

2.10 - Smart Bracelet

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Project Description and Requirements

Our product is a low cost smart bracelet designed to group and monitor children for their safety. Some features are:

- Programmable to 6 LED colors for group identification
- Controlled and monitored with our user application
- Generates alerts when a child goes out of a 15 meter range or removes the bracelet
- Receives an alert from the application

Project Inspiration

Our project is inspired by color coded t-shirts used for school outings. It is important because it will make outings with children manageable and safer. On March 11, 2020, ABC news reported “A 3-year-old boy was left behind by his class and his teachers while on a school field trip...” Incidents such as these could be prevented by the smart bracelet and its application.

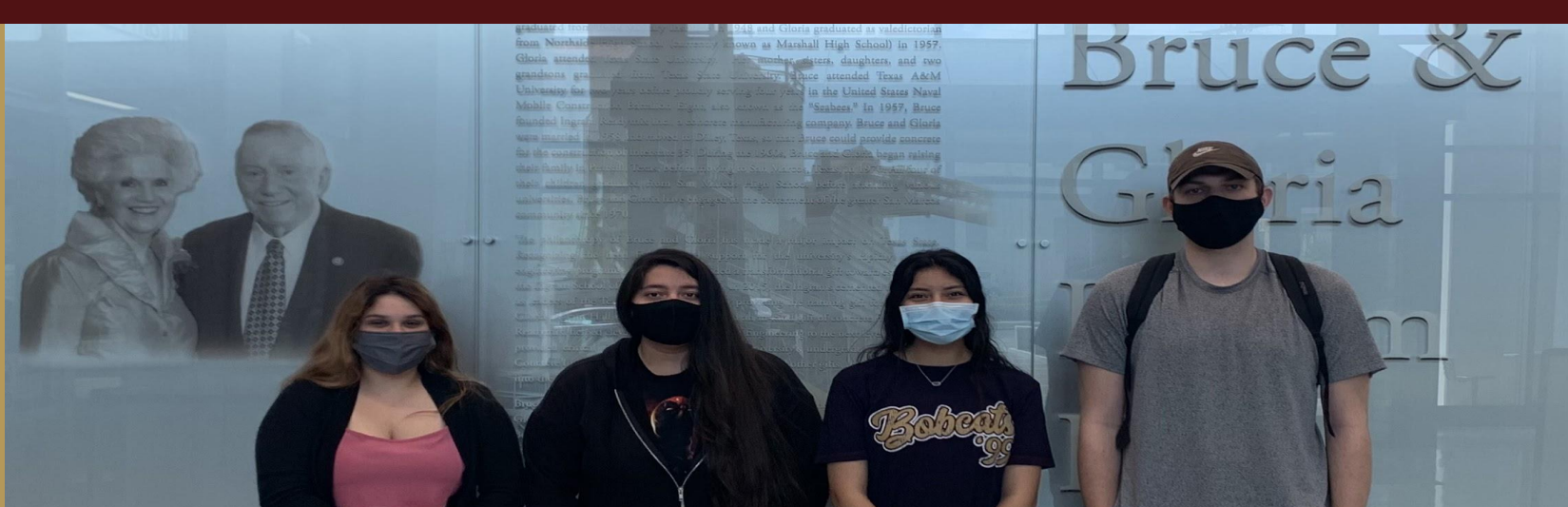
Design Approach

- Intelligent RGB LED for group identification
- Bracelet uses an ESP32 microcontroller due to its strong Bluetooth Low Energy module.
- Piezoelectric buzzer PS1240P02BT
- Micro Flat Button-type Vibration Motor
- TTP223B Capacitive Touch
- Uses the RSSI over Bluetooth to determine the distance

