Read Me for Alexander McCaffrey MSc thesis code submission:

**Datapreprocessing:**

SVD\_and\_TSNE: performs SVD and TSNE on the MNIST dataset

SVD\_explained\_variance: plots variance captured against number of svd components

MNIST\_tsne\_dataset\_binary: approximates 3 dimensional MNIST data (after tsne and svd) using 3 bits

binary\_transform: approximates 3 dimensional MNIST data (after tsne and svd) using 3 bits. Contains funtion that does this for class of MNIST image and another function that does this for all classes

one\_v\_all\_function: contains function that takes in MNIST dataframe and returns only those samples of a specific class

**Network Architectures:**

IR\_Network: Implmentation of sparse IR neuron, layer, network

IR\_network\_nomirror: Implmentation of sparse IR neuron, layer, network without mirror strategies

restricted\_NOR\_networks: Implementation of NOR networks

restricted\_NAND\_networks: Implementation of NAND networks

**Toy problem implementations:**

coordination\_game: two IR neurons play coordination game

prisoners\_dillema\_game: two IR neurons play PD game

rock\_paper\_scissor\_game: two IR neurons rock, paper, scissors

dis-coordination\_game: two IR neurons play dis-coordination game

toy\_problems\_XOr: A single IR neuron learn the XOr function.

**Training Scripts:**

train\_IR: training script for IR networks and IR networks having removed mirror strategies

nor\_unsaturate: retrains final 3 layers of pretrained NOR Netowork

train\_nand: training script for NAND networks

train\_nor: training script for NOR networks

train\_nor\_w\_credit\_assignment: training script for NOR networks that uses difference evaluation

functions to approximate the importance of each neuron and then shape agent specific fitness valuesnetwork\_evaluation\_functions: provides fucntions used to evaluation IR networks during training

**Testing:**

ensemble classifier: evaluates ensemble classifiers on test set