Ravensbourne
University London

Assessment Project Title	
Deadline	Report and Code fies (Week 12) - 12 Dec 2025 by 16:00 Presentations - Week 13
Submission Method	Canvas Submission (Online) (A link will be made available closer to the submission date)
Tutors	Dr KHadijat Ladoja

Module Title	Computer Vision and AI	Level / Semester	5
Module Code	CMS22202	**Credit / Weighting**	20
Module Leader	Dr Nosheen Gul	**Date of Issue**	03-10-2025

Assessment cover image

INTRODUCTION

This project challenges students to design and implement a basic computer vision system using Convolutional Neural Networks (CNNs) to classify objects in images or video streams. Students will use AI algorithms to create a multi-class classification system capable of identifying different objects in a given dataset. The goal is to provide hands-on experience with building and training a CNN model for practical applications in image recognition and classification.

ASSESSMENT PROJECT BRIEF – Breakdown / details

Project Objective

To develop a CNN-based object classification system that can analyze images or video frames and correctly classify objects into multiple categories. Students will select their own dataset and apply machine learning techniques to train and evaluate the system's performance.

Core Features

1. **Dataset Selection:**
   Students can choose a dataset of their interest (e.g., images of animals, vehicles, or everyday objects) or use a public dataset (e.g., CIFAR-10, ImageNet, or a smaller, manageable dataset).
2. **CNN Architecture Design:**
   Build and train a Convolutional Neural Network (CNN) to perform object classification. Use frameworks like TensorFlow to implement the model.
3. **Multi-Class Classification:**
   Implement a system capable of distinguishing between multiple object classes (e.g., cats, dogs, cars, etc.). Evaluate its accuracy using appropriate metrics like precision, recall, and F1-score.
4. **Basic Model Evaluation:**
   Test the model on unseen data to check its ability to generalize. Provide visualizations of predictions for clarity (e.g., confusion matrix or labeled images).
5. **Optional Features:**

   - Integrate the system with a live webcam or video feed to classify objects in real-time.
   - Add a simple notification system to display alerts or messages for specific object detections.

SUBMISSION

You are asked to submit the following work:

1. **Codebase**:

Fully commented source code, ensuring that it can run on a specified platform (mobile or desktop) with instructions for setup.

2. **Documentation**:

A technical report (500 words) detailing the design and implementation process, including:

- The object detection and behaviour recognition techniques used.
- How the system monitors for and detects intrusions.
- System performance evaluation, challenges encountered, and potential improvements.

3. **Presentation and Demo:**

A 10-minute live presentation (during the final week) explaining the project's technical aspects and giving a brief demo.

![Ravensbourne University London logo]

Essential reading/Learning resources:

1. Ahmed Fathi Bekhit, (2022), Computer Vision and Augmented Reality in iOS: OpenCV and ARKit Applications

2. Joseph Howse, Jose Minichino, (2022), Learning OpenCV 4 Computer Vision with Python 3: Get to grips with tools, techniques, and algorithms for computer vision and machine learning

Recommended reading/Learning resources: (Provide links/details on Canvas module page)

1. Muller, John, and Luca Massoron. (2016) Machine Learning for Dummies, John Willey and Sons Inc.

2. Pattanayak, Santanu. (2019) Intelligent Projects using Python: 9 Real-world AI Projects Leveraging Machine Learning and Deep Learning with TensorFlow and Keras. Packt Publishing.

Other useful information

Physical Resources:

1. Computer or Laptop with a Web Cam, capable of running OpenCV, Unity and Python.

USEFUL WEBSITES: Google Colab

Assessment and tutor feedback date	Grades and feedback will be released either within or up to a maximum of 20 working days after the assessment submission date.

Academic Misconduct	As specified in our General Academic Regulations, Academic Misconduct (e.g., plagiarism, inappropriate use of AI applications and tools, collusion, fabrication of information, contract cheating etc) will be dealt with formally following our procedure for Academic Misconduct. This means for example, close similarity between students' assessments, suspected use of AI, or third-party completion of assessed work and assessments that are not referenced appropriately are likely to lead to an investigation. The penalty for academic misconduct is a fail grade with an additional penalty applied according to the gravity of the case. If you have any doubts about how to avoid plagiarism, inappropriate use of AI or how group work assessments are submitted to recognise individuals' work and contribution, please discuss this with the module tutor or Course Leader. When you submit your assessments, you will be asked to complete/sign a declaration that it is your own work.
Late submissions	You can submit work up to 24 hours after the module deadline. This work will be capped as a pass grade unless you have a 5-day approved extension or other approved Extenuating Circumstances (ECs). Please see Academic Regulations below for further details.
Academic Regulations 25/26	To pass this module, you should aim to submission work before the deadline shown within this brief. However, it you fail to submit the work you will be offered 2 further retrieval opportunities. The grade for both retrieval opportunities will be capped unless you have approved **Extenuating Circumstances.** You will be notified of a new deadline date for the retrieval opportunities via a 'Retrieval Module brief'. **How to apply for a 5 day extension?** You can apply for a **5-day extension** for any module(s) during the year. This must be done before the submission deadline for each module. Click here to find 5 day extension application **How to apply for Extenuating Circumstances?** You can apply for **Extenuating Circumstances** before the deadline or within 5 days of the deadline: Click here to find EC application Note: You can apply for Extenuating Circumstances for any module, except where the assessment is 'ungraded' and marked as Pass/Fail' only. For further information please use this link to access General Academic Regulations

Other requirements for submission	1. Code should be submitted on Canvas as a zip folder containing all the required files to run and test the code. 2. Documentation should be submitted as pdf file on Canvas 3. Demonstration of the project will be face to face in classroom.

Module learning outcomes		Assessment Criteria	Relevant Core Competency
LO_01	Evaluate the principles of artificial intelligence, modern technologies and potential issues affecting the development of AI and ML	**Explore** Research and Analysis	• **Cognitive** • Creative • Professional • Emotional, Social and Physical • Culture • **Enterprise and Entrepreneurial** • **Digital** • Ravensbourne Return
LO_02	Develop an AI based system using suitable development tools and techniques	**Create** Experimentation	• Cognitive • **Creative** • **Professional** • Emotional, Social and Physical • Culture • Enterprise and Entrepreneurial • **Digital** • Ravensbourne Return
LO_03	Reflect upon own experience and investigate potential uses of approach taken	**Create** Technical competence	• **Cognitive** • Creative • Professional • Emotional, Social and Physical • Culture • **Enterprise and Entrepreneurial** • Digital • Ravensbourne Return
LO_04	Evaluate various approaches for Machine Learning and developing AI solutions and the effectiveness of different learning algorithms	**Integrate** Collaboration	• **Cognitive** • **Creative** • Professional • Emotional, Social and Physical • Culture • Enterprise and Entrepreneurial • Digital • Ravensbourne Return

Assessment tasks	Submission Method	Weighting %
Formative Python Labs **Summative** **Task 1: Project Development and Presentation** **Task 2:Documentation and code files submission**	Face-face Demonstration Canvas Submission	75% 25%