**E-Portfolio Submission.**

**Introduction.**

The Machine Learning module, the third module of the PG Dip Artificial Intelligence course of the University of Essex Online, has been a particularly challenging module where finally, the theory about Machine Learning has been put in practice with a very practical approach.

The overall work done during this module has been summarised in a special section of my E-portfolio, which has been named “Postgraduate Diploma in Artificial Intelligence - Machine Learning Module (April 2025)”.  
This section of the E-portfolio has been divided exactly as the module of the University: 12 modules, each module representing a topic and a week of work and study.  
In each section there will be the topics studied during the week, all the activities related to the topics (collaborative discussions, team project, individual project and personal reflections).

Last part of this submission will be a reflective section which will use the Gibbs' Reflective Cycle framework as a reflective tool. “Gibbs' Reflective Cycle consists of six stages that guide you through the stages of the reflective process by asking a series of cue questions” (Jasper, 2013: 80).  
These stages are: Description, Feelings, Evaluation, Description, Conclusion and Action Plan.

The online link of the E-Portfolio is: <https://atrevisi7521.github.io/pgdipAI.html>

**Section 1: Unit-by-Unit Learning Evidence.**

**Unit 1**

The first week provided an interesting yet challenging transition from theory to practical development. The main activity involved analysing Industry 4.0's impact on our working sectors. We read Susu Nusala, Gary Metcalf, and David Ing's work on the evolution from Industry 4.0 to 5.0. Surprisingly, Industry 5.0 represents not increased technological reliance, but rather a human-cantered approach balancing current excessive technology dependence (Metcalf, 2024: 2).

My collaborative discussion contribution examined automation's impact on the automotive sector. The analysis highlighted that despite significant company investments in automated driving advancements, infrastructure development remains insufficient to support these vehicles (Trevisi, 2025).

Additionally, I connected with my five Team Project members to organize our Unit 6 deliverable, scheduling our first team call to structure the upcoming workload.

**Unit 2**

The second week focused on Exploratory Data Analysis (EDA), a crucial technique considered "the stage where we actually start to understand the message contained in the data" (Mukhiya and Ahmed, 2020).

The main activity involved continuing the collaborative discussion by responding to two fellow students' posts. My first contribution deepened the topic of Development, Security and Operations (DevSecOps) in Industry 4.0 and 5.0, emphasizing the importance of incorporating ethical rules, privacy protection, and responsible artificial intelligence principles within this approach (Trevisi, 2025).

My second response moved beyond technical system failures to address ethical and legal issues. Using the example of AI chatbot malfunctions on social media platform "X" (formerly Twitter), I reinforced that ethical considerations, privacy protection, and responsible AI principles must be integral components of any AI system (Trevisi, 2025).

**Unit 3.**

Third week topic was introduction to correlation and regression, and the main activity was to upload example notebooks in Google Colab, change variables and note the changes in data points are impacting the correlation and regression. Examples were about: Pearson's correlation coefficient, linear regression, multiple linear regression, and polynomial regression.

A summary post has been uploaded in the collaborative discussion forum to summarise the previous posts.

**Unit 4, 5 and 6.**

The fourth, fifth, and sixth weeks focused primarily on the Team Project Report due at week six. Topics studied included Scikit-Learn open-source library for Python, clustering techniques, and clustering applications in Python programming.

The main activity involved preparing "Group 3" for the mid-module assignment. Following an initial Zoom call for introductions, key achievements included completing the Group Contract, preparing seminar questions, and assessing project components for role assignments based on individual strengths.

I took responsibility for organizing calls (challenging due to different time zones), releasing meeting minutes via WhatsApp, and creating a basic Gantt chart for task follow-up.  
  
The second team call in week five established members roles and responsibilities:

* “Open discussion about roles and responsibilities.
* Definition of roles in the team: Business Analyst; Machine Learning coding specialists; Data Analyst (Visualisation Specialist); Report Specialist.
* Team decided together not to have a Team or Project Leader. All the decisions will be taken via poll on WhatsApp Group (Majority wins).
* Started Planning the Machine Learning part of the project. Results shared via WhatsApp Group.
* Track 1 chosen => Classical ML (Regression & Clustering). Price prediction, demand trends, customer segmentation.
* Simple Gantt Chart has been prepared to follow-up various stages of the project and be aligned.”

