

SenseAhead Smart Shirt:

Wearable Vital Sign Monitoring for Occupational Health and Safety



Artemis Badger, Luisa Chavez, Marc Dobos, Sultanus Salehin, Irem Yunculer

Advisor: Dr. Troy Nagle

Problem Statement

Major risks from labor intensive jobs:

- heat stress
- cardiovascular strain
- respiratory distress

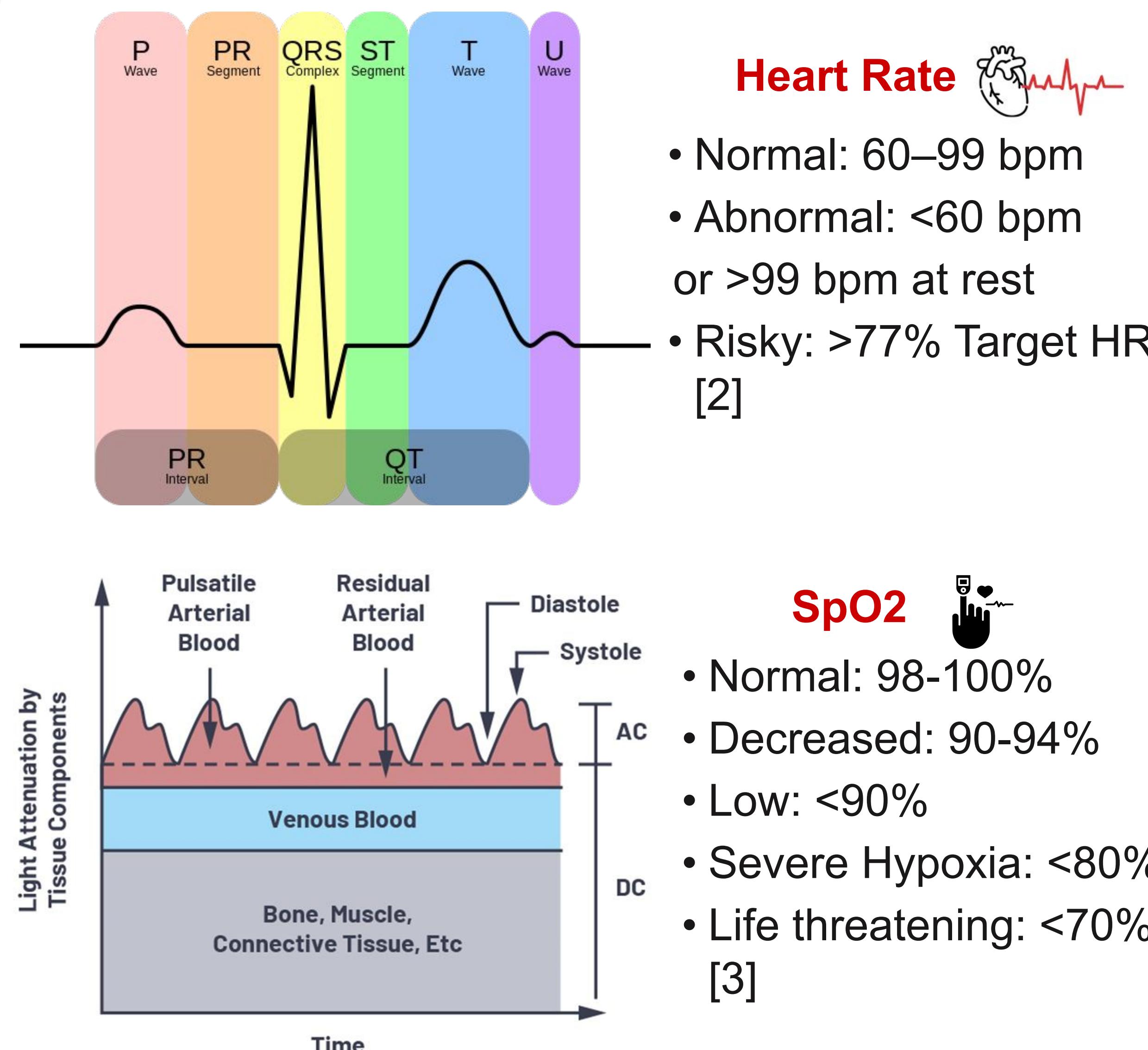


Continuous health monitoring:

