



Watch The InFLUence: A Flu Diagnostic System

by Team Influence

Members: Avik Banerjee, Ivan Madrigal, Quyen To

Professor Rahim Esfandyarpour

Department of Electrical Engineering and Computer Science

Project Background:

The influenza virus is an infectious viral disease that impacts society as a consequence of:

- Multiple and changing strains
- Scale of infections
- Social, medical and monetary stress

Project Goal

- Early detection of influenza virus based on changes in user's body
- Containment of influenza
- Developing a model that can detect flu symptoms

Implementation:

Start

Subject reads and signs waiver.

UI operator generates unique number for subject to be entered into system.

Subject data is then gathered via sensors and stored onto .CSV and .XLSX files

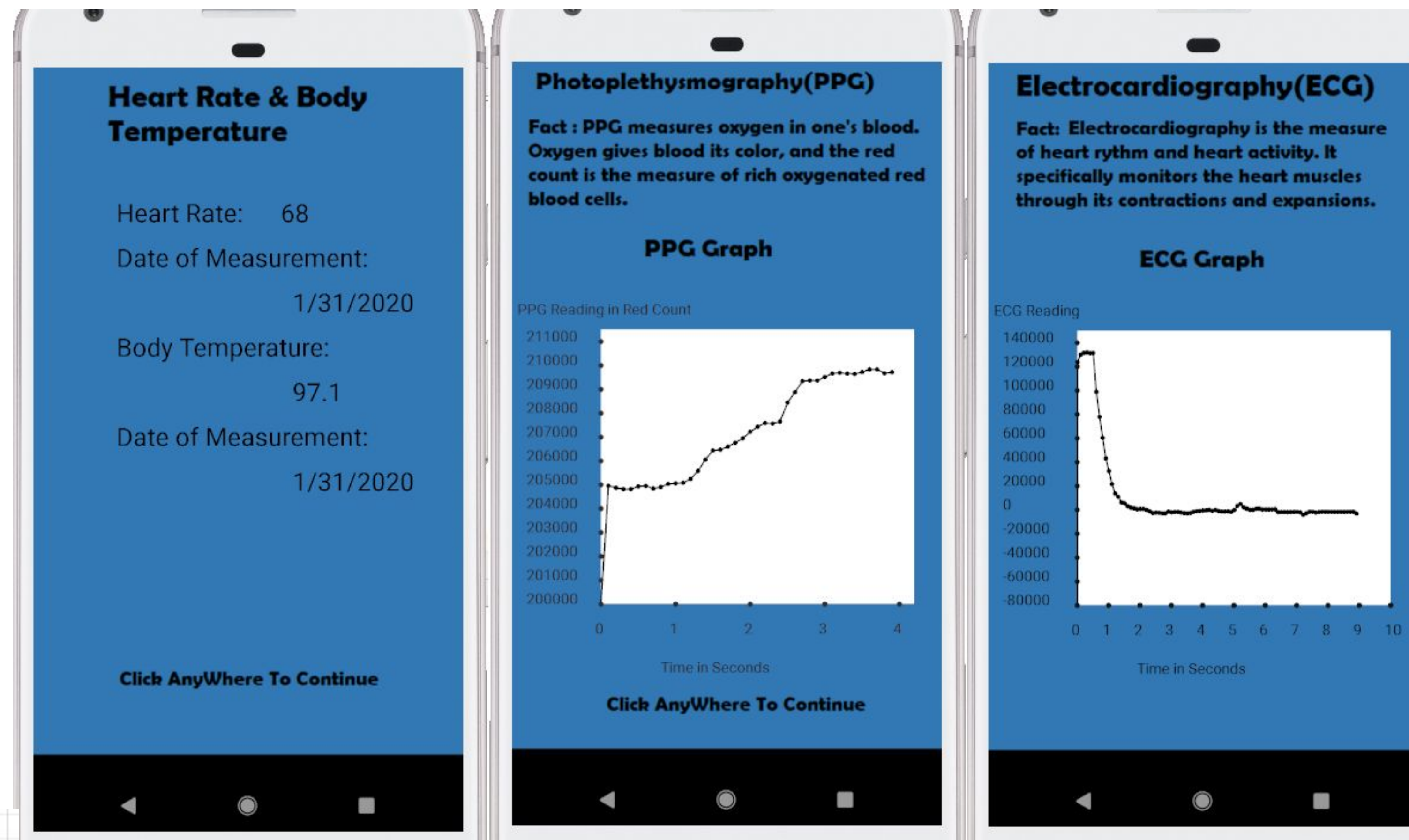
Data is manually sent to model.

Model conglomerates data and then gives a binary response of "Has flu" or "Healthy" based on this conglomerate.