(Trevisi, 2025).

As Report Specialist, I coordinated team contributions into a comprehensive report analysing an Airbnb dataset, presenting business-related questions to management through machine learning approaches, submitted by the June 9th deadline.

The grade was a particularly good 80% (distinction) but with some important remarks by our tutor:

* “the link between the model results and real business decisions could be clearer.
* the report needs more depth in discussing model limits, interpreting results, and linking findings to Airbnb’s wider strategy.
* the report goes over the 1,000-word limit, which affects conciseness.”

(Sotiriadis, 2025).

**Unit 7.**

Seventh weeks was dedicated to the study of the Artificial Neural Network (ANN). “ANN is inspired by the neural networks of the human body, while multithreading is a concept that can be considered a minor, modified derivative of this neural network” (Sarkar, A. et al., 2022).

The activity of this week was, again, to upload examples of simple perceptron, perceptron and operator and multi-layer perceptron in Google Colab and run the activities trying to understand the structure of Phyton.

**Unit 8.**Eight weekwas dedicated to the deepening of the study of the Artificial Neural Network (ANN). The main activity of this week was the second collaborative discussion to share with my fellow students thoughts and opinions about the risks and benefits of using AI powered writing generating tools and, most precisely, the ethical and possible legal issues related to the usage of those tools.

In my first and starting post, I wanted to highlight the usefulness of the usage of those tools yet the lack of understanding of surrounding situations that could lead to dangerous suggestions or wrong answers (Trevisi, 2025).  
This discussion forum gave me the opportunity to think about the ethical implications of using AI tools and how the human intervention or mediation is still crucial and I am connecting this thoughts with the principles of Industry 5.0 that are quite similar to my position.

Had the chance to reply to few fellow students about the possible issue of using AI writing tools for academic purposes and the importance of the intervention and help from tutors or professors to guide students towards an ethical usage of those tools.

A summary post of the discussion has been uploaded at the end of the collaborative discussion forum.

**Unit 9-10-11.**

Ninth, tenth and eleventh weeks have been dedicated to the introduction and study of Convolutional Neural Networks (CNN), Natural Language Processing (NLP) and Model Selection and Evaluation.

The main activity during these three weeks was the preparation of the summative assessment, the individual presentation. This has been, so far, the most challenging and complicated assignment I had to deal with, and it has been difficult to finish it and to answer to all its questions.

The assignment required to plan and develop and object recognition model using the famous CIFAR-10 dataset and try different machine learning approaches. (University of Essex Online, 2025).

The coding part was the extremely difficult part, not being a professional programmer and being only on my initial journey while learning Phyton. It took me over a month to produce a decent code but I needed a lot of help from AI engineers (work colleagues), online resources (part of the code has been inspired by very good online programmers and by some online videos) and a Phyton book I bought, which is: *“Python QuickStart Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications”* by Robert Oliver.

I am not fully satisfied with my coding for this project but, since there was a considerable time constraint, I did the best I could.

The model at the end worked and I learned a lot about feature engineering and its importance, and I put in practice the Support Vector Machines (SVM) and k-Nearest Neighbors (KNN), which are both supervised machine learning algorithm very suitable for classification and regression. Those two algorithms were chosen for the object recognition model.

Despite the time pressure and the elevated level of stress generated due to lack of programming skills and difficulty of the assignment, I managed to present a 20-minute PowerPoint presentation answering to all the requested points.

**Unit 12.**

Twelfth week has been dedicated to study and understand the trends in machine learning and the impact on industry 4.0

Main activity of the week is this report based on the overall E-portfolio work done during all the module and that can be found on this link: <https://atrevisi7521.github.io/pgdipAI.html>

Last part of this report is about a reflective session.