- Early detection
- Occupational safety
- Reduction in long-term health consequences
- Reduced ED visits

**~120,000 HRI
in 2023 [1]**

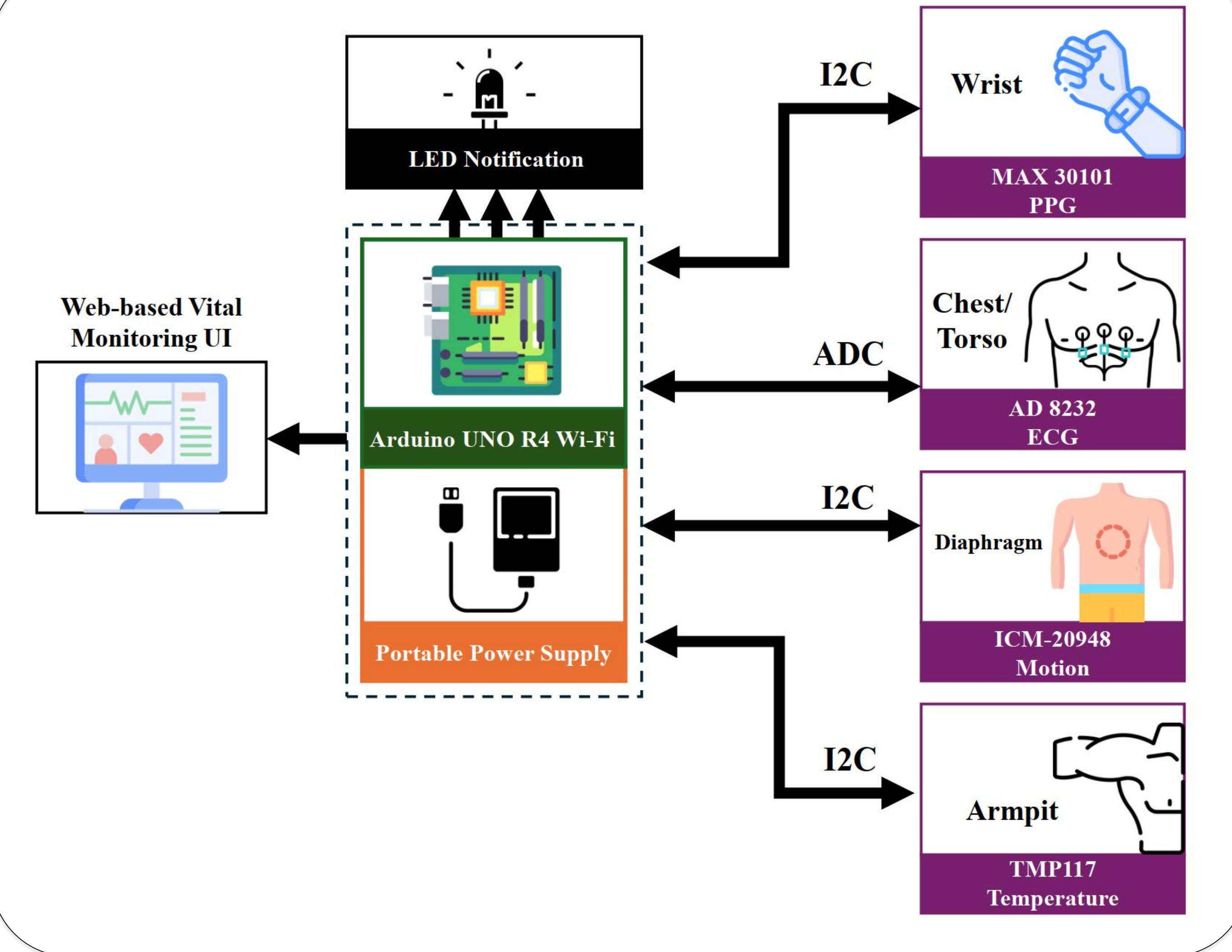
Critical Vital Signs



References

- Vaidyanathan, Ambishar, et al. "Heat-Related Emergency Department Visits — United States, May–September 2023." Morbidity and Mortality Weekly Report, vol. 73, no. 15, 18 Apr. 2024, pp. 324–329, www.cdc.gov/mmwr/volumes/73/wr/mm7315a1.htm?s_cid=mm7315a1_w, https://doi.org/10.15585/mmwr.mm7315a1. Accessed Sept 10, 2025.
- T. W. Son, D. A. Ramlí, and A. A. Aziz, "Wearable Heat Stroke Detection System in IoT-based Environment," Procedia Computer Science, vol. 192, pp. 3686–3695, 2021, doi: https://doi.org/10.1016/j.procs.2021.09.142.
- R. Finnerty, "How to Design a Better Pulse Oximeter | Analog Devices," Analog.com, 2024. https://www.analog.com/en/resources/technical-articles/how-to-design-a-better-pulse-oximeter.html
- Felson, Sabrina . "What Is Normal Body Temperature?" WebMD, 22 Mar. 2017, www.webmd.com/first-aid/normal-body-temperature. Accessed 10 Sept. 2025.

