EEM 422 Machine Vision Mini Project
Semester 1 2020/2021
Automated Meter Reading

This project's objective is to fulfil the following learning outcomes:
CO3, PO3: *To be able to design and select algorithms or components given the specification of the application of machine vision*

CO4, PO5: *To be able to develop machine vision solution using specified programming language*

Report format:

1. The report should be typed and picture/sketches should be drawn properly.
2. The report format is as follows:
    a. Front page: title and team members list
    b. Work distribution
    c. Abstract
    d. Introduction about the problem
    e. Methodology
    f. Results and discussion
    g. Conclusion and Future suggestion
    h. References
3. The soft copy of the report and source code/images should be submitted to elearning system

4. Due Date to submit report: **22/Jan /2021**.

"DO NOT COPY SENIOR's/YOUR FRIENDS' WORK/internet AS YOUR OWN". This is a serious offence!

Introduction:
During COVID19, TNB meter and water meter reading are not able to be performed. The objective of this project is to demonstrate machine vision can be utilized to enable meter reading remotely. The scope of this project is to capture the image and interpret the reading. It does not cover the transmission of the information.

Project output: To develop an automated meter reading system for a chosen meter

Project Requirement:
The project is a group project with two members. Please select and submit your group members' name to Elearning system.

(a) PO5: Implementation Requirement:

1. Programming language: C++ and OpenCV. You may use the image processing functions from OpenCV image library.

2. Graphical User Interface(GUI) for the program

b) Some form of analysis of the performance of the proposed vision system must be carried out.

c) In the report, there should be a section that describes how your solution fulfill at least three of the definitions of complex engineering problem as tabulated in Table 1. Please also describe how far you have achieved the objectives of the projects. **Failing to do marks will be deducted.**

Table 1 Criteria for Complex Engineering Problem

WP1	Depth of knowledge required	X
WP2	Range of conflicting requirements	X
WP3	Depth of analysis required	X
WP4	Familiarity of issues	X
WP5	Extent of applicable codes	X
WP6	Extent of stakeholder involvement	X
WP7	Interdependence	X
WP8	Consequences	
WP9	Judgement	

Project Marks distribution		
Report		Demo Video
Group (overall design and contents, justification for complex engineering problem)	Individual contribution (grammar and presentation)	
60%	20%	20%

Deliverables:

1. Written Report
   Requirement
   Clearly mark the contribution of each member. Failing to do so, marks will be deducted. You will get the marks according to your portion of write up.
2. Program (Source code and Images)
3. Demo video – A video to demonstrate how your developed system works.

All the files are zipped under EEM422Proj_Name1_Name2.zip and submit to Elearning system

The following are the related rubrics for report, individual contribution, demo video:

Rubric for Project Report

		Weight	Student performance/ Achievement					Score
	Criteria	weight (% course mark)	n=4	n=3	n=2	n=1	n=0	weight x n/4
1.	**PO3: Design**							
	Project Background ▪ Brief introduction of the entire project. ▪ Assess coverage of the aims and purpose of the project. ▪ Assess the descriptions of the approach to the problem and its context. ▪ Address and discuss the requirements of the project.. ▪	**5**	**best**	**expected**	**less than expected**	**poor**	**not satisfactory**	
	Project Design and Development ▪ Clearly state the chosen design option ▪ Explanation of concept involved ▪ Explanation of the design for the various areas involved in the project ▪ Detailing of the design involving	**20**	**best**	**expected**	**less than expected**	**poor**	**not satisfactory**	

	plans and drawings ▪ Design considerations are clearly presented with the relevant engineering drawings/sketches. ▪ Were there any difficulties in design and were they taken into consideration? ▪ Recognize the limitations and address any constraints of the project.							
	Experimental Design and Discussion ▪ Detail of experiment design and analysis of result/performance ▪ Presentation and Discussion on the result of the proposed design	**25**	**best**	**expected**	**less than expected**	**poor**	**not satisfactory**	
2.	**PO5: Use of Modern Engineering Tools (Psychomotor Domain)**							
	Use of Programming Tools and Imaging Library ▪ Consider the complexity of the programming in terms of project and GUI design ▪ Able to use and apply image processing	**40**	**best**	**expected**	**less than expected**	**poor**	**not satisfactory**	

	function available in image proceesing library ▪ Able to explain the function used in the program ▪ Successfully demo the project							
	Conclusions and Summary ▪ Highlight the overall conclusions of the project summarizing the design output.	**10**	**best**	**expected**	**less than expected**	**poor**	**not satisfactory**	
							Total	

Comments:

Examined by	**:**		**Signature**	**:**					
Date	**:**								

Rubric (Individual)

Category	Maximum marks	Criteria for maximum points

Grammar , spelling and language style Format and presentation	20	• The document contains no spelling or typographical errors. • The document contains proper grammar usage. • The document contains proper use of punctuation. • The document is well written, clear, and easy to understand. • Appropriate table and figure are used to demonstrate the explanation.

Rubric (Video demo)

Category	Maximum marks	Criteria for maximum points
Content	10	• Clear structure of presentation • The explanation is clear. • All the related components are included • All members demonstrate an active role in the process.
Video presentation	10	• The graphics and images are clear • Appropriate audio presentation