Controlling 3D gaming agents in an adversarial setting with Deep Reinforcement Learning

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Background

Background

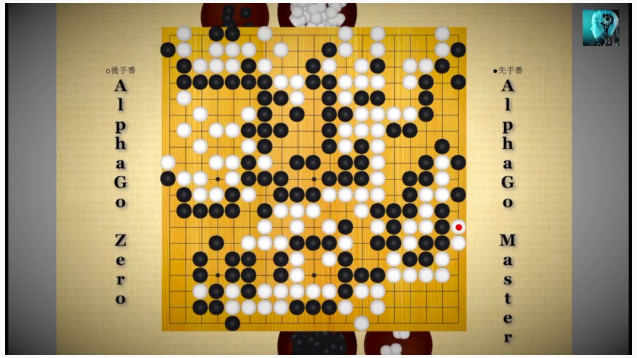
- Chess (1997)

Background

- Chess (1997)
- Atari (2013)

Background

- Chess (1997)
- Atari (2013)
- AlphaGO (2016)



Motivation

Motivation

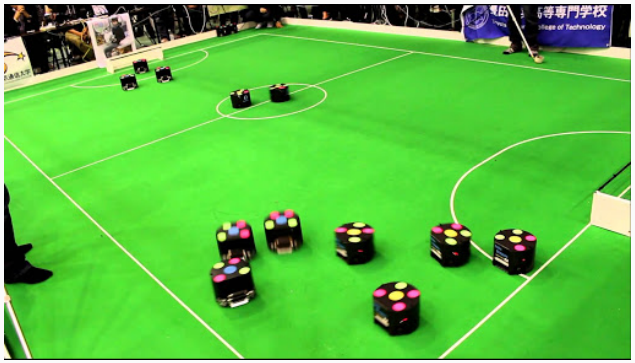
- RoboCup

Motivation

- RoboCup
- FIFA

Motivation

- RoboCup
- FIFA
- GTA 5



Introduction

Introduction

- Real World Robotics

Introduction

- Real World Robotics
- 3D Environment

Problem

Problem

- Adversarial Games

Problem

- Adversarial Games
- 3D Environment

Problem

- Adversarial Games
- 3D Environment
- Humanoid Robot

Problem

- Adversarial Games
- 3D Environment
- Humanoid Robot
- Source Code

Objective

Objective

- New Models

Objective

- New Models
- Constraint Environment

Objective

- New Models
- Constraint Environment
- Beating the University Champion

Project Area of Specialization

Project Area of Specialization

- Reinforcement Learning

Methodology

Methodology

- Reinforcement Learning

Methodology

- Reinforcement Learning
- Feature Base

Methodology

- Reinforcement Learning
- Feature Base
- Explore and Exploit

Methodology

- Reinforcement Learning
- Feature Base
- Explore and Exploit
- Q-Learning

Methodology

- Reinforcement Learning
- Feature Base
- Explore and Exploit
- Q-Learning
- Deep Q-Learning

