Ratthamnoon Prakitpong (#63205165)
MECH423 1 page proposal

1. Objectives
The goal of this project is to make a fan to automatic directs the air from the fan to a moving target. I will design the fan platform and its motor connection interface, motor controls software, and computer vision software. I will already have a stepper motor and a laptop, so the only thing I need to build is the fan platform and its interfaces. The final product will a combination of these three components.

2. Rationale
Computer vision is an increasing popular and accessible method of gaining input signal, from self-driving cars to automation. However, it is not taught as a part of the mechatronics curriculum. This project would provide a good personal introduction to using this software tool.

While many past MECH423 projects have used CV, they tend to have an extra layer of complexity missing in this project. For example, the automated nerf gun has to do projectile calculations and face tracking. Another example is air hockey, which required 2-axis controller and a fast response time. This project simply turns the direction of the fan towards the target. This allows for reduced scope, appropriate for limited amount of help I can get from working online, and for a one-person project (instead of two like past years).

3. List of Functional Requirements

Functional Requirements	% Effort
FR#1: Fan platform with motor connection	35
FR#2: UART Controlled stepper motor	20
FR#3: Tracking software using computer vision	45

In a project that starts from zero, FR#2 will take up more effort. However, since I can reuse motor set-up from Lab 3, the effort spent on that FR will be less.

4. Functional Requirement #1, 5. Functional Requirement #2, 6. Functional Requirement #3
Point 4-6 omitted from one-page proposal due to their lengthy nature. They will be in full proposal.

7. Most Critical Module
The skills for FR#1 and FR#2 are taught in classes (CAD, prototyping, motors, firmware), whereas FR#3 is not, the module required to satisfy FR#3 becomes the most critical module. I will be following online tutorials on some CV tools available online (starting with OpenCV) and observe its accuracy, precision, input, output, and other parameters to verify how feasible they are for use in this project.

8. Risks and Countermeasures
Point 8 omitted as are point 4-6.

9. Learning Objectives
Software tools like computer vision will be increasing popular and accessible, so gaining this skill now is important for future mechatronics projects (even though it is not taught in the current curriculum). I hope to learn how to use computer vision modules available online, and learn how to adapt it for use in mechatronics context. Other parts of the project such as prototyping or motor controls can help me revise and apply what I've learned from classes.