Project Outline

# The task

Our customer has tasked us with creating a program to demonstrate the capability of Artificial Intelligence API’s to prospective students and members of the public. The product must have a customer facing UI that is easy to use, with the possibility of a rendered face that the user will interact with, although the feasibility of this has not yet been assessed.

The purpose of the application is to impress, and as such the application must have a professional look and feel, and should be responsive to user input.

# Proposed Solution

Our proposed solution will be a bespoke system that will make use of the Microsoft Cognitive Services API’s, which will be collated into a cohesive application.

The program should be able to make use of available hardware in the machine that hosts it, including the microphone, webcam, and speakers in order to allow user interaction outside of standard peripherals such as keyboard and mouse.

There are several API’s that can be taken advantage of:

* Movement Detection
  + Allow the application to detect when movement occurs, potentially triggering other aspects of the program
* Facial recognition
  + Capable of recognising individuals, and using this information to tailor actions to that user
  + Able to estimate age
  + Predict the emotion of the user
* Text to Speech
  + Allow the application to verbally respond to user input
* Speech to text
  + Allow users to give voice commands to the application
* Image analysis
  + Allow the user to choose and image and have the application analyse it, providing a response as to what it thinks it is
  + Could also make use of the webcam to capture images
* Video analysis
  + Able to track and display overlays on faces
  + Describe image frames

It may be possible to combine these API’s to perform other more complex functions, depending on the needs of the customer, due to a lack of prior knowledge and absence of libraries for the API’s.

# Proposed Implementations

## Java

It is possible to create a professional and feature-rich User Interface within Java. Although there are no official libraries designed for using the API’s with Java, it is still possible to use them using custom network interactions.

Java is also the language which the team members are most familiar with, this would expedite the development process.

Further to this, an early prototype has already been created to demonstrate and test the use of the API’s. This was created in Java, although if Java is the chosen implementation the prototype will be discarded in favour of a more comprehensive and cohesive design.

## C#

As there are existing libraries developed for use with C#, it may be easier to implement the API’s with this language. On the other hand, none of the team are familiar with C#, so it would involve learning the language during implementation.

## Other

It would be possible to create this product using other frameworks, although there would be no obvious advantage to doing so.