BabyGuard

Wearable & Rich Featured
Baby Monitoring and Safety System

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Department of Electrical and Computer Engineering

Advisor: Professor Tessier

Group Members

Yun Shi

- Establish connection detection among wearable and phone
- Implement and test alarm system
- Implement a website to illustrate our product

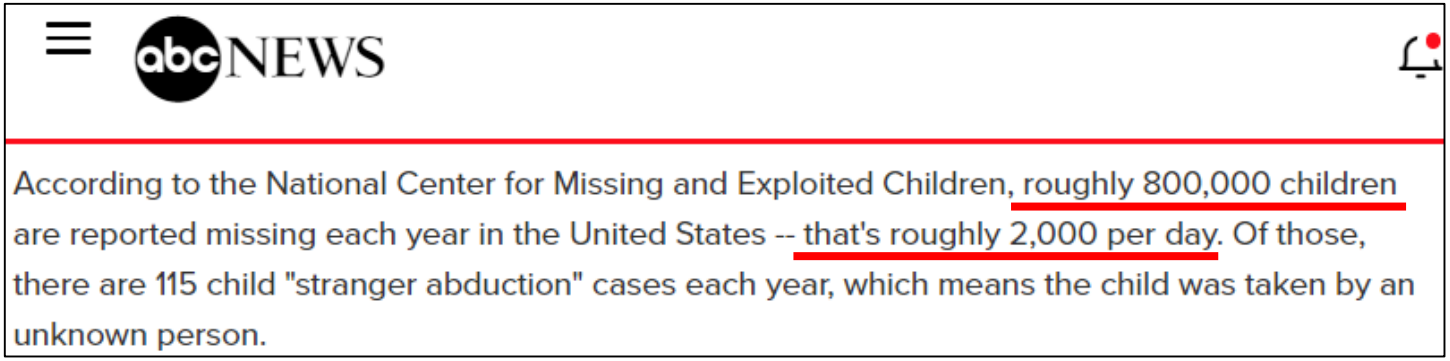
Advisor
Prof. Tessier

Kiran

- Wearable hardware design
- Wearable device development, interfacing and programing
- Determine technical feasibility of the solution.

What are the Problems?

- Large amount of missing children without instant alert



https://abcnews.go.com/US/missing-children-america-unsolved-cases/story?id=19126967

- Lack of tools for timely detecting the body temperature of a baby
- Current products in the market do not have multi-functional features

What is BabyGuard?

- Low cost array of **wearable sensors** collect a baby's body temperature and motion data
- Provides **real-time** feedback and able to track long term physical movement and temperature data
- Uses a home-mounted server to support **post data analysis** and **sharing**

New Features Since CDR

- Alarm System for Android App
  - Temperature Alarm
  - Distance Alarm
- Magnitude Adjustment Function for Motion Sensor
- AES Encrypted Data Transmission

Material Costs

Item	Estimated Cost
Bluetooth Low Energy Device	¥ 300
Button Cell	¥ 5
Android Device	¥ 2000 (Testing Purpose)
Personal Computer	¥ 4000 (Testing Purpose)
TOTAL COST	¥ 305 (US$45)

SYSTEM DESIGN OVERVIEW

System Requirements

Wearable Device

- Mounted with sensors and connects to Android app or Home Server via BT
- Real-time capture for temperature, acceleration and orientations sensor data
- AES encryption for data transmission, which protects a user's privacy.

