

Project Title: Body Fat NERF Scanner
Team: Sasmit Agarwal, Justin Kim, Faith Dennis
EECS 149/249A Project Charter, Fall, 2023

Project Goal

This project will create a measurement device that enables users to estimate their body fat percentage by using a rotating camera and the NERF algorithm.

Project Approach

The project will model the measurement process as a state machine for the control of the rotation of the camera arm as well as the tilt of the camera. The goal will be to accurately position and rotate the camera in order to take images of the user at specific coordinates. It will send the images to an online program to run the NERF algorithm to convert the images at these points into a 3D model. This will allow the user to measure their volume, which can be used to calculate body fat percentage.

Resources

Our plan is to use a Raspberry Pi to control a servo for tilting a camera up and down as well as a motor or another servo to rotate the camera arm around the user. This system is mounted on a wooden platform for the user. The first step in the project will be to identify the torque requirements for the servo as well as the motor. One candidate for the tilting servo is the Dynamixel AX-12+ Robot Actuator. The motor has to be more powerful because it is rotating the entire camera arm. A candidate for the motor/servo is the HS-805BB Giant 1/4 Scale Analog Aircraft Servo. The first goal will be to test the motor and servo using the Raspberry Pi. Additionally, we would like to have a button to start the measurement process and a switch for power. Time permitting, we will integrate additional sensors to improve accuracy of positioning and tilting.

Schedule

- October 23: Project charter (this document)
- October 30: Design project in CAD, begin NERF testing
- November 6: *Milestone 1*: Demonstrate servo and motor action and on/off inputs.
- November 13: Start writing code to integrate, start making base
- November 20: Get all parts for platform + camera arm and begin assembly
- November 27: *Milestone 2*: Demonstrate camera rotation and tilt and NERF sample.
- December 4: System testing, assess body fat measurement effectiveness. Demonstration video made, poster prepared.
- December 13: Final presentation and demo.
- December 14: Project report turned in.

Risk and Feasibility

Parts for the rotation of the camera may exceed the budget. Additional motors/servos may be required for a greater degree of movement. Additional sensors may be required to determine position and tilt with greater accuracy.

GitHub

<https://github.com/HJK-X/eecs149-bodyfat>