



MICHIGAN STATE UNIVERSITY

Resource Center for
Persons with Disabilities



Precision Pointing Device for the Blind with wireless Haptic and audio Feedback

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Current Sponsors: Texas Instruments, MSU College of Engineering, MSU Resource Center for Persons with Disabilities (RCPD), Michigan State University Demmer Center, MSU Adaptive Sports Club, Marathon Oil



Target practice at the Demmer Center MSU



Machine vision system with haptic feedback
created by ECE 480 students spring 2016

Introduction

This request originated from the MSU Demmer Center. The aspiration or aim was to provide an accommodation for blind individuals who wish to participate in recreational activities at the center. These activities include archery, small caliber target practice, and similar recreation.

Current technology for this purpose was purchased and tested with some success. One of the systems tested was designed by Jim Miekka of Surry, Maine.

<http://bangordailynews.com/2010/08/25/news/bangor/blind-mans-device-helps-him-shoot-gun/>

ECE 480 students in spring 2016 successfully created a precision pointing device with haptic feedback shown above. <https://www.rcpd.msu.edu/programs/engineering-design-day>

This system uses machine vision technology which sees a laser spot projected on the target. As the blind user moves the laser spot closer to the bull's-eye he is guided by changing intensity vibrations on a wrist cuff.

Project Goal

Students in fall 2016 will continue the development of this precision pointing device by providing the following improvements.

1. Software enhancements will improve the ease at adjusting color recognition. The current system requires many difficult adjustments to optimize the machine vision system to identify the laser spot. The current systems hardware includes a raspberry pi microcontroller and Python code.
2. Audio feedback will be provided in addition to the haptic feedback to help the user point to the target bulls-eye. Audio feedback could add other information such as the distance, size of the target, and wind direction.
3. Wireless technology will be used to eliminate the cord going from the camera system to the user.

Future enhancements

Gyro sensors could be added to this system to orient the user in the general direction of the target. The current system only senses the paper target area. The user currently sweeps the laser back and forth until he finds the target.

Project participants

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