**WNR (Wireless Neural Recorder)**

Rice University

Weekly Progress Report 17

1/29/2016 - 2/4/2016

**Agenda for meetings**

Mentor Meeting:

1. Updates on BLE
2. Updates on Compression

**Activities this week**

1. Wireless Transmission:
   1. Bluetooth throughput testing
   2. BLE throughput testing for a single link
2. Compression:
   1. Input and transmission buffers for compressed data have been implemented, though not fully tested

**Problems encountered**

1. Wireless Transmission
   1. Interfacing Bluetooth with MATLAB seems to have a bottleneck of around 250 to 300 kbps, which we believe is MATLAB’s limit.
2. Compression
   1. Still have memory errors on Nordic nRF52, but implementing on PC seems to be working for now.

**Time devoted to project this week**

|  |  |  |
| --- | --- | --- |
| **Name** | **Tasks Accomplished** | **Hours Spent** |
| Stephen Xia | * Continuously transmit data over BLE from one peripheral to central device * Characterize data rate while transmitting continuously over BLE from one peripheral to central device | 15 |
| Tingkai Liu | * Continuously transmit data over BLE from one peripheral to central device * Characterize data rate while transmitting continuously over BLE from one peripheral to central device | 15 |
| Xin Huang | * Continuously transmit data over BLE from one peripheral to central device | 8 |
| Yuan Gao | * Implement and characterize compression algorithm (like MiniLZO) * Implement a compression algorithm (like LZO) on Nordic nRF52 | 12 |
|  | **Team Total** | 50 |

**Meetings Minutes**

Mentor Meeting – 2/4/2016, 12:00PM - 1:00 PM

Attendees: Stephen Xia, Tingkai Liu, Xin Huang, Yuan Gao, Gary Woods, Hamed Rahmani

Location: OEDK 104

Completed objectives:

1. Wireless Transmission
   1. There seems to be maximum throughput transmission example implemented on Nordic nRF51; Xin is trying to port it to nRF52
   2. Bluetooth vs. BLE
      1. Bluetooth:
         1. There are throughput issues with Bluetooth, even though the maximum throughput is supposedly ~2 mbps
         2. There seems to be a 300 kbps limit when the TI CC2650 is communicating with MATLAB or another board; we have not been able to achieve more than 300 kbps, even with one link
         3. Using CC2650 would make us not meet our power and size constraints; at this point we cannot even meet our throughput requirements
      2. BLE
         1. Fits all size and power constraints
         2. Will have trouble fitting throughput constraint; we have not been able to get more than 10 kbps continuous transmission
         3. We can make up a story saying that there is a new protocol called WiFi Halow that is low power and can meet our throughput requirements if the project were to continue after our year.
         4. We will be **switching back to BLE**
2. Compression
   1. Input and Transmission buffers have been implemented on the PC and seem to work; will need to test more and implement on the Nordic board to verify.

**Expenditures**

* N/A

**Action items list**

|  |  |  |  |
| --- | --- | --- | --- |
| **Action item** | **Owner** | **Due date** | **Status** |
| Run SPI test to read data and measure power consumption | Tingkai Liu | 2/25/2016 | 30% |
| Implement and characterize compression algorithm (like miniLZO) | Yuan Gao | 2/25/2016 | 20% |
| Sign up for competitions | Xin Huang | 2/26/2016 | 100% |
| Continuously transmit data over BLE from one peripheral to central device | Stephen Xia | 2/25/2016 | 20% |
| Characterize data rate while transmitting continuously over BLE from one peripheral to central device | Stephen Xia | 2/25/2016 | 20% |
| Continuously transmit data over BLE from at least two peripheral devices to a central device | Stephen Xia | 2/25/2016 | 0% |
| Characterize data rate while transmitting continuously over BLE from at least two peripheral devices to a central device | Stephen Xia | 2/25/2016 | 0% |
| Characterize power consumption of Nordic nRF52 board | Xin Huang | 2/25/2016 | 0% |
| Read “fake” data from Intan Chip through SPI and display to confirm the data is actually being received using Nordic nRF52 | Tingkai Liu | 2/25/2016 | 10% |
| Characterize/confirm power consumption of the Intan Chip + accessory devices (like LVDS) | Stephen Xia | 2/25/2016 | 0% |
| Implement a compression algorithm (like LZO) on Nordic nRF52 | Yuan Gao | 2/25/2016 | 20% |
| Achieve at least 20% compression on raw data | Yuan Gao | 2/25/2016 | 0% |

**Additional Comments/Questions for Mentors**