

**K.J.Somaiya College Of Engineering**  
**(Autonomous College Affiliated to University of Mumbai)**

**Progress Report Project B**

<b>Project Name</b>	Game Playing - A reinforcement Learning Approach
<b>Project Members</b>	1.Rohit Surana
	2.Abhishek Patil
	3.Jainam Sheth
<b>Reporting period</b>	Jan - Mar 17
<b>Section One: Summary</b>	
<p>Studied reinforcement learning from lecture videos of David Silver from youtube. Studied specific topics which were to be used in the implementation such as artificial neural networks using keras, using openai gym. Learned the basics of python since we choose to implement the project in python.</p> <p>Next we installed the dependencies and libraries to be used. Then we started implementation for the cartpole game which used Q-learning algorithm. Since there were many errors in the code, debugging was done. Finally, the code was tested using different parameters and was successful.</p>	
<b>Section Two: Activities and Progress</b>	
<p>Modified the code for cartpole game which was previously taking random actions and now following a specific path which is optimized every step. The algorithms learns the game quickly using Q-learning algorithm and artificial neural networks. The code was tested different values (gamma i.e discount factor, epsilon i.e exploration rate, etc) and the final values were decided. Included user involvement by asking the user to choose the values of the parameters used in the algorithm to adjust the learning rate.</p>	
<b>Section Three: Institutional &amp; Project Partner Issues</b>	
None.	

#### **Section Four: Outputs and Deliverables**

Presentation, report were made and the design models were changed according to the change in the code.

#### **Section Five: Outcomes and Lessons Learned**

While adjusting the parameters such as discount factor( $\gamma$ ), exploration rate(max epsilon, min epsilon), learning rate we found that discount factor should be close to 1, learning rate should be slow or else it will overfit the model, exploration rate should be high initially and then should decrease gradually. Also the agent should keep exploring and hence minimum exploration value should be defined.

#### **Section Six: Usage of Tools**

OpenAi gym is used to get the game environment and to run the agent code.  
Python is used as programming language.  
Keras library is used for implementing Neural Networks.  
Other dependency or softwares used includes - python-pip, git.  
There was no hardware used.

#### **Section Six: Evaluation**

According to the plan we implemented the code for cartpole game. While evaluating it we found that the code worked well for cartpole game, however, it is not generalized and does not work well for other games.

#### **Section Seven: Dissemination**

None.

#### **Section Eight: Risks, Issues and Challenges**

Since the game considered was very complex, hence there was a suggestion for implementing for some game with lesser complexity. Hence, we considered the cartpole game and implemented for that game.

<b>Section Nine: Collaboration and Support</b>
None.
<b>Section Ten: Next Steps</b>
Next we will try to generalize the algorithm so that it can work for more than one game. Then we will be testing for wide range of values for the parameters used in the code.

**Comments by Examiner (s):**

**Name and Signature of Examiner(s):**