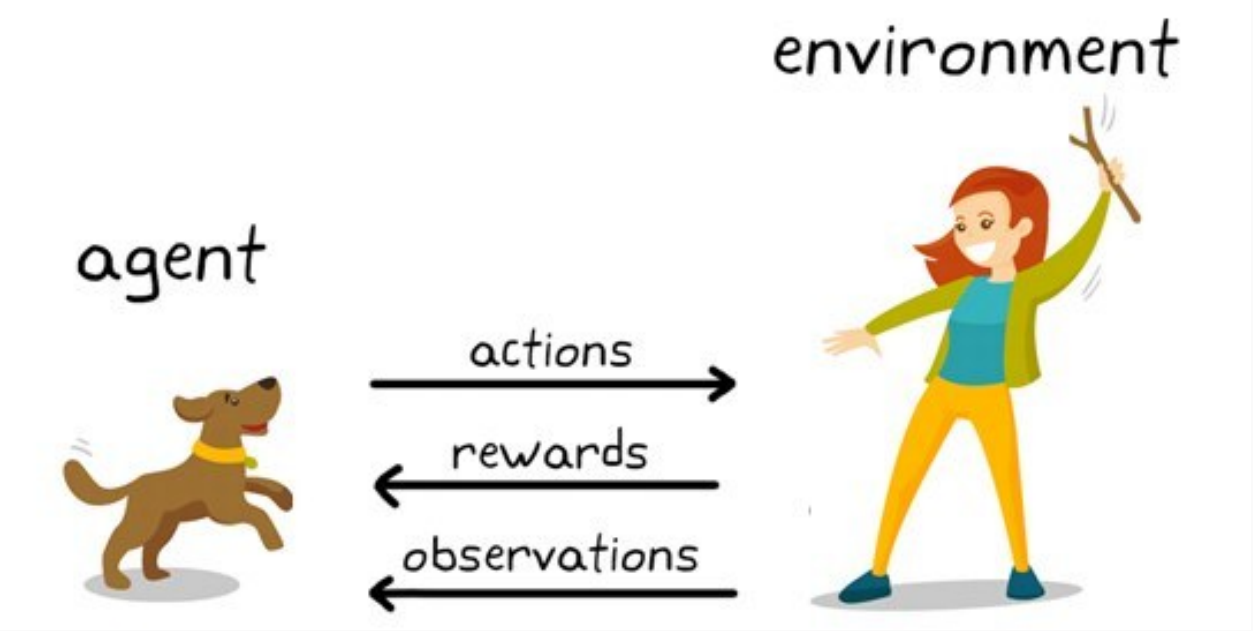


Figure 1: Model

Scope

Scope

- Adversarial 3D Environment

Scope

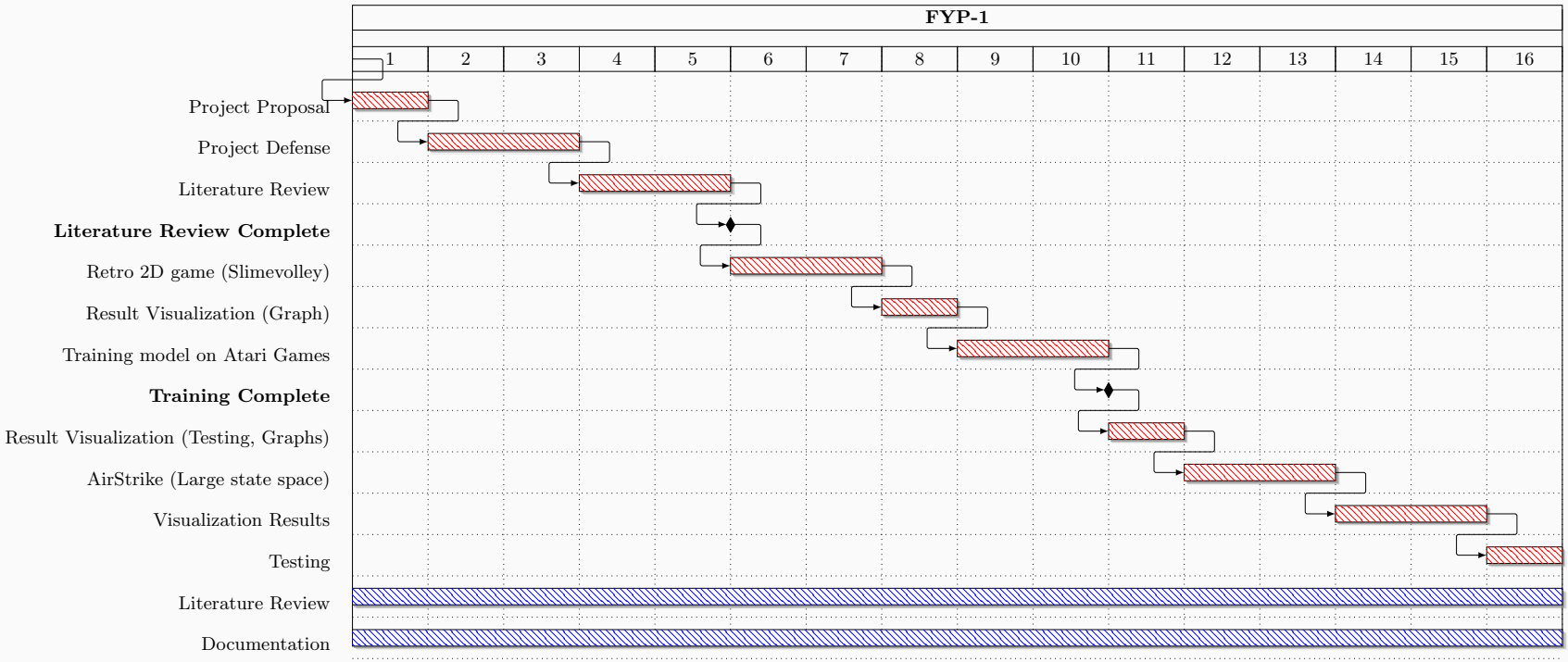
- Adversarial 3D Environment
- User Control

