DALHOUSIE UNIVERSITY
FACULTY OF ENGINEERING

Team 8
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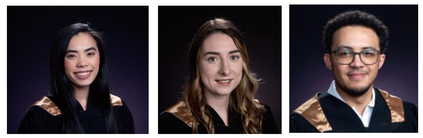

Peach Arch Hospital
Department of Emergency
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PULSE FINDER

INTRODUCTION

Cardiopulmonary Resuscitation (CPR) is a procedure used when someone's heart or brain has stopped. It is a method that helps supply blood flow to the organs even if the heart has no rhythm. It is suggested pulse and rhythm should be checked every four minutes. Pulse is the rate at which blood is pushed out of the heart whereas, rhythm is a pattern of beats.

PROBLEMS

- CPR interruptions reduces survival chance
- Pulse measuring delays CPR
- Excess staff exposed during CPR

SOLUTION

A hands-free device to monitor pulse during CPR

EXISITING TECHNOLOGY

Piezoelectric sensor

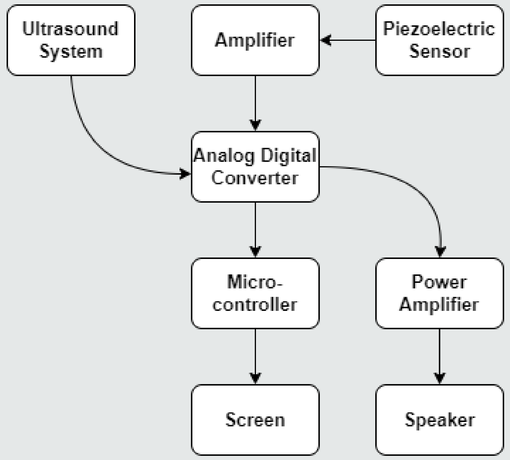
SD3 Vascular Doppler

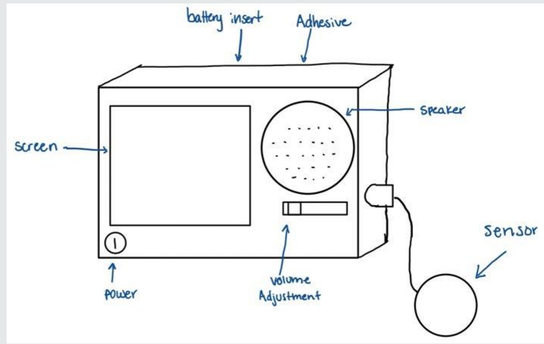
Pulse Oximeter

DESIGN

Sensors:
- Piezoelectric
- Ultrasound Doppler

Circuit Components:
- Amplifier
- ADC
- Microprocessor
- Screen
- Speaker





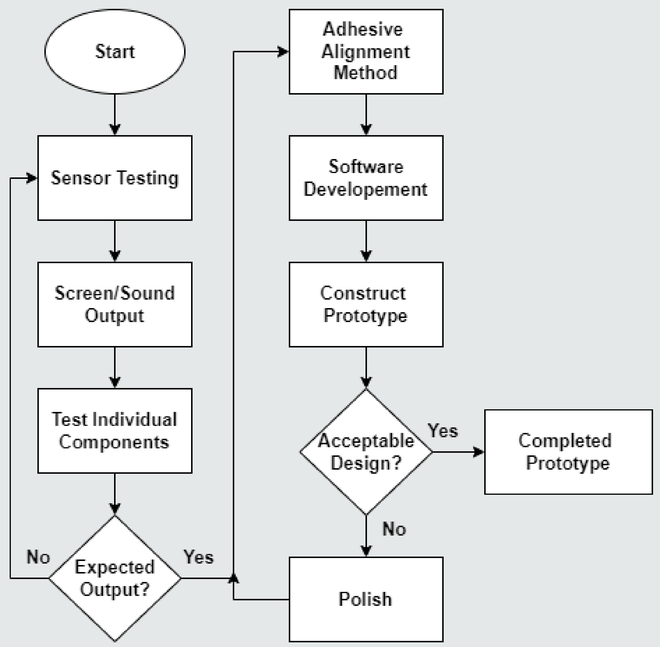
- A 3D sketch of how the final prototype could look.
- Physical look of product may change with:
  - Method of Securement
  - Sensor Requirements
  - Durability requirements

TESTING & VERTIFICATION

Testing Phase 1:
- SD3 Doppler Deconstruction
- Adjusting/Testing Doppler Probe With Flat Adhesive
- Testing Piezo Sensor Output
- Initial Software Development
- Prototype Component Testing

Testing Phase 2:
- Finalize Sensor Use
- Combine Sensor Signal And Microcontroller
- Test Signal Quality, Consistency And Accuracy

Final Prototype:
- Develop Enclosure
- Add Securement Method
- Polish Signal/Output Quality



CONCLUSION

- Piezoelectric is an efficient sensor
- Ultrasound is a helpful backup
- Arduino Uno is sufficient for software
- The device will consist of two sensors
- On-going investigation for device attachment
- On-going investigation for the device enclosure
- A calibration system for placement is ideal

FUTURE WORK

Winter 2022
- Research & Design Prototype
- Begin Test Phase 1

Summer 2022
- Order Components
- Complete Test Phase 1

Fall 2022
- Test Phase 2/Final Prototype
- Finalize Documentation

REFERENCES

- Flosonics. (2019). *FloPatch.* from https://flosonicsmedical.com/
- Guo, C.-Y., Wang, K.-J., & Hsieh, T.-L. (2021, October 19). *Piezoelectric sensor for the monitoring of arterial pulse wave: Detection of arrhythmia occurring in PAC/PVC patients*. Sensors (Basel, Switzerland).from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8540434
- Quinn, S. (2017, October 1). *Photoplethysmography - (IR Heart Rate Monitor)*. from https://www.instructables.com/Photoplethysmography-IR-Heart-Rate-Monitor/