Case Study for Advanced AI.

Background

Make sure that you have read the Assessment specification – available via Blackboard.

The assignment brief and 'project guidelines' for Distributed and Enterprise Systems. still apply. The principle difference is that for this case study you will create an instance of 'Machine Learning-as-a-service' (MLAAS) rather than connecting to pre-existing external services.
All other characteristics and requirements, still apply, including

- The need for different classes of users, in this case:
    - **End-users** (which could be different groups within the organisation, or external customers) should be able to access a dashboard via which they can upload a record (which may be text, image, video, audio file) to the service and in get outputs (for example, predictions) returned by the ML model. In some scenarios the system should prompt the user for feedback and store that.
    - **AI engineers** should be able to train a new ML model outside the system and then upload that model into the MLAAS service. They should also be able to access a database of all end-user interactions for the purpose of refining the ML model.
    - **Administrators** should be able to see all activity on the system and manage users. You may wish to add the ability to monitor the level of activity on the MLAAS.
    - **Finance teams** should able to generate billing and invoices (for example, to different insurance companies) based on end-user activity.
- Web interfaces that involve different dashboards for different users
- The use of a database to store logs of all interactions with the system
- The ability to connect to a billing service

Choice of Case Study/project

The default situation is that groups will create, evaluate and deploy a solution for the case study below.
However, we do not wish to restrict your creativity or interests. Therefore, groups *may* choose to propose a different case study, and then negotiate with tutors what changes might be needed to make it an appropriate level of complexity. We reserve the right not to accept proposals we think unsuitable.
To avoid any doubt.

- If you do not have specific written agreement from the module team you must do the case study below.
- Groups who submit work based on a ML project that has not been agreed in writing with the module team will still have their worked marked. But we will treat

it as if it were an effort at the case study below. Obviously that means it is highly unlikely to pass.

Description of Default Case Study

You will be given a 'synthetic' data set comprising a number of records of insurance claims cases, with a range of categorical and numeric fields holding values such as type and prognosis (expected recovery time) of injury, travel costs, loss of earnings, and various additional expenses. Each record also has a "settlement value": the value the claim was settled for after negotiation.
The dataset contains many of the characteristics typical of real-world such as incomplete records, and imbalance between different types (and values) of claims.
The company wishes to create a system and then deploy to streamline the negotiation process and improve the 'customer journey' by predicting the settlement value early in the process.
The task is to:

- Design an experimental methodology for solving the problem/evaluating the proposed technique.
- Implement and test AI-based solutions.
- Demonstrate a working implementation,
- Report your findings in ways suitable for different audiences.
- Include a recommendation of whether the technology is suitable to be adopted by the organisation: now, after further work, or never.

Some Considerations

This data contains personal information, so you should be mindful of GDPR considerations as laid out in the Information Commissioner's Office AI & Data Protection Toolkit.
Specifically you should consider:

- Explainability:
  - users at the company are more likely to adopt a tool if they can understand it's predictions,
  - the company will need to be able to make a convincing argument that this is 'decision support' rather than 'Automated Decision Making' (which could be illegal- see the ICO toolkit for descriptions).
- Fairness, Accountability and Trust.
  - Does the data contain records relating to protected characteristics?
  - If so, what are you going to do about it?
  - What is your strategy for monitoring accuracy over time?
- Interactions: if a user over-rides the model's prediction, what are you going to do about that? How does that relate to monitoring performance over time?