Final Year Project Proposal Department of Computing

|  |  |
| --- | --- |
| Name | David Taylor |
| Student ID | 18013908 |
| Award | BSc (Hons) Computer Games Programming |
| Semester | Year 3 Semester 1 |
| Award Leader | Davin Ward |

|  |  |
| --- | --- |
| Version | 1.0 |

|  |  |  |
| --- | --- | --- |
| Change History | Version | Date |
| Initial Type-up | 1.0 | 6th October |

|  |
| --- |
| Project Title |
| Self-driving neural network to handle multiple off-road terrains |

|  |
| --- |
| Background |
| The obstacle I am looking to remedy is that off-road/ extreme weather-driving is difficult for AI. This issue is one that features in most games that contains AI driving, I have personally witnessed this in games like Forza Horizon 3 (free roam mode), and GTA V where an AI car either gets itself stuck or doesn’t even venture offroad. An element that makes this more complex is due to both Forza Horizon 3 and GTA V having realistic car physics for the AI cars.  I have selected this project as I have a fascination with self-driving cars as well as neural networks. The Difficulties that I will face in completing this project will be, learning multiple new technologies as well as the training of the neural network as if these tasks take too long it will affect the quality of the final outcome of the project. |

|  |
| --- |
| Objectives |
| The scope for this project is to create an AI to assist in all-terrain driving. My focus for this project is researching, designing, and implementing the neural network that will drive the car. To help reduce the scope, I will be using UE4 and TensorFlow to minimise the amount of work making this viable project scope wise.  The areas I will researching for this project are:   * Neural network API(TensorFlow) * Neural network Layouts * Neural network training (Methods and Hardware improvements/software improvements)   For this research, I will be producing professional and accurate documents to record all activities these will record any meetings, research outcomes, critical evaluation and any other activities done for the project.  For this project, I will be creating a software artefact this will be using the best methods that I have found through research. I want the software artefact to feature:   * Unassisted movement * Safely traversing over altering terrain (Ice/ Steep incline/ Steep Descent / uneven terrain) * Movement to a predetermined location   I will mark the project success on:   * Identifying a suitable method to use in my software artefact * Producing a requirement specification that identifies the problem and justifies it * A working prototype that addresses the problem and is within the specification and applying an appropriate design method. (The software artefact will be a success if it completes the points listed above) * By undertaking appropriate testing strategies * Producing work on time according to the project plan |

|  |
| --- |
| Resources |
| The resources required to complete the project are:  A Word Processor,  Visual Studio Code,  Computer (CPU 6 Core 12 Threads, 16gb memory, 1050ti 4gb),  UE4,  TensorFlow Plugin for UE4  Papers on different Training methods of Neural Networks  Papers on different Layouts of Neural Networks  TensorFlow API Documentation |

|  |
| --- |
| Deliverables |
| Project documentation will be produced following the standards stipulated in the Final Year Project Handbook and will include:   * All documentary requirements stated in the Final Year Project Handbook * Logbook * All appropriate design and implementation documents relevant to the selected methods * Fully documented and analysed test results * A full program listing (soft or hard copy) * Installation and user documentation for the software artefact * The Original Project Plan * The Software Artefact on a disk that achieves   + Unassisted movement   + Safely traversing over altering terrain (Ice/ Steep incline/ Steep Descent / uneven terrain)   + Movement to a predetermined location |