Our Framework



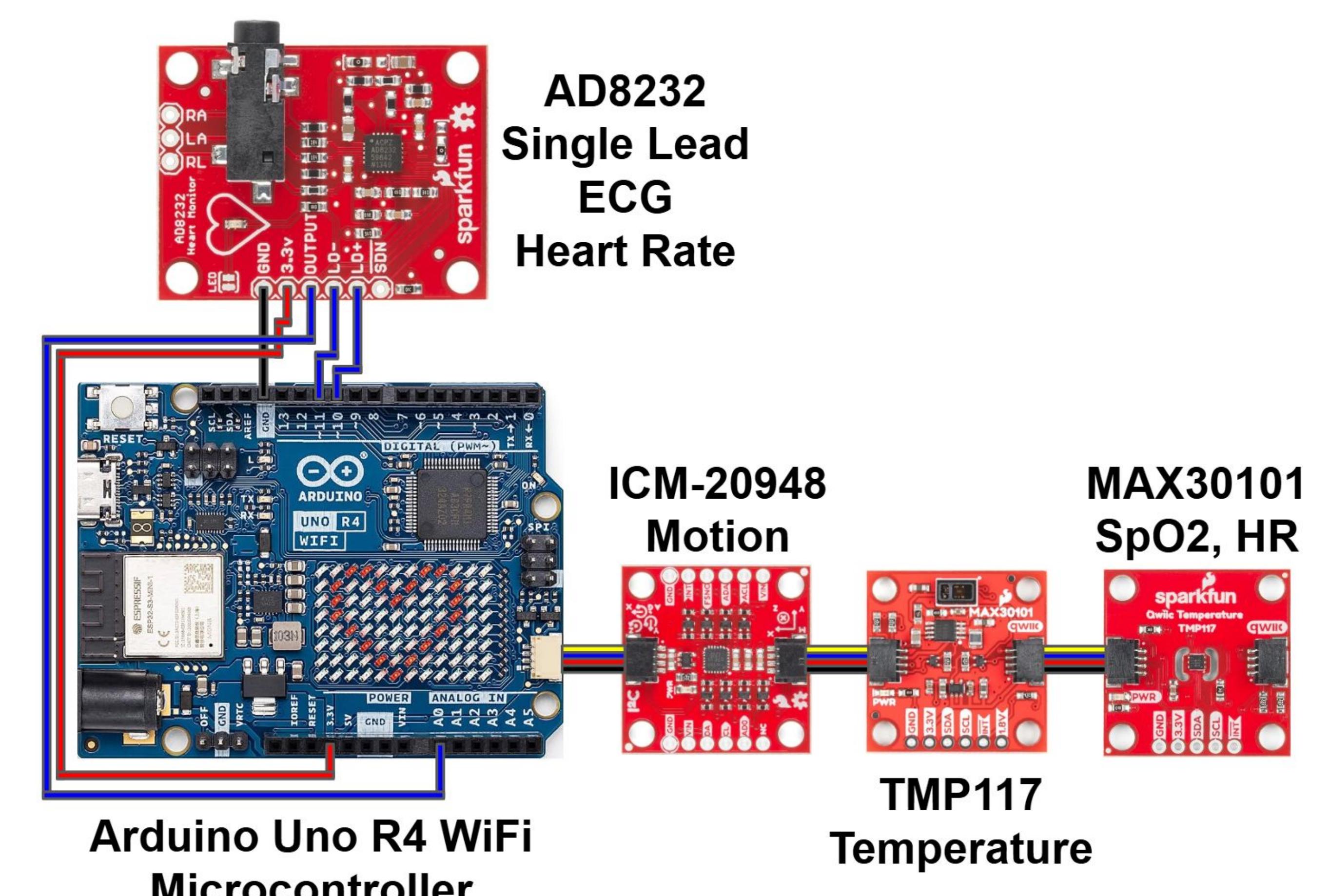
Dry Electrode Fabrication



Real Time Updates



