

Progress Review Meeting Minutes

Date: Tuesday, June 4, 2019

In Attendance: Craig Scratchley, Andrew Rawicz (present from 10:17AM to 10:30AM), Mohammad Akbari, Brittany Hewitson, Corey Myrdal, Huy Thong Bui, Wenpei Li, Winsey Chui

Start Time: 10:17AM

Purpose of Meeting: First Progress Review Meeting with Craig, Andrew and TA Mohammad consisting of a presentation about the current progress of the project and a period for questions from the professors and TA.

Presentation Overview:

- Introduction to photoplethysmography (PPG) and scope of project – Brittany Hewitson
- Importance of technology – Wenpei Li
- Target Market and Competition – Corey Myrdal
 - o Clarifying comments made by Andrew about marketing numbers
 - o Target market in immobile patients and babies
 - o Competition is minimal due to PPG being mostly research-based
- Current progress – Winsey Chui
- Remediation/Risk – Huy Thong Bui
- Summary – Huy Thong Bui

Discussion/Question Period:

Suggestions made by Craig/Andrew/Mohammad

- Discuss image processing with Dr. Beg, since he has had experience with similar technology
- Explore possibility of using this device to monitor body temperature for patients with diabetes – larger blood volume in the feet due to high blood sugar = higher temperatures
- Consider different cases where environment changes
- Should balance between trade-off accuracy vs mobility

Questions asked by Craig/Andrew/Mohammad

- How do you measure heart rate (HR) with visual analysis?
 - o Measure the reflectance of near-infrared light by blood absorption in tissue – reflectance will change depending on how much blood
 - o Brief demo from Brittany with smartphone camera and python script to show how to extract heart rate from video
- There are several areas for error (ambient illumination, movement, skin color) – how do you intend to fix them?
 - o We aren't sure yet, but we will think about them as time goes on and we conduct more research
 - o Currently considering facial detection, or any sort of skin detection
 - o TA mentions that if we have questions about the camera, we can pose them to him and is thanked
 - o TA also mentions that in relation to skin color, it may be necessary to look into machine learning or deep learning

- Can you use sensors instead of a camera to reduce chances of error?
 - o Existing products use webcams, but most of error reduction will be done through the algorithm
- What is your advantage over the commercial product?
 - o Question answered by Craig: it's remote
 - o The commercial product is specific for facial feature recognition, and only calculates HR. We are looking for respiratory rate as well.
- Safety? How can be dangerous?
 - o Near-infrared light penetrates skin and can potentially cause photoaging, but it will be fine if we stay below thresholds detailed in other papers. This is simply a precaution.
- How to see respiratory rate?
 - o Need to derive from HR – not entirely related, but math intensive to get RR from HR, but will need more exploration
 - o Craig: could get from image or from measuring SpO2 levels oscillating
- Why this instead of a smartwatch option?
 - o This technology is remote, and a common complaint from the elderly is having sensitive skin makes wearable products uncomfortable
- Are you only focus on sleeping? What about during the day like sitting, etc?
 - o The focus is currently stationary, immobile patients, and we will expand from there

Engineering Journals: Following the discussion, a brief period of time was used to go over team engineering journals. Comments were made about using pens, numbering pages and crossing out information. Winsey forgot to bring her journal and will be showing TA Mohammad soon.

Action Items:

- Speak to Dr. Beg about image processing
 - o Responsible: Winsey and Brittany
 - o Due Date: June 14, 2019
- Discuss and research possible solutions to issues brought up by Craig/Andrew/Mohammad
 - o Responsible: Entire team
 - o Due Date: Indefinite until we find solution
- Bring engineering journal to Mohammad
 - o Responsible: Winsey
 - o Due Date: Unknown

End of meeting: 10:47AM