



# FiAR

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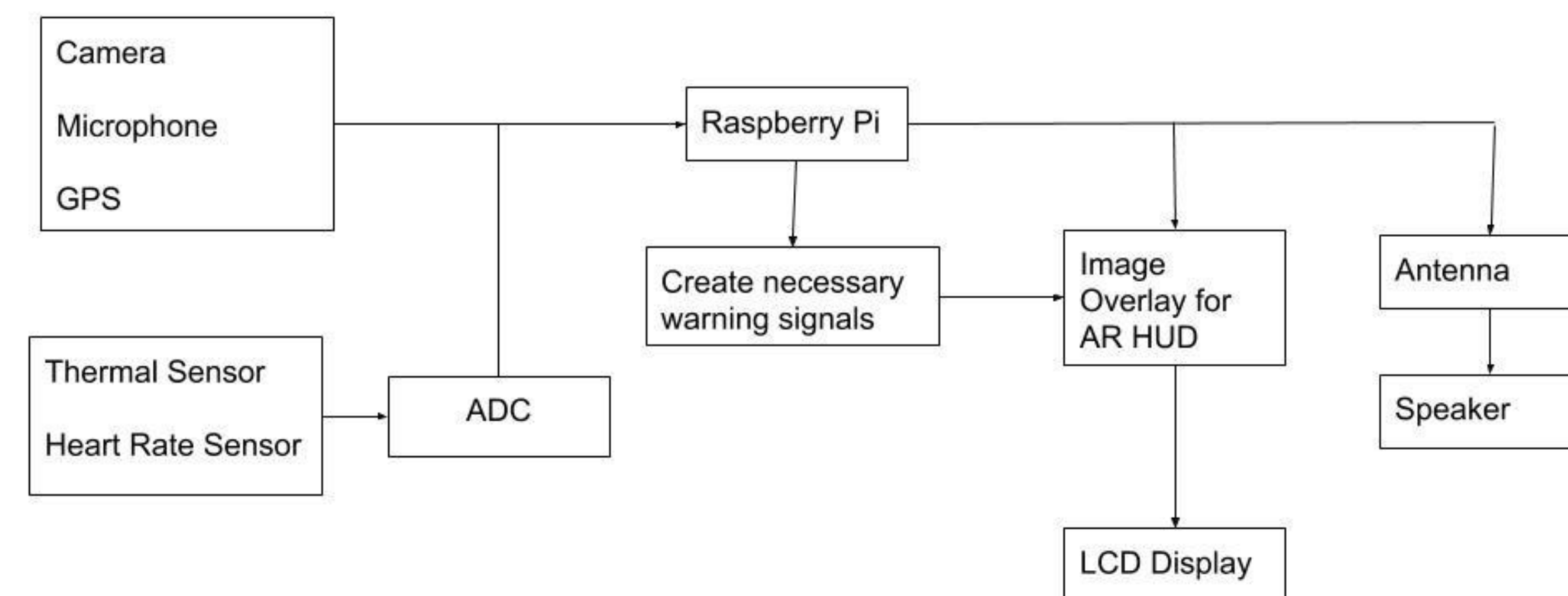
## Background

- firefighter suits are only rated to 300° C or 572° F
- fires can easily go past the temperature rating such as cases of flashover (500° C or 1000° F)
- most firefighter injuries are caused by overexertion and strain during a fire

## Project Goals

- provide firefighters a Heads Up Display (HUD) showing real-time temp data, heart rate, and heart rate of nearby firefighters
- limit exposure to fires that are too hot and unsafe
- minimize injuries by alerting firefighters to when they are pushing themselves too hard

## Diagram



## Hardware

- LCD display
- Raspberry Pi Camera V2-8
- Raspberry Pi (4GB)
- Heart rate sensor
- Amphenol Thermistor
- Adafruit Ultimate GPS Breakout
- Speaker and microphone
- Communications antenna
- Helmet and SCBA mask
- ADC
- Anker Powercore

## Schedule/Progress

### Fall 2019

Week 1-3

Research software and hardware needed

Week 3-5

Buy hardware, download software, design AR HUD

Week 5-6

Configure Thermistor, configure heart rate sensor, implement AR HUD with camera and LCD screen

Week 6-7

Implement AR HUD with sensor input and helmet

Week 7-9

Testing and debugging

### Winter 2020

Week 1-2

Research new hardware and redesign AR HUD and helmet setup

Week 2-6

Configure communications and GPS hardware and implement with AR HUD

Week 6-9

Testing and debugging

## References

- [1] Evarts, Ben. "NFPA Journal." NFPA Journal - US Firefighter Injuries 2017, Nov, Dec 2018, 1 Nov. 2018. [Online]. Available: [www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2018/November-December-2018/Features/US-Firefighter-Injuries-2017](http://www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2018/November-December-2018/Features/US-Firefighter-Injuries-2017). [Accessed October 7, 2019]
- [2] Madrzykowski, Daniel. *Fire Fighter Equipment Operational Environment: Evaluation of Thermal Conditions*. Fire Protection Research Foundation, Aug. 2017. [Online]. Available: [ulfirefightersafety.org/docs/RFEvaluationThermalConditions.pdf](http://ulfirefightersafety.org/docs/RFEvaluationThermalConditions.pdf). [Accessed October 7, 2019]
- [3] "Firefighter." Firefighter - an Overview | ScienceDirect Topics. [Online]. Available: <https://www.sciencedirect.com/topics/engineering/firefighter>. [Accessed October 7, 2019]



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