**E-Portfolio Submission.**

**Introduction.**

The Intelligent Agents module has been the fourth module of my Postgraduate Diploma in Artificial Intelligence with the University of Essex Online. It has been a challenging yet interesting module where we could put in practise the theory about Intelligent Agents and, finally, create, in my case, a forensic system that has the capability to detect fraudulent emails based on defined parameters.

The work done during this module (twelve weeks starting in July 2025) is summarized in my E-Portfolio (stored in GitHub) and available at this link: <https://atrevisi7521.github.io/intelligent-agents.html>

There is a dedicated section called: “*Postgraduate Diploma in Artificial Intelligence - Intelligent Agents (July 2025)*” under Experience => Intelligent Agent.  
The structure of my E-portfolio is similar to the one of the University of Essex Online: divided in twelve sections, each section containing the topics related to a unit.

The first part of this assignment will be a description of the job done during the twelve weeks of the module with particular focus on the experience to be part of a development team and the evaluation of the results of the team work (Group Project submitted at the end of week six).  
The second and last part will contain a reflective section which will contain the personal reflections and growth during this module (achievements, challenges, frustration, satisfaction and other feelings experienced during the entire module).

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

**Unit 1: Introduction to Agent-Based Computing**.

During this introductory unit I have familiarized myself with the concept of Intelligent Agents which is described by Wooldridge (2009: 21) as “a computer system that is situated in some environment, and that is capable of autonomous action in this environment in order to meet its delegated objectives”.

I have started reading the two books recommended by the module that are:

* “*An Introduction to MultiAgent Systems*” of Michael Wooldridge (2009) and
* “*Artificial Intelligence: A Modern Approach*” of Stuart Russel and Peter Norvig (2021).

During the first unit there was also the first discussion forum (unit 1-2-3) which gave me the opportunity to discuss the raise of the agent-based systems and the benefits that could bring to organisations. In my first post, I decided to focus my contribution on the benefits like automatization, errors reduction, time saving and costs efficiency. (Trevisi, 2025).

**Unit 2: Introducing First Order Logic.**

Second unit started to be quite challenging due to its mathematical implications. We have studied the FOL (First Order Logic) which is a particularly important language for the Artificial Intelligence (in this report shortened in AI). A brief definition could be a language that is enabling us to make precise statements about objects and their properties and relationships.

During this units we also continued to participate in the discussion forum and the debate continues with my fellow students. With Jaafar El Komati we discussed further about the benefits of the agent-based systems, and he added few valid points as: the fault tolerance, the system resilience and the more responsive decision-making.(El Komati, 2025). In the discussion with Abdulrahman Alhashmi we were discussing the centrality of the human validation of the agent-based systems (Alhashmi, 2025) while I pointed out that that the human validation is one of the characteristics of the industry 5.0 where the AI collaborate with the humans in a harmonious way (Trevisi, 2025).

**Unit 3: Agent Architectures.**

This unit has been focusing on the Agent Architecture, which has been a fundamental topic for the upcoming group project. Agent Architecture is the structure of the interaction of the intelligent agents inside a system.

For the first time I contacted the team members of my Group: Fabian Narel and Pavlos Papachristos. As first thing we create a WhatsApp Group called “Group F – Intelligent Agents” where we started to know each other and we discussed and filled properly the Team contract that, after, has been sent to our tutor.

I have to say that I immediately realised that the group was harmonious and focused on delivering a high-quality report. We discussed briefly about the assignment and about the roles and responsibilities and we agree to develop the entire system architecture together, without splitting the tasks among the team members.

It was also time to summarise the three weeks of discussion forum with a summary post, which can be found at this link: <https://atrevisi7521.github.io/intelligent-agents-Unit3.html>

**Unit 4: Hybrid Agent Architectures.**

In this units we focalised our attention on the hybrid agent architectures which are architectures that mix the reactive and deliberative architectures which are clearly more complicated to design but offer a better mix between fast reaction for urgent situation and long-term planning for more complex decisions. An example could be the autonomous driving cars.

During this week, we have scheduled, with the team, the first conference call where to define and discuss the next steps for delivering the Group project.  
For the Group project we are requested to be a team of software consultants and specialists in agents design and development. We decided together to, as a task, to consider the digital forensic and, specifically, we decided to design a system that works on the detection of fraudulent mails inside an organisation.

**Unit 5: Agent Communication & Unit 6: Working Together.**

During this unit we studied the KQML (Knowledge Query and Manipulation Language) which is the language that is the language and protocol for communication between intelligent agents which allows the agents to share information, knowledge and to prioritize actions.

But the main highlight of this unit and week has been the conference call between the members of the “Group F” for working at the Group Project Assignment.   
In Appendix A you can find the complete meeting minutes of the first conference call with all the actions taken and the follow up activities (Narel et al., 2025). Before the conference call I had prepared a basic Phyton code with a basic set of agents for creating, storing, analysing and visualizing the results of a fraudulent mail detection system.

The conference call was highly effective and, in fact, after the call, we decided just to work and share the results by email and coordinate any actions through our WhatsApp group.