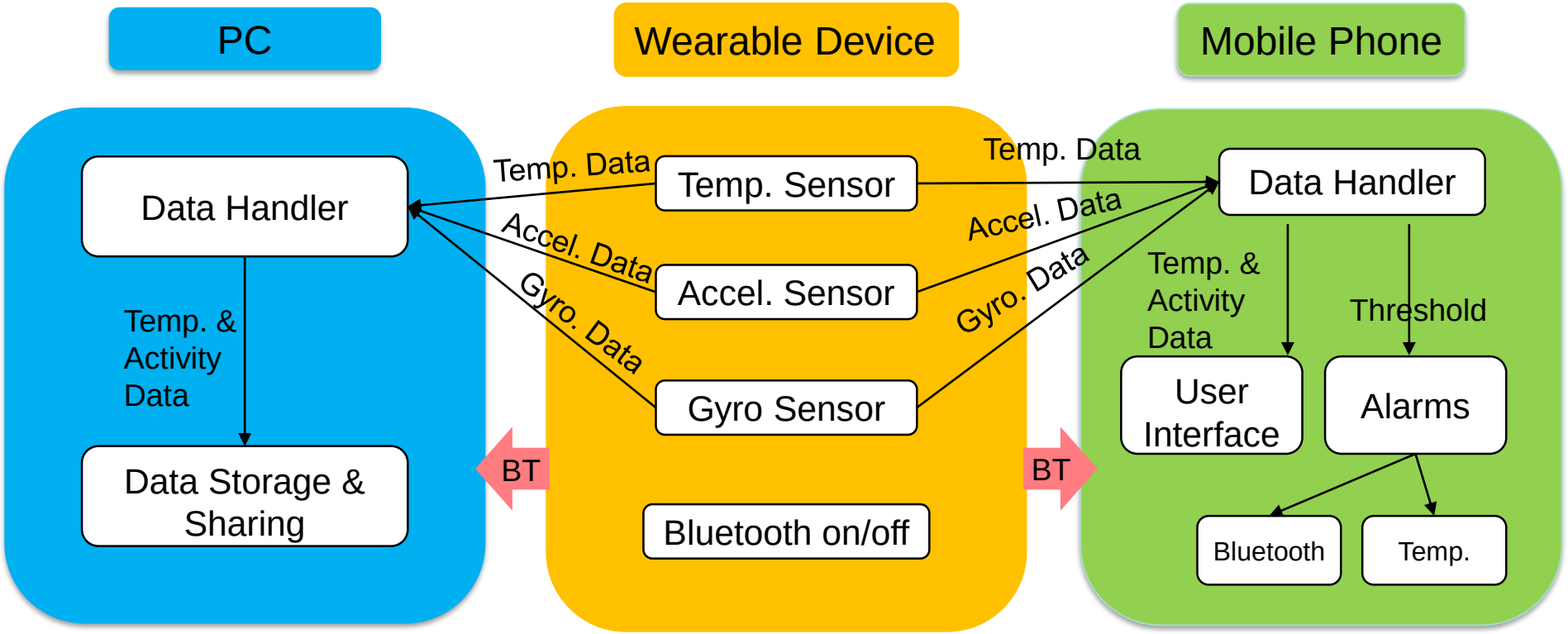
PC

- Connects with wearable device to download sensor data
- Enabled post data analysis and data sharing functions.

