Dirt 2

\*\* again move to methodology somehow \*\*

This project could be compared to Hannan’s work and is somewhat a spiritual continuation on the AI that was implemented. For example, the output of the neural network in this project will be flags for the buttons on the "controller" and the neural network will be a multi-layer perceptron network.

However, this project also has some differences including; using ray casts and waypoints around the track to steer correctly instead of following a racing line for the same reasons as discussed previously, and although resilient propagation will be implemented, the RMGS training method (which will be discussed in the next section) will be the focus of this project.

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Spiking neurons

\*\* methodology move below \*\*

In this project the car will also use sensors to find its position, however it will be searching for waypoints that will be placed on the track. The reason for this change is that when given a training line, it is far easier for the ANN to know where it needs to be, as the adjustments for driving are constant. With waypoints the ANN must try to line up with the perpendicular position before it reaches it thus requiring better training to do so. A similar evaluation technique will also be used in this project; as the time it takes for the car to get around the track is the best measure of the performance of the training methods in a racing game scenario.

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RGMS

This training technique really stands out compared to the other two techniques discussed as most notably; it only takes one iteration to train the entire network. This provides a huge advantage to using the technique as it allows huge data sets to be used for training that will take minutes not hours to fully train the network. However with this comes a disadvantage in the fact that it is noted by Verma (Verma 1997) that in some scenarios the accuracy of the technique falls in comparison to its longer more rigorous competitors. This issue only really becomes a problem when dealing with something that has to be accurate for a serious reason, such as detection of a fault in an oil pipeline. In a game scenario, the accuracy of the network can be lower; this will provide unpredictability and most importantly, will allow the player to compete with the AI as it may make a mistake. The development of this project has been aimed at allowing the player the ability to actually compete with the AI as well as allowing the training techniques to be able to compete with each other. This will be discussed in full in the next section.