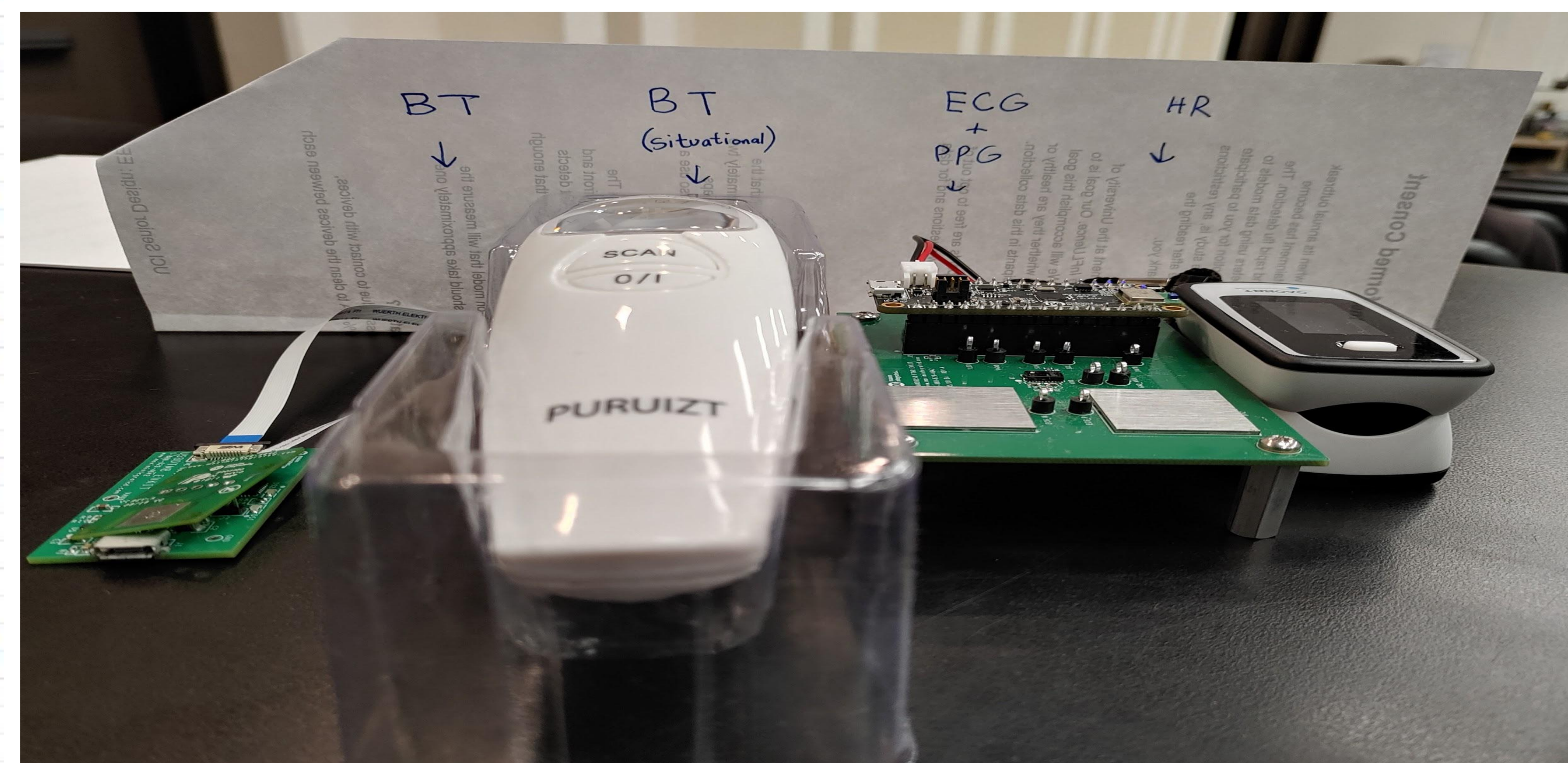
UI displays data and the result from the model to the subject.

Stop

User Interface



Sensors



Improvements

- Gather more live data from subjects with and without the flu
- Incorporate a way to detect heart problems/disease that may be developing
- Design a wearable device that can record body temperature continuously without bothering the user.
- Integrate all sensors into one wearable device

Results

1. Created an informed consent waiver that meets HIPAA standards
2. Can independently gather data on ECG, PPG, Heart Rate and Body Temperature
3. Have a quick data gathering process averaging under 3 minutes
4. UI that allows subject to view collected data
5. Rudimentary influenza detection capabilities

References:

- [1] S. Ghebrehewet, P. MacPherson, and A. Ho, "Influenza," *BMJ*, vol. 2015, no. 355, Dec. 2016, doi: 10.1136/bmj.i6258. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5141587/>. Accessed: Oct. 8, 2019.
- [2] G. C. Thomas, J. Arnold, E. Craige, E. C. Curnen, "Electrocardiographic studies in Asian influenza," *American Heart Journal*, vol. 57, no. 5, pp. 661-668, May 1959. doi: 10.1016/j.jneumeth.2010.04.028 [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0022870359901759>. Accessed: Oct. 10, 2019.
- [3] M. G. Ison, V. Campbell, C. Rembold, J. Dent, F. G. Hayden, "Cardiac Findings during Uncomplicated Acute Influenza in Ambulatory Adults," *Clinical Infectious Diseases*, vol. 40, no. 3, pp. 415-422, Feb. 2005, doi: 10.1086/427282. [Online]. Available: <https://academic.oup.com/cid/article/40/3/415/303135>. Accessed: Oct. 10, 2019.
- [4] S. Heinonen, H. Silvennoinen, P. Lehtinen, R. Vainionpää, T. Heikkilä, "Feasibility of diagnosing influenza within 24 hours of symptom onset in children 1-3 years of age," *European Journal of Clinical Microbiology & Infectious Diseases*, vol. 30, no. 3, pp. 387-392, March 2011, doi: 10.1007/s10096-010-1098-5. [Online]. Available: <https://link.springer.com/article/10.1007/s10096-010-1098-5#citeas>. Accessed: Oct. 8, 2019.