ECE Capstone program
Spring 2018
Project Abstract & Info

Please provide the following information to be shared with on capstone information exchange platform:

1. Project number: S18-38

2. Project title (as will appear on the poster): VisualEyes - The Special Obstruction Detector

3. Team members: Aston Kuroczka, Khan Saifullah, Yizhu Wang

4. Adviser(s) name(s): Professor Zoran Gajic

5. Up to 5 keywords that will help to classify the project scope:
Vision-assistance, Sensors, mmWave, DSP, Bluetooth

6. Project abstract (up to 250 words) to be shared with judges:
Our team has chosen to aid visually-impaired people in their everyday navigation around obstacles. We are choosing to tackle this problem by developing a system that captures visual inputs, analyses said inputs for obstructions in a user's path, and outputs this information to the user through a feedback system. The sensor we are using to detect obstructions is a TI mmWave IWR1642 radar sensor. The chip has a build in 600 MHz DSP core and a 200 MHz Cortex-R4F core. The PCB had two transmitters and four receivers whose signals are analyzed via the DSP core to calculate distance, direction, and speed of the materials in the environment. In our case, it is not necessary to classify specific objects, but rather map a boundary of passable terrain. Then to watch for sections of the boundary that move toward the user, such as with a car or when walking toward an object. The Cortex core handles intercommunications with the bluetooth module via I2C protocol. The bluetooth module will send an alert to the feedback system to notify the user of the approaching object. With a more elaborate feedback system beyond audio, there would be massive potential in provided an alternate interpretation in the 3D landscape as interpreted by the sensors.