After reviewing the code, we agreed in using an architecture with 4 main agents: *DiscoveryAgent* which has to be responsible for the location and loading of files (txt format) in the filesystem, *DashboardAgent* responsible for the visualization and graphs, AnalysisAgent (core agent of the architecture) which has the responsibility of detecting the fraudulent mails and, finally, the *ReportAgen*t which is responsible for the generation of reports (one in HTML and one in txt format for forensic deep analysis).

I took the responsibility of explaining my draft of the first code in Phyton and Fabian Narel decided to improve the graphics quality while Pavlos Papachristos decided to increase the number of mails generated from 20 to 50 to have better results and visibility in the graphs.

For a better understanding of the conference call, I suggest to check Appendix A for the meeting minutes or, otherwise, look a the following link: <https://atrevisi7521.github.io/intelligent-agents-Unit5.html>

After the conference call, we finalise and commented properly the Phyton code for future reference or enhancements and we move our focus on the thousand words report that Fabian decided to draft.

The weekend before the presentation of the report, we reviewed (by mails and in the WhatsApp Group) the code and the comments, we tested the enhanced graphics and visualization, we run some test to check the accuracy of the system, and we work (the three of us) to improve the report drafted by Fabian Narel.

Overall was a successful team work and the report was graded as per following:

* Group work grade = 95%.
* Individual grade = 48.3% - your contribution to this work is good.
* Overall grade = 86%.

(Danso, 2025).

In the next section, the reflective, there will be a more accurate analysis about the feeling and challenges about this project.

**Unit 5: Discussion Forum 2 & Unit 9: Discussion Forum 3.**

In Unit 5 we had the second Discussion Forum and the topic was the Agent Communication Languages. In my first post I decided to evaluate benefits and disadvantages of using the KQML indicating as advantages the interoperability or the ability to make all the agents communicating each other effectively but, at the same time, I wanted to point out that this language is quite complex and requires some substantial improvements to increase its easiness. (Trevisi, 2025)

For reviewing my entire contribution to the forum, my posts are visible in unit 5, 6 and 7 in the E-portfolio: <https://atrevisi7521.github.io/intelligent-agents.html>

Last Discussion forum was in unit 9 and it was about the Deep Learning technologies and its possible ethical or legal issues. It was definitely a remarkably interesting topic and my fellow students, and I agreed on many points. My first contribution was about these four issues related to the Deep Learning technologies:

* Copyright and Intellectual Property.
* Bias and Discrimination.
* Misinformation.
* Labor Displacement.

(Trevisi, 2025)

Also here, to review my entire contribution to the discussion forum, my posts are visible in unit 9,10 and 11 in the E-Portfolio: <https://atrevisi7521.github.io/intelligent-agents.html>

**Section 2: Reflective Section.**

**Group Project (Unit 6).**

I would like to start the self-reflection section talking about the *Group Project.* I have to say that the team attitude and professionalism made the difference, and we worked together extremely hard since the beginning. We were taking decisions together and agreeing each step of the project.

* We decided together to use 4 agents in order to create a complete fraudulent emails detection systems that could generate, find, store, analyse and create visualizations and report and we managed that satisfactorily.
* We create together the code and that was the most challenging and difficult part for me: I never worked on a code written by other persons, and it was really challenging because the styles of programming of the three of us was quite different and so it needed attention to make a homogeneous code and avoid errors.
* We had a particularly good interaction with the team members and that made the project very enjoyable due to the professional and friendly atmosphere within the team. In fact, even after the end of the group project, we are still in touch and sharing information about the module.

This project gave me, for the first time, to use Intelligent Agent to perform a complicated task like the fraudulent email detection. It was very challenging for me because, even if I have a coding background, I did not code for almost 15 years and I had to review my Phyton knowledge.  
To do so, I bought a book for Phyton coding and I need to say that it was really useful for the module.

I think my group contribution was quite solid, especially in drafting the first code for our project and in defining the agent architecture even if it could be improved in the future. But, despite time constraints, I consider my contribution to the project: active, professional, accurate and respectful of my team members.

At the beginning of the project I was quite nervous because I prefer to work alone, but I have to say that my team members made this experience very pleasant and I enjoy the cooperation, especially writing the code together. I still have to learn to adapt to different style of coding, but this experience was really worthwhile.

There were also few challenges, and I think is worth to mention it:

* *Hour difference*: I am in Asia, and the other team member are in Europe, so it was quite complicated to organise calls and when we had our call it was midnight local time in Singapore and that was quite a challenge for me because I was tired and not able to give my 100% for the team.
* *Workload*: since July we are going through a strong restructuring in my company, so my mind was not always very present. It was complicated something to start studying especially having a lot of issues with work but, again, this has been overcome with resilience and willing not to let down my team members.
* *Stress*: it has been a difficult period in the last few months, and my mental health has been quite affected. I am happy that I carried on and decided to concentrate on the Group project because, at the end, the results have been really satisfactory and it was worth long hours of studying, coding and preparing reports.

**Final Project (Unit 11).**

The final project (Unit 11) gave me the opportunity to review the job done with the team in the Group Project and analyse better the Multi-Agent Email Forensics System.