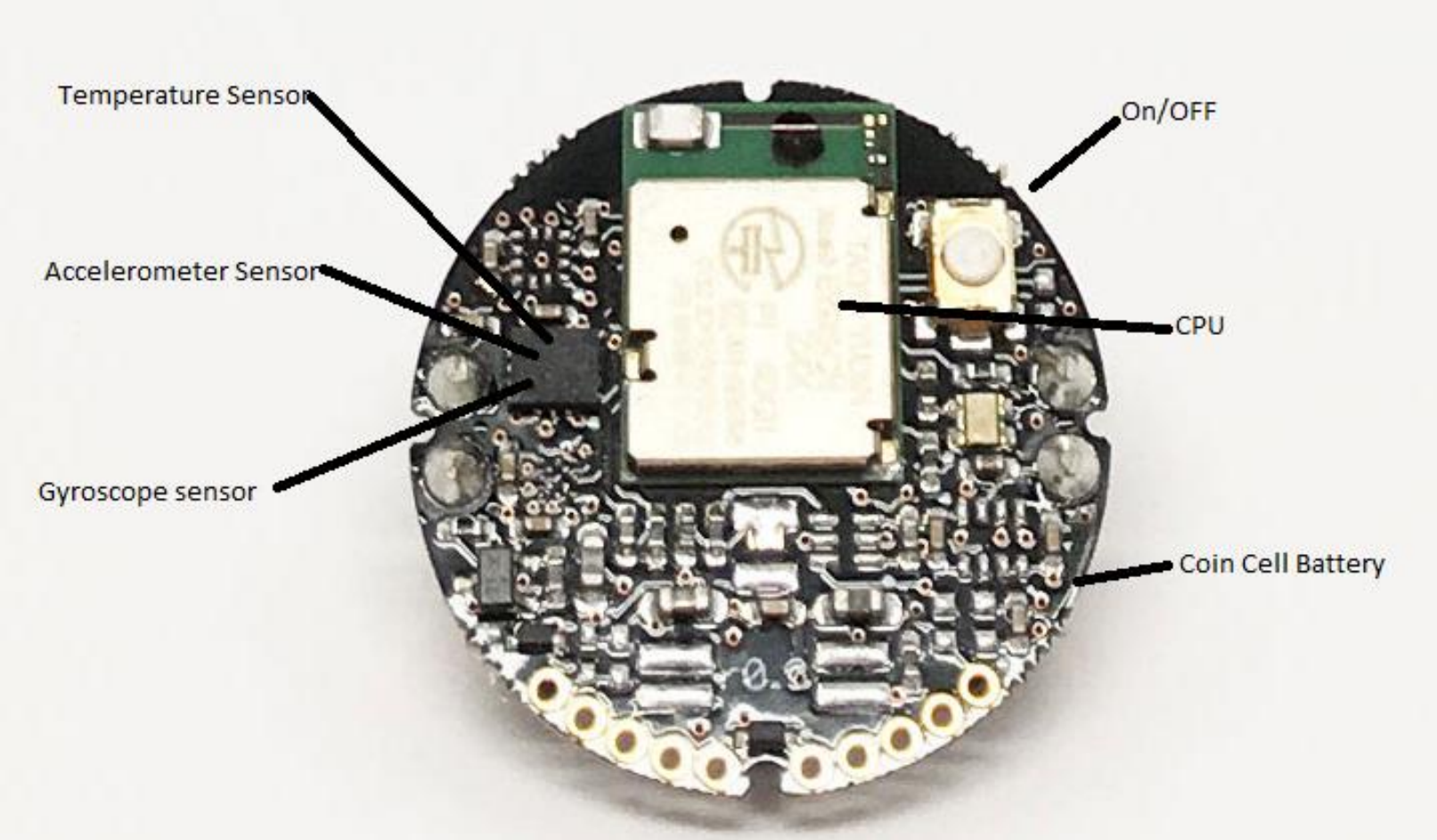
Android App

- Interacts with Wearable Device to receive data from various sensors
- User interface to monitor and provide alarm if trigger pre-set threshold

