COMPARING SINGLE & DOUBLE DEEP-Q NETWORKS FOR AI LEARNING TO PLAY GALAGA

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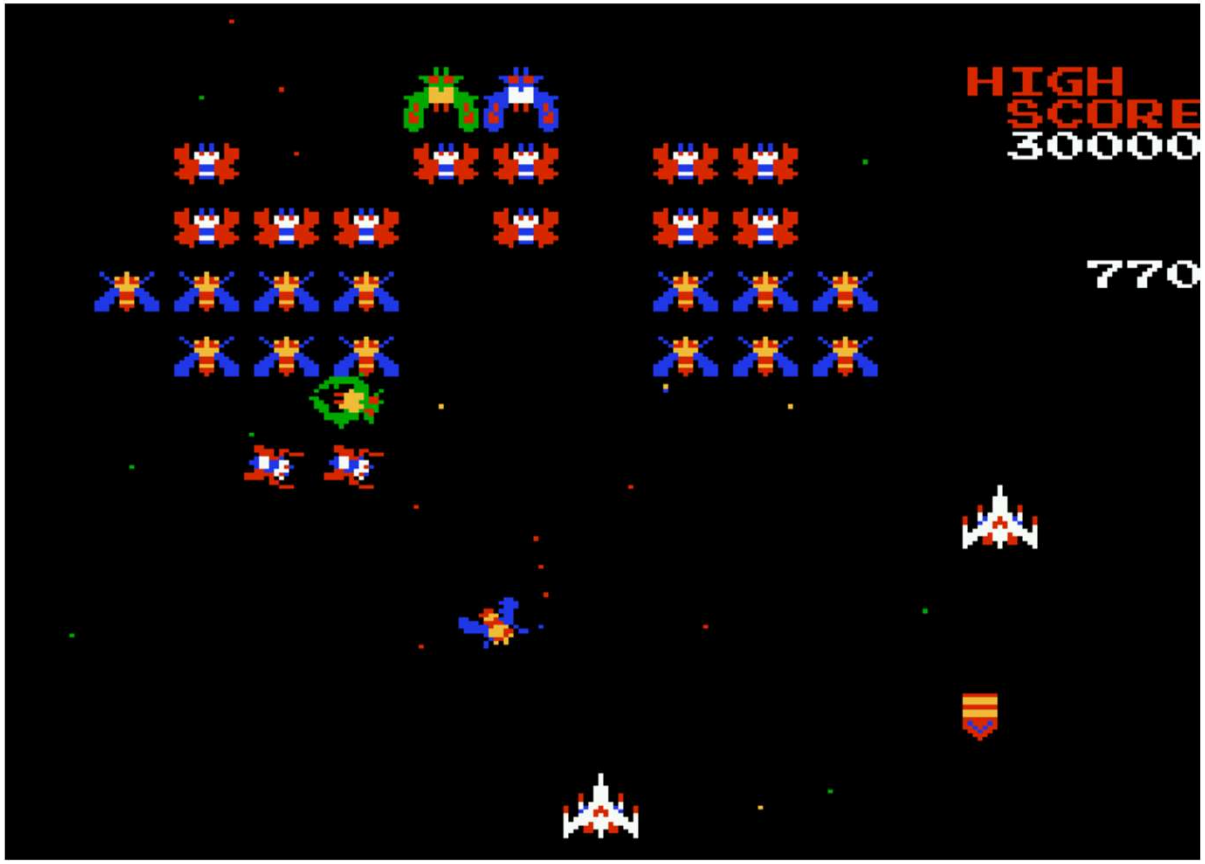


Picture of the video game *Galaga (Source One)*

Brief Refresher:

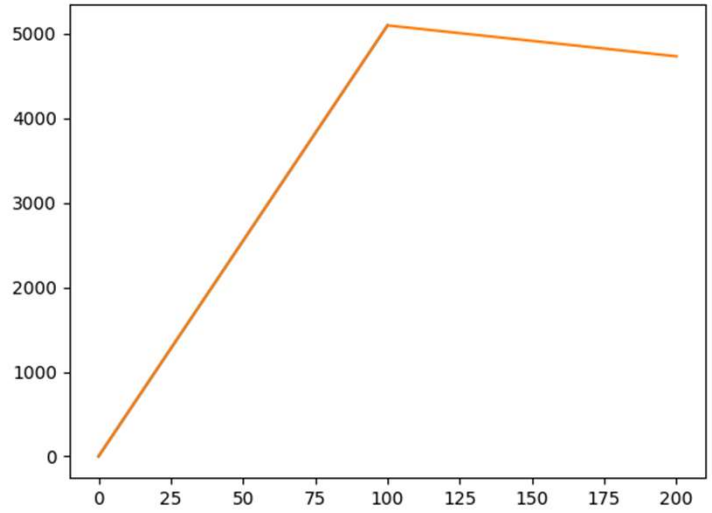
I am comparing a Double DQN vs a normal/singular DQN for an agent learning to play Galaga.

Progress:

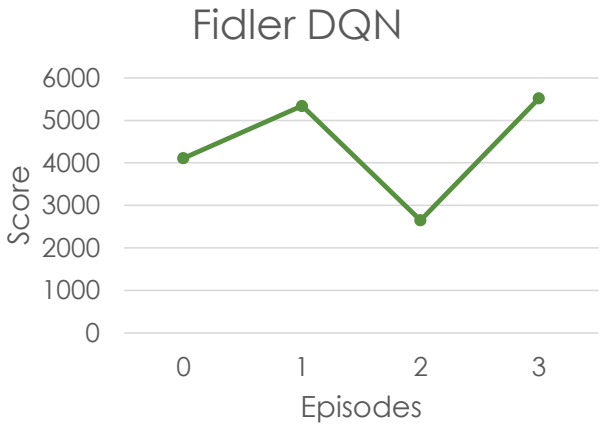
The original code provided at Source One is now running but has not been fully migrated to TensorFlow 2.x. I figured out that the original implementation was not actually a Double DQN. I have also built my own DQN implementation based off Source 2. I have preliminary results for both(next slide).

Current Network

Last 100 Average Score Over number of Episodes



Original Network



Next Steps:

- Implement actual Double DQN using Source 3 as a starting point
- Optimize Network to be more accurate and faster
- Get Networks to run using the Research Computing Support at CHPC
- Experiment with different hyper-parameters, Rewards, Loss functions.
- Find another neural network to build and experiment with if time allows

Works Cited:

- Source 1: Galaga_AI by georgefidler1709. https://github.com/georgefidler1709/Galaga_AI
- Source 2: DQN_Pong by Meredevs. https://github.com/Meredevs/DQN_Pong
- Source 3: Double DQN Implementation to Solve OpenAI Gym's CartPole v-0 by Leo Simmons. https://medium.com/@leosimmons/double-dqn-implementation-to-solve-openai-gyms-cartpole-v-0-df554cd0614d