Scope

- Adversarial 3D Environment
- User Control
- Transfer Control to Agent

Work Breakdown

FYP-1


FYP-1
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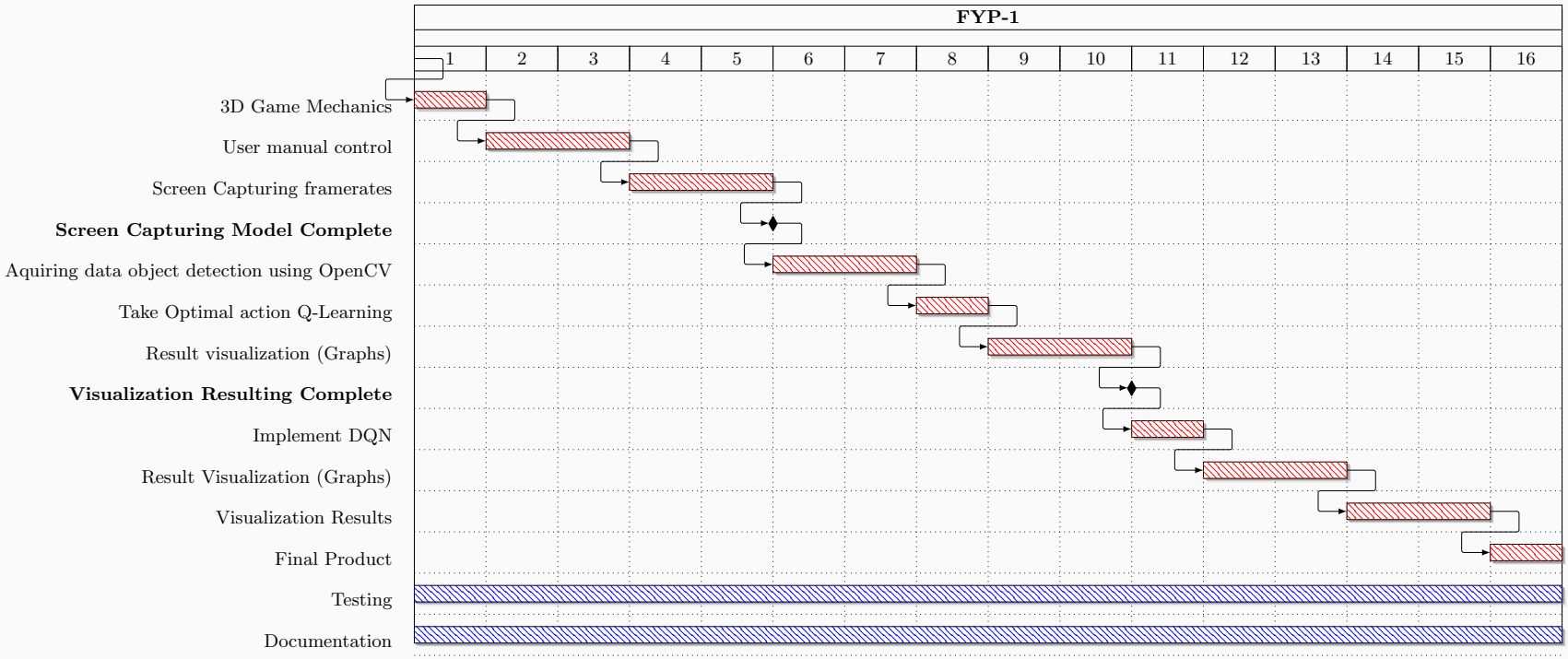
Project Proposal
Project Defense
Literature Review
Literature Review Complete
Retro 2D game (Slimevolley)
Result Visualization (Graph)
Training model on Atari Games
Training Complete
Result Visualization (Testing, Graphs)
AirStrike (Large state space)
Visualization Results
Testing
Literature Review
Documentation

FYP-2


FYP-1
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3D Game Mechanics
User manual control
Screen Capturing framerates
Screen Capturing Model Complete
Aquiring data object detection using OpenCV
Take Optimal action Q-Learning
Result visualization (Graphs)
Visualization Resulting Complete
Implement DQN
Result Visualization (Graphs)
Visualization Results
Final Product
Testing
Documentation

Tools

Tools

Language Utilized

- Python

Visual Library

- OpenCV

Deeplearning Library

- PyTorch
- TensorFlow
- Keras

Graphs Library

- Seaborn
- Qt

Expected Results

Expected Results

FYP-1

- Training Agent on different Atari games CartPole, AirStriker.

FYP-2

- Creating environment for 3D games and training agent on the environment.

Literature Review

Literature Review

- Dota-2 [1]

Literature Review

- Dota-2 [1]
- Alphago [2]

References

References

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Questions?