Acknowledgments

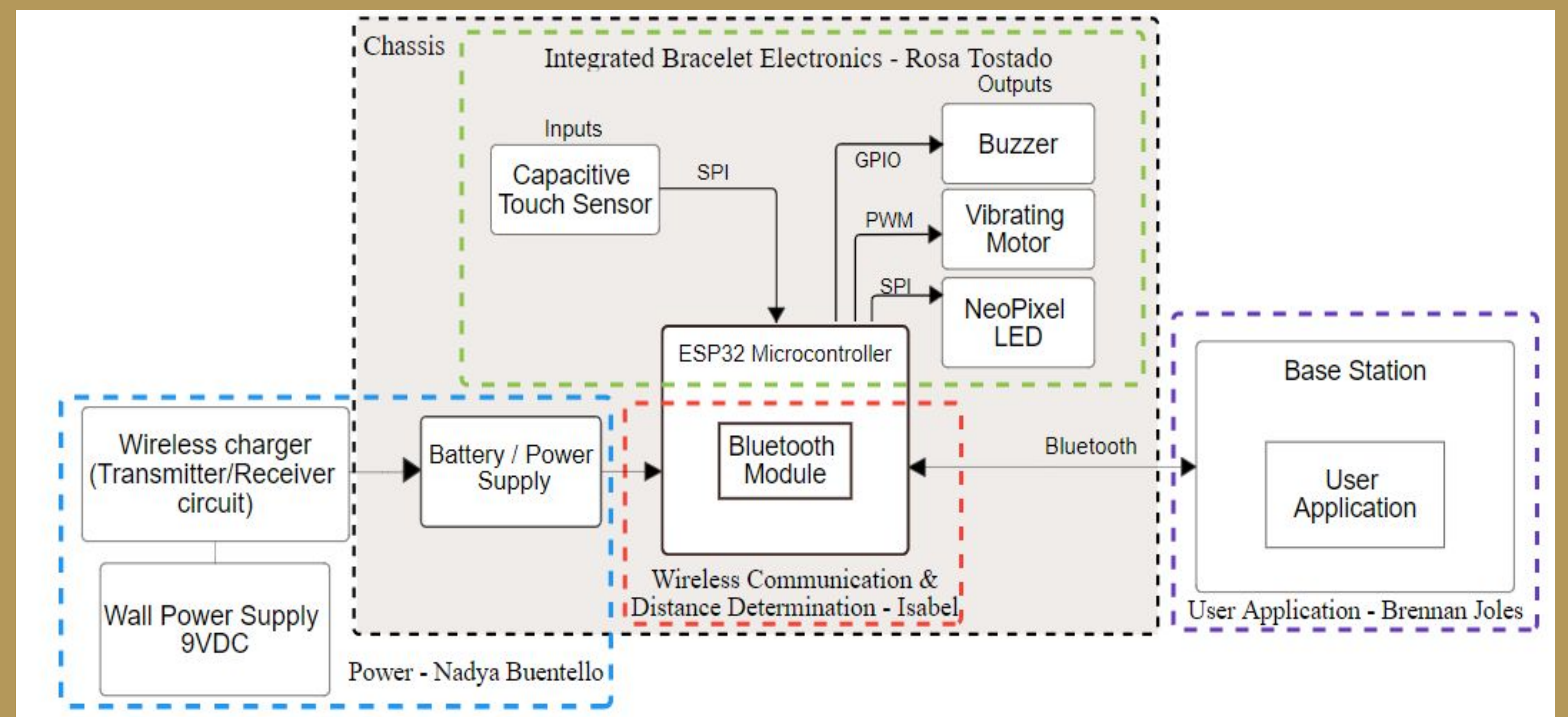
- Instructors: Mr. Lee Hinkle & Mr. Mark Welker
- Faculty Advisor: Mr. Lee Hinkle
- Sponsor: Texas State University & Mr. Lee Hinkle

