Project Milestone 01

Objective:

The first milestone of the project is with the following details:

Milestone 01	Deadline Date	Description
M-01 **(4%)**	Tuesday 4th of March, 2025	1. **Literature review** on image processing techniques of the assigned project and obtain for the review a **proposed plan**. 2. **List of hardware components** to be used in the project. 3. **Schematic/chart** of the project including the hardware components, circuit connections, location and type of the cameras, flow of the data from acquiring the image to actuating the hardware motors, etc. 4. **Setup of Anaconda (Jupyter Notebook)** for Python to be used as a coding language. 5. **Hardware design** using **SOLIDWORKS**. 6. **Circuit design** using **Fritzing or Proteus** applications. Note that you have to consider the **Raspberry PI in the control loop** as the main decision maker having the image processing code running and sending the control action to a microcontroller (Arduino) to actuate the system. 7. **Purchase** project components. 8. **Acquire Image** by the purchased camera connected to the **Raspberry Pi**.

Requirements:

The requirements from this milestone of the project are as follows:

1. Each team is required to perform a **2 pages** literature review on the assigned project. This review should be performed with **at least 5 different papers** (from 2020 till our mean time), including literature on the project idea, the image processing techniques and operations to be used and the possible hardware and circuit (electronics) implementation.
2. From the review, propose the **project plan** including the appropriate operations followed in the course outline that might be used to perform the required image processing tasks for the project (image filtration, edge detection, segmentation, or others).
3. In addition to the review, each team is required to perform a **market research report** for the components to be used in the project including actuators, sensors, batteries, cameras, microcontrollers, etc… needed for the project implementation. *(Note that: possible modifications can be performed to the list based on the implementation limitations)*.
4. Each team is required to draw a chart or **schematic diagram** (basic chart on paint/powerpoint/etc.). The chart should include the hardware connected to a schematic

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diagram of the connections done including the circuit connect, the locations of the cameras and the flow of the data from acquiring the image to actuating the hardware.

5. **Hardware** and **circuit design** through **SolidWorks and Fritzing/Proteus**. Note that you have to consider the **Raspberry Pi** in the control loop as the main decision maker having the image processing code running and sending the control action to a microcontroller (Arduino) to actuate the system.
6. **Start purchasing** the project components.
7. **Acquire an image** by the purchased camera connected to the **Raspberry Pi**.

Submission:

Each Team should create a **private repository** named ***"Image_Processing_Project_Team_#"*** on the GitHub, add all the team members as collaborators to the repository through Settings, then from Collaborators add the team members from Add people by their email address and add the course email as a Collaborator as well "gucmctr1010@gmail.com", create a folder named ***"Milestone_01_Team_#"*** to add all the files required on the milestone's submission.

Add to the repository the following:

1. **PDF file** PDF file including the following requirements:
   - Literature review done for the project should be presented. The document should include paragraphs for the literature done, screenshots (if applicable) of the literature implementation to the project and list of references used.
   - The proposed flow of the project (draft that can be modified)
   - The list of components needed for the project should be presented in a table format including the name of the component, the location of purchasing, and the number of items per each product and the price of each component.
   - This task should include screenshots of the system proposed diagram that can be divided into several screenshots including the hardware diagram, the circuit diagram and a flow chart representing the flow of data in the system and the flow of processes in the project.
   - Add screenshots for the designed hardware.
   - Add screenshots for the designed circuit.
   - Add screenshots for acquiring an image using the Raspberry Pi and the steps you did to acquire the image.
2. **Codes** Python code including:
   - The scripts added to the Raspberry Pi to capture an image.

The deadline of the **submission** is next **Tuesday 4th of March, 2025 at 11:59 PM**. Late Submissions will result in deduction from the grade of this deliverable.