Republic of the Philippines
Laguna State Polytechnic University
Province of Laguna

Machine Problem No. 1			
Topic:	**Topic 1.1: Introduction to Computer Vision and Image Processing**	**Week No.**	1-2
Course Code:	**CSST106**	**Term:**	1st Semester
Course Title:	**Perception and Computer Vision**	**Academic Year:**	2024-2025
Student Name		**Section**	
Due date	**September 06, 2024**	**Points**	

Machine Problem No. 1: Exploring the Role of Computer Vision and Image Processing in AI

Objective:
Understand the importance of computer vision and image processing in Artificial Intelligence (AI) and explore how these technologies enable AI systems to analyze and interpret visual data.

Instructions:
Research and Comprehend:

- **Introduction to Computer Vision:**
  - Start by researching the basic concepts of Computer Vision, focusing on how AI systems process visual information.
  - Understand the role of image processing in AI, including why it is crucial for AI systems to enhance, manipulate, and analyze images effectively.
- **Overview of Image Processing Techniques:**
  - Explore the key techniques used in image processing, such as filtering, edge detection, and segmentation.
  - Identify at least three core techniques and investigate how these techniques help AI systems to extract meaningful information from images.

Hands-On Exploration:

- **Case Study Selection:**
  - Choose a real-world AI application that utilizes computer vision (e.g., facial recognition systems, autonomous vehicles, or medical imaging).
  - Investigate how image processing is used within this application. Focus on the specific techniques applied and their effectiveness in solving visual problems.
- **Implementation Creation:**
  - Select a simple problem related to your chosen AI application.
  - Create an image processing model (e.g., edge detection algorithm or image segmentation) to address this problem.

- Use diagrams or visual aids to illustrate how the image processing technique is applied and how the AI system would utilize it.

Presentation Development:

- **Slide 1: Introduction to Computer Vision and Image Processing**
  - Provide an overview of Computer Vision and the critical role image processing plays in AI systems.
- **Slide 2: Types of Image Processing Techniques**
  - Describe the three core techniques you researched. Include examples of each and discuss their applications in AI.
- **Slide 3: Case Study Overview**
  - Present the AI application you selected. Explain how image processing is used in this application and the challenges it addresses.
- **Slide 4: Your Image Processing Implementation**
  - Present the model you created for the simple problem. Explain how the model works and how it helps the AI system solve the problem.
- **Slide 5: Conclusion**
  - Summarize the importance of effective image processing in AI and reflect on what you learned from the activity.

Extension Activity:

- **Research an Emerging Form of Image Processing:**
  - Investigate a newer or emerging technique in image processing, such as deep learning-based image analysis.
  - Prepare a brief report or additional slide discussing its potential impact on future AI systems.

Submission Instruction:

- **Create GitHub Repository:** Create a repository for the subject (e.g., CSST106-CS4D).
- **Sample Machine Problem** (Reference: https://github.com/leeroyvincent/MIT-504-DEPATILLO)
- **Submission Format:** Create a PowerPoint presentation based on the "Presentation Development" section and export it to a video with 5-10 seconds transition per slide. Include the content in GitHub using Markdown Language (.md).
- **Filename Format:** [SECTION-BERNARDINO-MP1] 4D-BERNARDINO-MP1
- **Penalties:** Inability to follow this instruction will result in a 5-point deduction for filename format and a 5-point deduction per day for late submission. Cheating and plagiarism will be penalized.

Rubric for Machine Problem No. 1: Exploring the Role of Computer Vision and Image Processing in AI

Criteria	Excellent (10 points)	Good (8 points)	Fair (5 points)	Poor (2 points)
Research and understanding of AI	Comprehensive understanding of AI and the role of image processing.	Good understanding with minor gaps.	Basic understanding with some inaccuracies.	Poor or incomplete understanding.
Overview of Image Processing Techniques	Thorough exploration of three techniques with clear examples.	Adequate exploration with some examples.	Limited exploration with unclear examples.	Minimal or incorrect exploration of techniques.
Case Study Selection and Analysis	Well-chosen AI application with clear analysis of image processing techniques and their effectiveness.	Appropriate application chosen with some analysis.	Basic application chosen with limited analysis.	Poorly chosen application with little to no analysis.
Creation of Image Processing Model	Clear, accurate, and well-illustrated model that effectively addresses the problem.	Good model with minor inaccuracies or unclear illustrations.	Basic model with significant errors or poor illustrations.	Inaccurate or poorly constructed model.
Presentation Quality	Well-organized, visually appealing, and professional presentation with clear explanations.	Organized presentation with minor issues in visual appeal or clarity.	Somewhat organized but lacks visual appeal or clarity.	Disorganized presentation with poor visuals and unclear content.