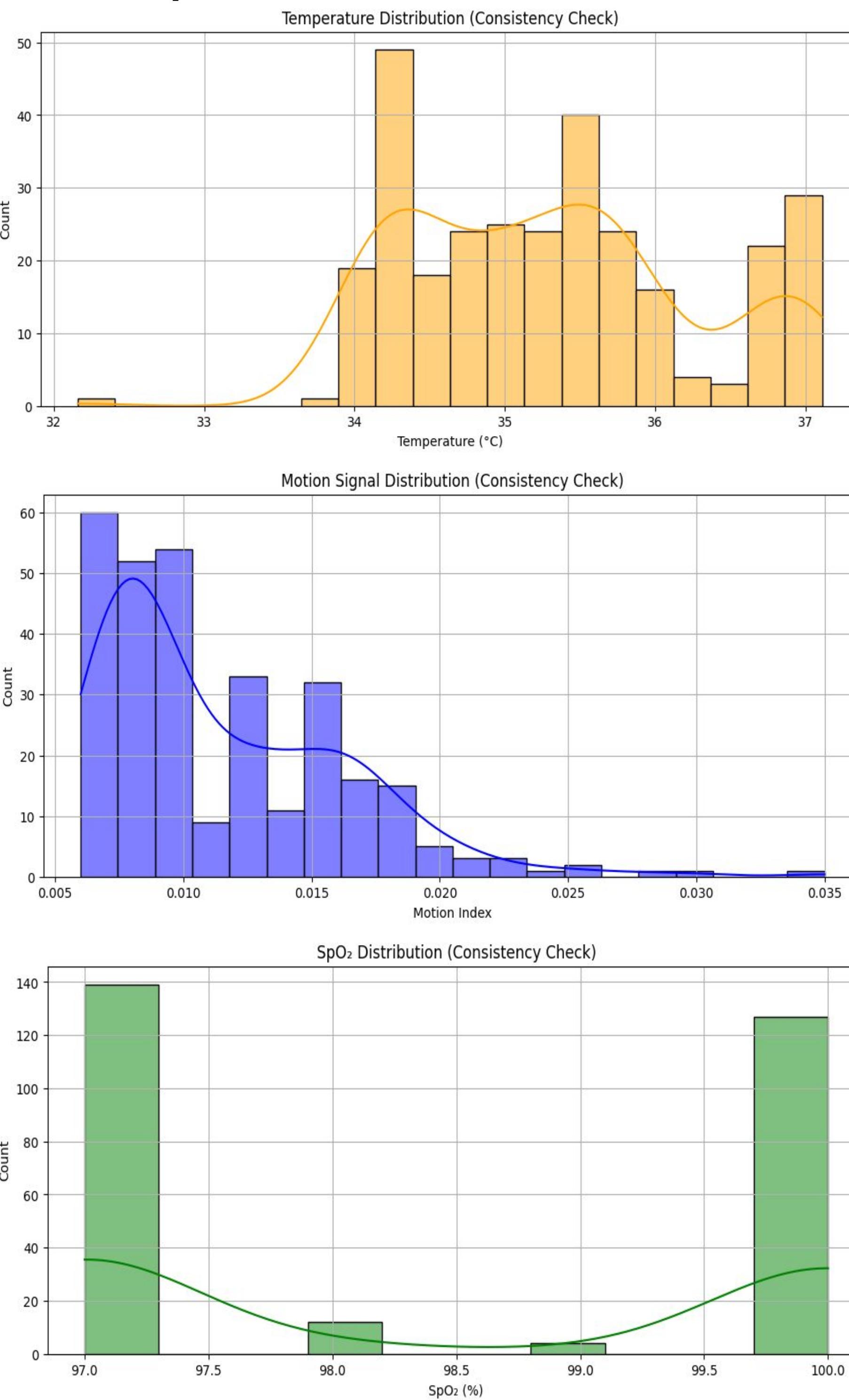
Device & Sensor Usage



Final Product



Analysis of Collected Data



Enclosure & CAD Design