Team Members

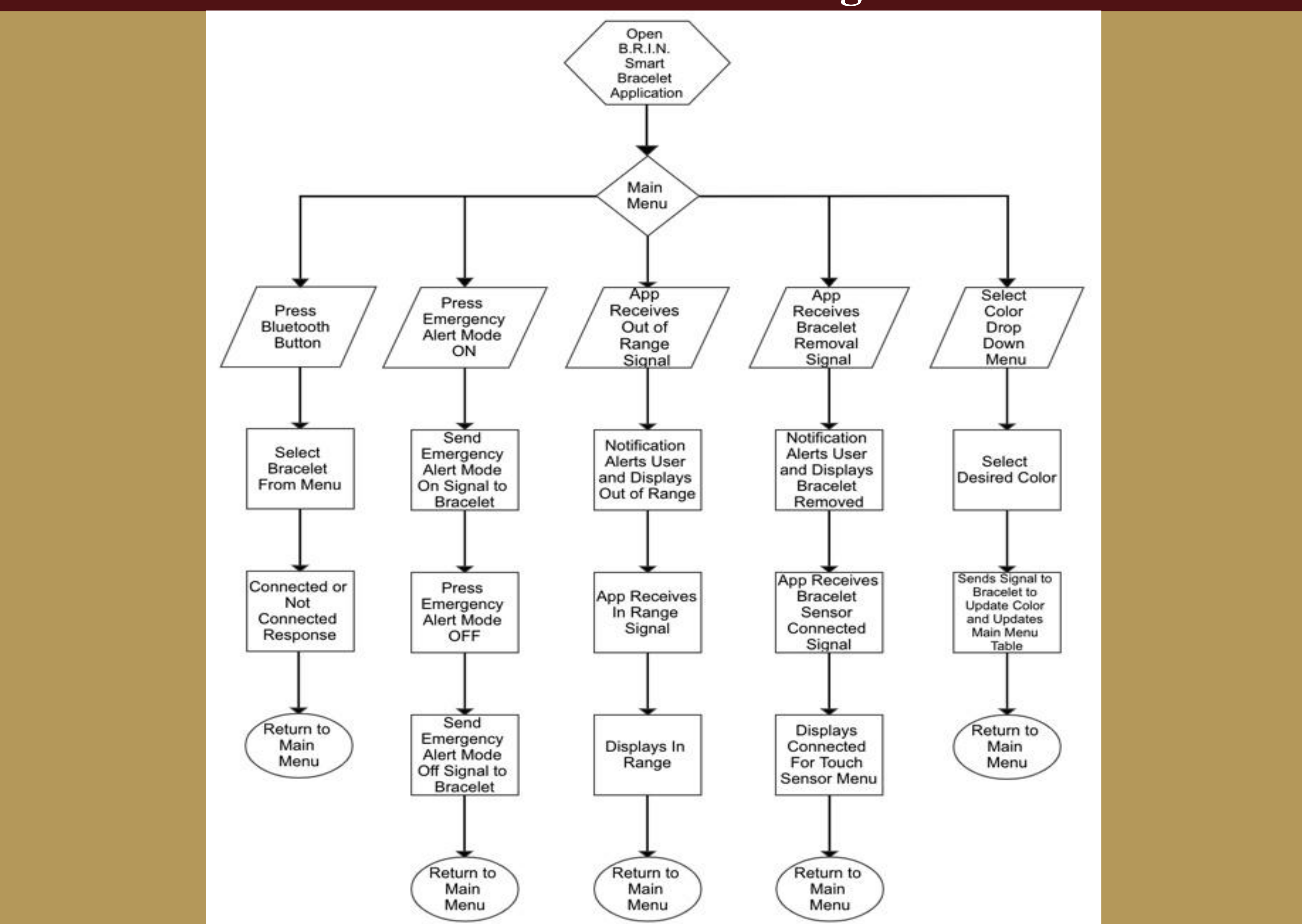


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Block Diagram



User Interface Flow Diagram



User Application

Responsibilities:

- Display connected bracelets
- Notifications when outside of 15 meter range or when bracelet is removed
- Emergency alert mode button
- Allow user to select color of bracelet LED
- Main menu table updates whether bracelet is connected and in or out of range

Test Results

Requirement	Measured Data	Result
Min 3hr Battery Life (full alert mode)	Greater than 3 hours	Pass. The smart bracelet can last for the minimum run time of 3 hours while being used.
Communication between bracelet and device	20 Meters	Pass. The bracelet was able to maintain communication with the user application up to 20 meters
Programmable LEDs	Changes to 6 different colors	Pass. The LED was able to change up to 6 different colors from the selected menu from the user application
Out-of-Range Alert	15 meters	Pass. The application is updated when bracelet leaves 15 meter range
Emergency alert	Sound, LED flashing, vibration	Pass. The bracelet starts to make a sound, vibrate, and flash the LED red.
Controlled via smartphone app	Runs all functions	Pass.