**Section 2: Reflecting Session.**

This Reflecting Session will cover four main points:

* *Knowledge* of different machine learning algorithms used in this module.
* *Individual contribution* to team activities.
* *Experience* as a member of a development team.
* *Impact* on my professional and personal development.

**Machine Learning Algorithms Knowledge.**

As discussed in the previous section, the individual presentation assignment was one of the most challenging and complicated in my academic experience. The two main algorithms that I got to study and use practically have been the Support Vector Machines (SVM) and k-Nearest Neighbors (KNN), requested to be used by the assignment instructions. I had theoretical knowledge about both the algorithms but never practical.

From the coding point of view, it was straightforward to import the libraries (SVC from sklearn.svm and KNeighborsClassifier from sklearn.neighbors), training and testing the algorithms, but, personally, the complications were how to connect those two algorithms to the object recognition model. This is a particularly crucial point for improvement: now I am not sure how to choose the right model having a given dataset and how the algorithms fit within the overall model. It took me quite a while to figure it out and it was stressful and sometimes demotivating not to understand the full picture.

This will require additional study and more practical examples to work with to define and determine the best algorithms to use with a given dataset and a given module to create. Honestly, it was a very humbling moment to remain stuck and not knowing how to integrate the algorithms to the overall model so I had to ask for help and suggestions otherwise I would have been still stuck at that point.

Finally, I realised that SVM helped my model to create clear limits within the different classes, strengthening the capacity of recognize different pictures and I could practically see that KNN, even though was also able to recognize different pictures, did it in a different way predicting the right pictures based on cluster and local patterns.

**Individual contribution to team activities**.

From week two until week six I was included in a team with the purpose of preparing a report with a business analysis of some aspects of a dataset to give the Airbnb management some hints on how to increase the profitability of its business in the city of New York.

After creating a WhatsApp group, I took the lead and decided to organise a formal Zoom call for the team to introduce itself and start discussing about roles and responsibilities for the upcoming Team Project. It was good to see that three of the members (me included) of the team were very committed to the good result of the project while unfortunately other members were not so present (due to work commitments).

I was happy that during the first call we reach agreements on how to develop the project: we discussed each other’s strengths and weaknesses to assign the most suitable piece of work to each member and we decided to start working immediately on an analysis of the dataset.   
The half of the team participating to the call worked together very well and was able to finalise a good report which received a good mark.  
I personally think, as a form of improvement with my contribution, since I was in charge of the team calls and meeting minutes, I should have been more strict with the members that did not participate much to the development of the project.  
All the team members were busy with work and other commitments but it was not a justification not to contribute to the success of the project.  
I consider my contribution to the team project as substantial and constant.

**Experience as a member of a development team.**

The overall experience as member of a development team was exiting and rewarding yet challenging. The team was spread over three continents with a maximum hour difference of eleven hours which made quite challenging the communication and organising the calls.

The team communicated through a WhatsApp group which was effective. Again, only half of the team was actively communicating and sharing ideas or pieces of work (coding, visual graphics, ideas about the structure of the report).   
Despite the fact of trying to involve the other members of the team there was not so much response from them.  
  
A part of that challenge, the experience was very formative. I normally prefer to work of individual pieces of work to set my timeline and my pace but this time I had to follow the group pace and timeline and constantly discuss every step of the project and consolidate all the separate parts of the project into one report. The experience was indeed very formative, challenging but, at the end, rewarding.

For a possible next project, I would try to be stricter and assure that all the team participates in the Group project and contribute at the same level.

**Impact on my professional and personal development.**

This module, overall, was a challenging experience. First of all my lack of programming skills put me in a very stressful situation especially during the preparation of the induvial assignment but it was at the same time really rewarding to be able to improve my time management skills, find time to study Phyton programming language, exercise and, finally, being able to write a decent code which answered to all the questions required by the assignment.

Personally, I found myself in a position where I almost got overwhelmed by the tasks (programming the object recognition model), but I was able to be resilient and plan my time accordingly, stick to the plan and ask for help when needed.

I consider this module as one of the most challenging in my academic path, but it gave me the opportunity to challenge myself and step out from my comfort zone and face brand new tasks and deeply test my time management skills.

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