Frequency Modulated Continuous Wave RADAR for Blind Navigation

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To help blind individuals navigate independently, I have created a plan for a wearable device which uses RADAR to warn navigators of objects in their path. The concept of this device was proven plausible by an EV3 Mindstorm first generation functional prototype in my project last year, where the focus was on certain user experience aspects of the design (e.g. how to provide feedback to the user, what object distances were relevant when navigating, what field of view was needed as a proxy for peripheral vision, etc). This year, I will continue progressing towards a practical implementation by exploring a more compact and powerful sensor based Frequency Modulated Continuous Wave (FMCW) Radio Detection and Ranging (RADAR) approach. The Texas Instruments IWR6843 RADAR operates at 60 GHz and can detect the distance, angle, and velocity of objects in a fairly wide field of view. To determine if this promising technology will truly meet the needs of a blind navigator's aid, I have conducted several experiments related to the configuration of the RADAR. These experiments have demonstrated configurations of the RADR that are appropriate for this particular application, proving the RADAR's capability to distinguish objects that are close together as well as objects' angular location and range. They have also shown the relationships and limitations of these factors, which will be important when programming the RADAR to detect obstacles in a navigator's path.

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