**WNR (Wireless Neural Recorder)**

Rice University

Weekly Progress Report 19

2/12/2016 - 2/18/2016

**Agenda for meetings**

Mentor Meeting:

1. Relooking at BLE
   1. Data Rate Re-analysis
   2. Compression Requirements
   3. Energy/Power Consumption
2. Compression
3. Analog Front-End and SPI
4. Requirement Variable Graphs

**Activities this week**

1. Wireless Transmission:
   1. Able to achieve 128 kbps for one peripheral to central using an alpha version firmware
   2. Measured power consumption
2. Analog Front-End
   1. Data spectrogram plotted to verify that a plausible signal is being read
   2. Power consumption is still really high (~20 mA)
3. Compression:
   1. MiniLZO is being implemented on Nordic nRF52

**Problems encountered**

1. Wireless Transmission
   1. The new firmware to achieve 128 kbps is untested and had very little support
2. Analog Front-End
   1. Data is still noisy
   2. Power consumption is still very high
3. Compression
   1. Still receiving unexpected memory errors

**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 | 30 |
| Tingkai Liu | * Read “fake” data from Intan Chip through SPI and display to confirm the data is actually being received using Nordic nRF52 * Characterize/confirm power consumption of the Intan Chip + accessory devices (like LVDS) * Continuously transmit data over BLE from one peripheral to central device | 30 |
| Xin Huang | * Continuously transmit data over BLE from one peripheral to central device * Characterize power consumption of Nordic nRF52 board | 18 |
| Yuan Gao | * Implement and characterize compression algorithm (like MiniLZO) * Implement a compression algorithm (like LZO) on Nordic nRF52 * Achieve at least 20% compression on raw data | 18 |
|  | **Team Total** | 96 |

**Meetings Minutes**

Mentor Meeting – 2/18/2016, 12:00PM - 1:00 PM

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

Location: OEDK 104

Completed objectives:

1. Wireless Transmission
   1. 128 kbps achieved for one connection
   2. Seems to draw 6.0 mA while running at this rate, which is close to the datasheet value
   3. Need to implement multi-link next
2. Analog Front-End
   1. Data is confirmed to have the correct spectral components, though the waveform is still very noisy
   2. Power is also very much constant (~20 mA) no matter at what frequency you sample at
3. Compression
   1. Can achieve around 30 to 40% compression
   2. Still memory issues when implementing on Nordic, which we still do not know why

**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 | 100% |
| Implement and characterize compression algorithm (like miniLZO) | Yuan Gao | 2/25/2016 | 100% |
| Continuously transmit data over BLE from one peripheral to central device | Stephen Xia | 2/25/2016 | 100% |
| Characterize data rate while transmitting continuously over BLE from one peripheral to central device | Stephen Xia | 2/25/2016 | 100% |
| 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 | 100% |
| 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 | 100% |
| Characterize/confirm power consumption of the Intan Chip + accessory devices (like LVDS) | Stephen Xia | 2/25/2016 | 100% |
| Implement a compression algorithm (like LZO) on Nordic nRF52 | Yuan Gao | 2/25/2016 | 30% |
| Achieve at least 20% compression on raw data | Yuan Gao | 2/25/2016 | 100% |

**Additional Comments/Questions for Mentors**