ME 133 Winter 2023
Lab Project
Feb 23, 2023
Due: 3/22/2022

Submit a `zip` file named `yourFirstName-LabProject.zip` on Canvas with your code, a lab report (following the format in syllabus), and a short video proving the working hardware-software integration.

Overview

The purpose of the course project is to apply the tools and concepts learned throughout the quarter. The goal of the project is to design and build a mechatronic system using your Arduino and components from the labs. To begin, formulate your project as a *design question* which you will try to answer (How should an alarm system be designed?). This will keep the project focused and in scope.

Requirements

Mechatronic Components: Your project must incorporate *each* component of a general mechatronic system as shown in Fig. 1.

Implementation of some type of user input and control: Your project must incorporate input from a user. This can be in the form of button pressing or a graphical user interface, for example. Your mechatronic system must use the input to modify some type of behavior of the mechatronic system.

Should have sufficient complexity: The project must be sufficiently different then the previously labs and have a level of complexity appropriate for a final project. This mean don't make something simple. At the same time don't be too ambitious. A good strategy is to start simple, and add complexity in stages.

Final Report

The final report should consist of a lab report following the same format as previous labs.

a. **Abstract.** A single paragraph summarizing the paper's content, including a concise introduction of the topic, outline of the major results, and summary of the conclusions.

b. **Introduction.** This section should provide context for the project and include a summary of related work. Make sure to answer the following: Why is the problem interesting, what question does your project aim answer, how is it challenging and what related work has been done before?
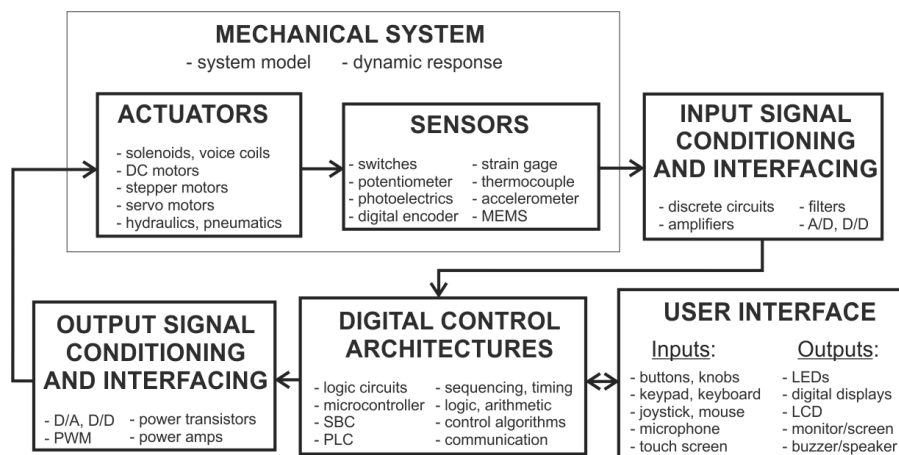

Figure 1: Components of a mechatronic system.

c. **Methods.** Here you should provide a detailed description of all the techniques used to generate your results. Include a description of the each component of the mechatronic system (see Fig. 1), and descriptions of the algorithms used with appropriate visual aids (e.g., block diagram of the controller).

d. **Results and Discussion.** Present and discuss the results of your project. Include figures to support your results. Provide context and interpretation.

e. **Conclusion.** Restate your research question, the methods used, and your major findings. Contextualize your results in terms of what has been previously done.

f. Please include your code as an appendix or supplemental files.

Your final report will be graded as follows:

1. (15%) Clear and organized presentation

2. (20%) Design and problem description

3. (20%) Solution (methods) description

4. (25%) Results description including supporting materials

5. (10%) Video demonstration

6. (10%) Overall difficulty