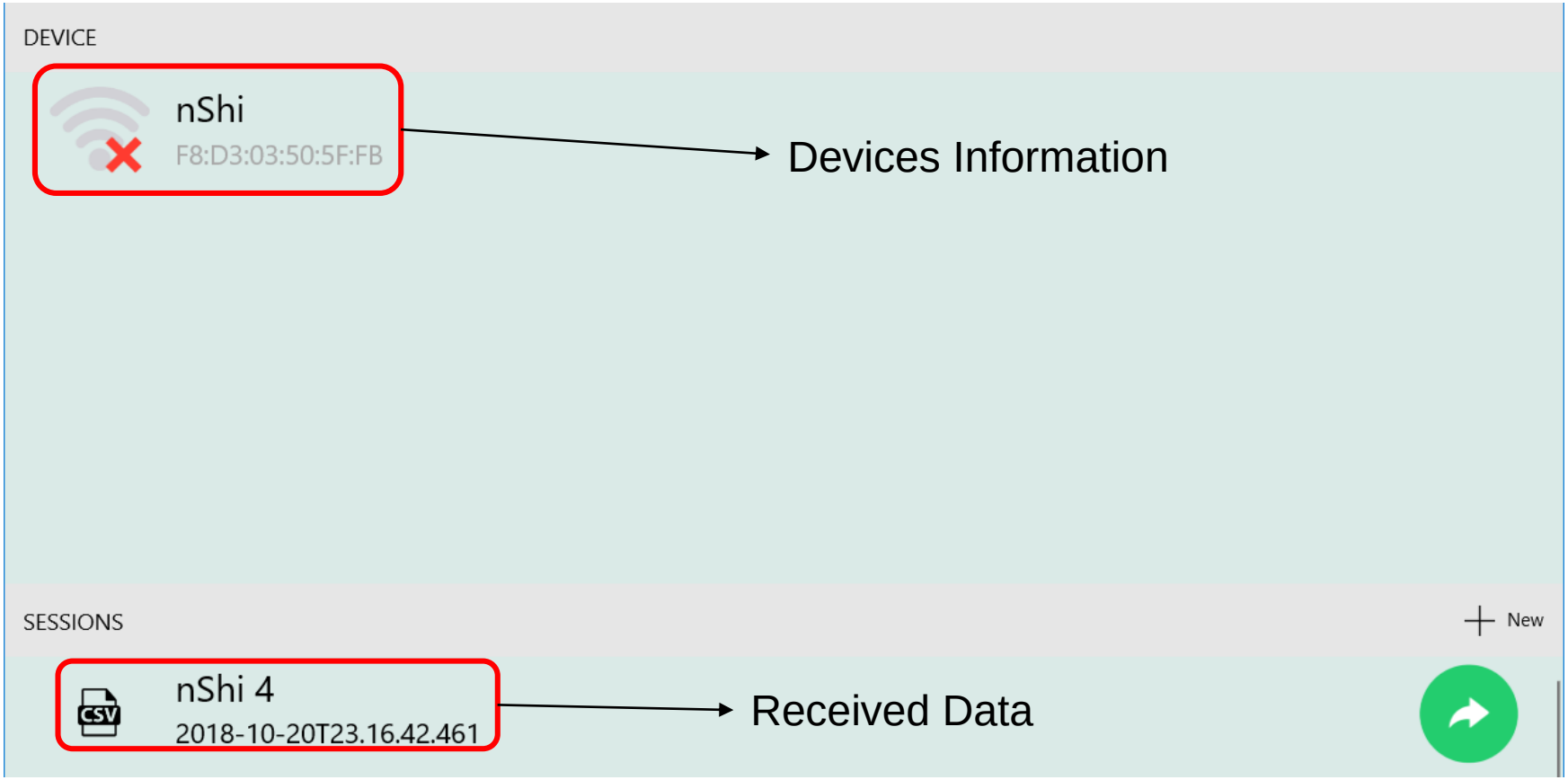
Block Diagram



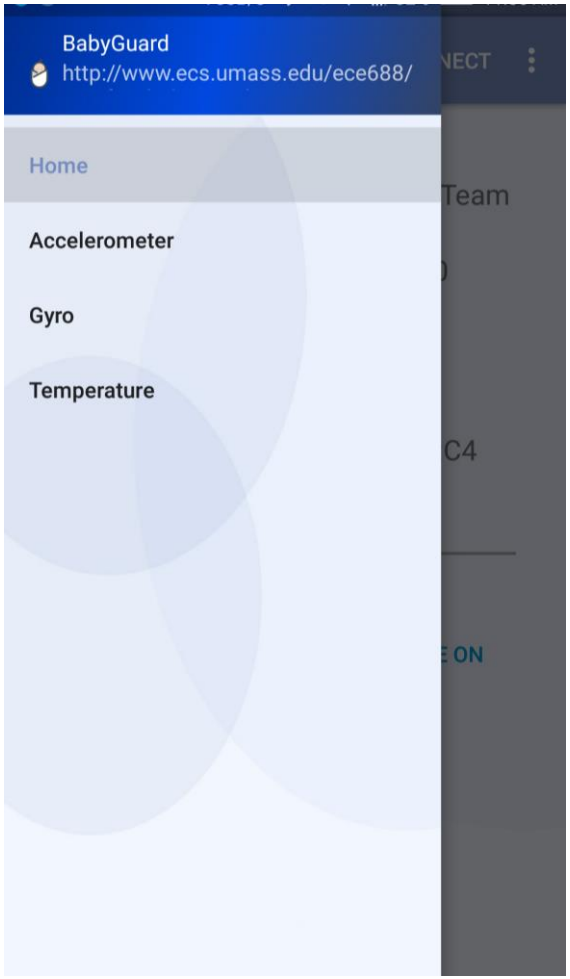
Solution Design - Wearable



Solution Design - PC Interface



Solution Design - Android APP



- Android application designed in Android Studio
- Retrieves real-time data from wearable
- Instant alarm for:
  - Temperature
  - Distance

