: detects any changes in the patients’ body temperature and moisture level.
- A Receiver/Transporter: receives data from sensor and/or transmits data to the Data Processing Unit.
- A Data Processing Unit: interprets data and sends notifications in various methods.

Sensing Unit
- TI Sensor Tag

Receiver/Transporter
- Raspberry Pi

Data Processing Unit
- IBM IoT Bluemix Cloud Platform

Notification
- Phone Call
- Text Messaging
- Email
- Twitter

Result and Conclusion
- The team have developed a cloud-based system using IBM Bluemix that can
  - Monitor multiple gateway devices, which in turn control multiple sensors.
  - Capture bedding conditions of many patients in real time.
  - Send and receive text messages from caretakers to facilitate instant reaction.

Future Development
- Re-design sensors to be comfortably attachable to patients. Increase measurement accuracy for better data collection of the surrounding conditions.
- Install deployment system on Raspberry Pi to update software automatically.

References
- "TI Sensor Tag and Raspberry Pi - DeveloperWorks Recipes." DeveloperWorks

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