BME 484: Biomedical Engineering Capstone Design Project 2017-2018

Project Proposal

Project Title: Tee It UP – An adaptive golf device designed to bring back the joy of the game to visually impaired Veterans.

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Abstract: "Tee It UP" is an adaptive golf mat intended to provide a visually impaired individual with the ability to correctly align themselves to the golf ball. This innovative approach uses ultrasound technology to eliminate the responsibility of a coach to help the user setup to the ball while avoiding any modification to the golfer's natural swing. Ultrasound sensors beneath the driving range mat will drive the technology behind Tee It UP. The embedded ultrasound range finders will detect the distance between the club head and the ball in order to communicate this to a smartphone which will be used by a coach. The auditory feedback response will alert the golfer how far away their clubhead is from the ball using emitted beeps. The distance away from the ball is directly proportional to the frequency of the beeps. Tee It UP will enable visually impaired Veterans to experience the joy of teeing off again.

Innovation: Driving range mats embedded with ultrasound sensors safely accommodate and enable a visually impaired Veteran to drive the ball on their own once again. Auditory beeps increase in frequency as the clubhead gets closer to aligning the ball towards the desired target.

Materials: 2 ultrasonic range finders, smart phone, headphones, Arduino, golf club and ball

Subtasks: Sketch design, gather materials, put together an initial prototype of the "iGolf smart tee," get ultrasound working, tackle Arduino software and create code, create audio cues, etc.

Timeline: Following the template on the course webpage

References:

[1]C. Jager, "How GPS Technology Helps Blind Golfers To "See"", Lifehacker Australia, 2017. [Online]. Available: https://www.lifeacker.com.au/2013/06/how-gps-technology-helps-blind-golfers-to-see/.

[2]D. Massa, "Choosing an Ultrasonic Sensor for Proximity or Distance Measurement Part 1: Acoustic Considerations | Sensors Magazine", *Sensorsmag.com*, 2017. [Online]. Available: http://www.sensorsmag.com/components/choosing-ultrasonic-sensor-for-proximity-or-distance-measurement-part-1-acoustic.

[3]"United States Blind Golf Association - USBGA", *Usblindgolf.com*, 2017. [Online]. Available: http://usblindgolf.com/history.htm.
[4]2017. [Online]. Available: http://www.mouser.com/ds/2/813/HCSR04-1022824.pdf.