I finally reviewed the code and comment properly section by section with the reason why we have chosen that code. It was there when I realized that the three of us, delivered a very complete and comprehensive code with many visualizations and report and that both the agent architecture and the structure of the code were according to the requirements of the assignment. Also here there were few challenges for me:

* *Power Point Presentation*: for me is always complicated to prepare a Power Point presentations because I lack graphic creativity and my slides always look boring and dry. This time I slightly improved my presentation.
* *Time constraint:* speaking this module has been really demanding and something I felt quite overwhelmed by the lack of time to study and do the assignments as I really wanted. I had some incredibly stressful moments, and I got frustrated due to the lack of time but at the end I was able to deliver a decent individual project even if far from what I had in mind.

**Collaborative Discussion (Units 1, 5 and 9).**

Discussion forums are normally the part I like most of the module because I am able to interact directly with my fellow students and we can share opinions, debate, agree or disagree but is a moment of sharing that I treasure a lot.

All the three collaborative discussions have been entertaining but the last one is the one that I enjoy the most. I am interested in the ethical and legal implications that misuse of the AI (in this case Deep Learning Technologies) could generate. This is a field of interest for me, and, after the Postgraduate diploma, I would like to deepen my understanding of the ethical regulation for the AI at international level.

Overall it was really an intense module. Now I am satisfied with the result, but it was stressful and quite demanding for my mental health. I need to deepen the Intelligent Agents topic and improve also my Phyton coding skills for the next two modules I need to study.

The E-portfolio is still not completely updated due to time constraints, but I believe it will be up to date very soon.

**References:**

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**Appendix A.**

**Meeting minutes first Team Call (Group F).**

**Intelligent Agents - Group F sync up.**

**Transcript.**

<https://otter.ai/u/dKnxCvB6JpCIJaZDQwOCVvaEvy8?view=summary>

The team discussed the progress and challenges of their project on email forensics. Andrea shared her experience in AI and fraudulent mail detection at Continental, highlighting the code's structure and functionality. Alex encountered indentation errors while running the code in Jupiter, which Andrea offered to review. The code generates 30-50 emails, analyses them for suspicious content, and produces reports. Andrea demonstrated the output folder, including email details, analysis results, and a basic forensic chart. They agreed to improve the graphics and finalize a 1000-word report, including code descriptions and results. Fabian suggested focusing on enhancing the report's visuals.

**Action Items**

• [ ] Fabian Narel - Explore options for improving the visualization and reporting aspects of the project.

• [ ] Review the code and provide feedback on any issues or improvements.

• [ ] Send Andrea the error messages encountered when running the code, so she can help debug.

• [ ] Incorporate the group's feedback and updates into the final project deliverable.

Outline

**Introductions and Initial Greetings**

• Alex Papachristos introduces himself and explains the confusion with his email name, which is his son's name.

• Andrea Trevisi and Fabian Narel exchange greetings and discuss their current times and schedules.

• Andrea mentions she has a call in one hour with Brazil for work, so they need to keep the meeting short.

• Alex, Andrea, and Fabian share their backgrounds, including their countries of origin and current locations.

**Discussion on Coding and Errors.**

• Alex mentions he has been running the code in Jupiter and encountering indentation errors.

• Andrea explains her background in marketing and sales, and her experience as a software engineer for HP, focusing on Java and Python.

• Andrea discusses her current role in the AI department at Continental, working on automated driving and fraudulent mail detection.

• Alex shares his struggles with running the code and asks for help with indentation errors and understanding the structure.

**Explanation of the Code and Its Structure.**

• Andrea provides a brief overview of the code, explaining its purpose and structure.

• Alex and Andrea discuss the process of generating fake emails, including the parameters and suspicious elements.

• Andrea explains the basic routine for email generation and the importance of keeping the number of emails generated reasonable.

• Fabian and Andrea discuss the need for the code to mimic a real-world thread and the importance of understanding the code block by block.

**Running the Code and Error Troubleshooting.**

• Alex shares his screen to show the Jupiter environment and the errors he is encountering.

• Andrea offers to review the code and provide comments to help Alex understand it better.

• Fabian suggests using Google Collab to run the code and comment live, but Andrea explains the need to save the file on the PC and run it from a specific folder.

• Alex and Andrea discuss the importance of saving the file in the correct folder and running it from Anaconda on the PC.

**Review of the Output and Report Generation.**

• Andrea shares her screen to show the output folder generated by the code, including the files created: emails, analysis result, forensic report, and HTML report.

• Alex and Fabian discuss the contents of the files and the structure of the reports.

• Andrea explains the purpose of each file and the information it contains, such as the generated emails, analysis results, and forensic charts.

• Fabian suggests focusing on improving the graphics and presentation of the reports to make them more visually appealing.

**Final Discussions and Next Steps.**

• Alex and Andrea discuss the need for a 1000-word report, including copying, pasting graphs, and describing the code in the appendix.

• Fabian suggests adding notes from their meetings to the final presentation and deciding on additional graphics to include.

• Andrea offers to share the code and provide comments to help Alex understand it better.

• Alex and Andrea discuss the importance of running the code successfully and understanding the output to contribute effectively to the project.

(Narel et al., 2025).