DEMO TIME

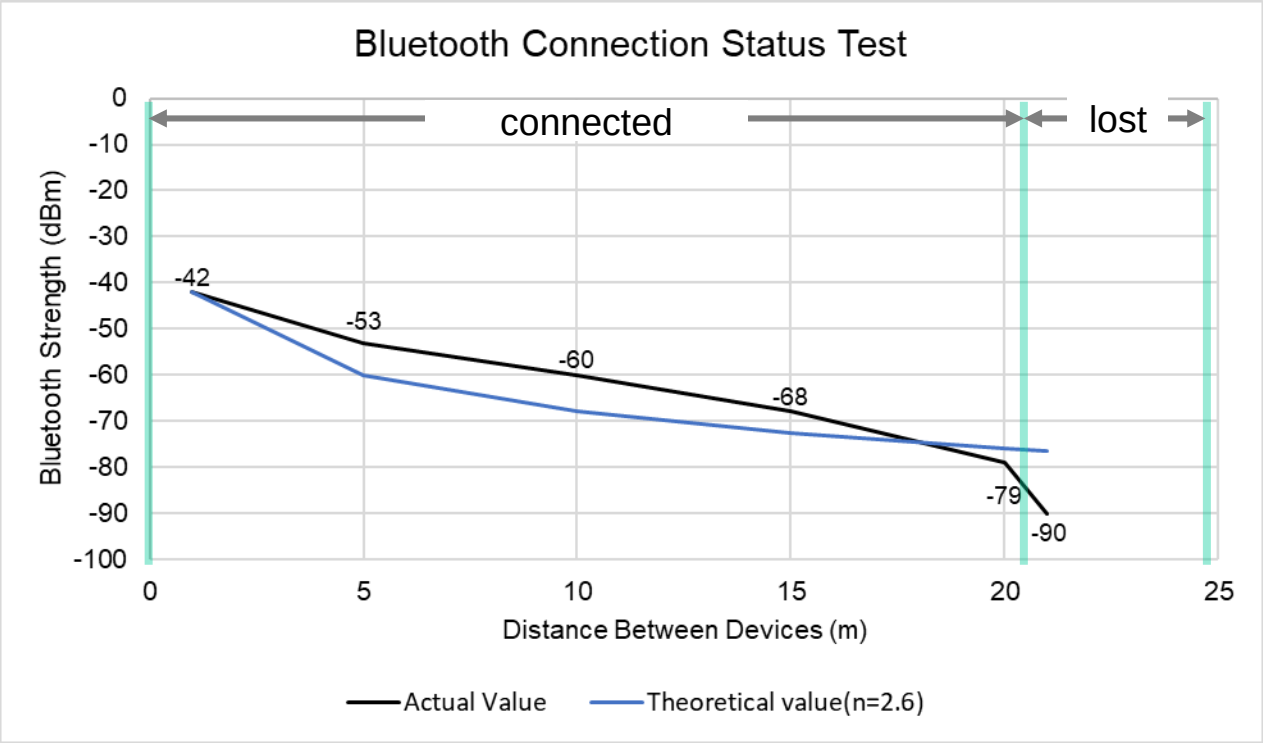
Demo Outline

- Android App
  - Temperature Sensor
  - Temperature Alert
  - Distance Alert & Data Analysis
  - Motion Sensor
  - User Customized Function
- Home Server
  - Temperature and Motion Data Transmission
  - Data Post-Analysis and Sharing

Bluetooth Signal Strength Test

RSSI[dBm] = -10*n*log(d) + A [dBm]

d = distance from device (m)
n = environment constant
A[dBm] = RSSI value measured 1 meter from device



THANK YOU

QUESTIONS?