Reinforcement learning (RL) is an important concept on the basis of machine learning and AI. The idea around RL models is to train an agent, which can be done in various ways, to use past experiences to make decisions in an environment that give the agent the maximum reward. Using mathematical algorithms, for example the bellman equation, our agent should be able to compute the best possible action from the state that it currently rests in. After training, the goal of the RL model is to maximize its cumulative reward and minimize the loss by finding the most efficient sequence of steps.

The main focus around our project was understanding what actually influences an RL agent to make the decisions it does. We did this by computing Saliency maps, which highlight the specific parts of an image or frame that encouraged the agent to make the decision that it made. This ultimately generates a “heat map”, visualizing the pixels that the saliency map highlighted.

I implemented a `compute_saliency_map` function, which allowed me to create a heat map of the individual runs and episodes.

My agent utilized its replay buffer in the neural network the most, where it stored experiences and gameplay to learn from and train itself.

Coming in to the SHINE program, I was nervous at first, having minimal experience with machine learning and AI. However, I expressed my skill level to my mentor, and he was very accommodating. He helped me understand the basis of machine learning and ramped up the difficulty of code exercises and papers, which allowed me to appreciate the learning process with comfort as we got hands on with code. My advice to future SHINE students would be to really extract help from your mentors and pick their brains. Cherish the hands on experience that goes on in the lab, being in an environment like that of a Ph.D lab was vital to my learning because I got to view student’s various thought processes and experiments. What’s next for me is to continue in the world of AI and machine learning, hopefully starting my own projects and developing a model that leaves a lasting impact in the future.

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