**Feasibility Report**

**Introduction**

This report will outline the feasibility for creating a cross-platform application which incorporates real-time object detection in C#. The primary objectives for this project are to process real-time video information, accurately detect and identify objects within the video stream and use the information from identified objects to give additional feedback to the user. This involves using machine learning algorithms such as semi-supervised or reinforcement learning, integrating with existing libraries like Emgu CV and ML.NET, and ensuring the application runs efficiently on multiple platforms.

**Background**

Throughout the years, object detection and recognition has constantly advanced to keep up with the everyday needs and requirements of society. Initially we struggled to get computers to recognise human faces, due to the variability in features such as head rotation, lighting, facial expression etc. however now we have access to models which have been trained on thousands of faces and are able to recognise them and features easily. I believe the full potential for object detection and recognition has not been achieved yet and with this project I hope to discover a use case which is needed but does not exist currently.

In the past I undertook a facial recognition project in college, however due to a lack of knowledge and access to available libraries I wasn’t able to make a successful final product. Learning from this experience, I decided to break down my goal of facial recognition by focusing on detection. During my final year project at university I created an application that used image processing tools to detect the directions of forces from regions in MFM (Magnetic Force Microscopy) images. I was detecting how an object displayed a certain action, in this case a force and how a computer was taking this information and transforming it into a virtual representation of the surface that was pictured.

It now feels the logical step for me to take to reach my overall goal is to detect real-world objects, transform them into virtual objects which I can manipulate and provide more information on. This has led to me choosing this object recognition project. When a human sees an apple or a pen we are taught from a young age what these objects are and we can easily label them when asked, unlike a computer which requires large amounts of training to learn and identify common items.

**Outline of project**

Objectives:

* Develop a cross-platform application capable of real-time object detection.
* Utilize C# for application development and perhaps Python for training purposes if required.
* Ensure the application can process video streams and detect/identify objects.
* Add functionality for the application to provide relevant feedback on what it sees

**Conclusion**

Creating a cross-platform application with real-time object detection in C# will be a challenging endeavour but I do believe it is feasible. I will stick to free, open-source libraries to support other developers, the time period I have to complete this project will be enough and the application will be useful. By standing on the shoulders of giants I will develop a robust application that meets the objectives set out earlier in the report.