## Summary of AI platforms

This section contains a summary of the AI platforms and libraries that I have researched and will use either directly or draw inspiration from to construct the required software deliverables for my honors thesis project. The AI platforms and libraries that I will be using are as follows:

1. Smartfox Server and Client (https://docs2x.smartfoxserver.com/): I will be using the SmartFox Client and Server APIs to communicate reinforcement learning data like the reward function, location of puddle, possibility of making a move, etc. I will be building an extension to handle a reinforcement-learning based puddle world implementation room on the server-side and handling the communication on the client's end to ensure communication is working as expected.
2. Gymnasium (https://gymnasium.farama.org/) : Gymnasium is an up-to-date library written in Python that supports the use of pre-created reinforcement learning worlds to experiment with policies and train reinforcement learning models with. I will not be directly using this framework for my project, but I will draw inspiration from other GitHub repositories that have utilized this framework in building the core logic for my reinforcement learning extension. The links to the repositories that I will be referencing in building the core logic for my extension are as follows:
    - https://github.com/EhsanEI/gym-puddle - This GitHub repository uses Python's OpenAI Gymnasium library to model the puddle world game, and I will be using this as a reference when writing my code in Java.
3. RL4J API examples GitHub repository (https://github.com/smarthi/rl4j/tree/master): This GitHub repository contains examples on implementing RL4J in applications, and I will be using this as a reference.
4. RL4J tutorial GitHub repository (https://github.com/PacktPublishing/Hands-On-Reinforcement-Learning-with-Java): This GitHub repository contains more examples of using RL4J to implement the Q-Learning algorithm as well as other reinforcement learning algorithms to solve different types of problems across domains, and I will be using this repository as a reference.
5. Arcade Learning Environment (ALE) (https://github.com/Farama-Foundation/Arcade-Learning-Environment): This GitHub repository provides support for developing Atari 2600 games with metrics to see how well an AI agent is playing a particular game, which could be further used to optimize the AI model that plays the game, and I will be using this mostly for honors thesis writing purposes and not for development.
6. Project Malmo (https://github.com/microsoft/malmo): This GitHub repository is a game development platform that is similar to ALE in that it provides support in building AI agents that play the game of Minecraft, and I will be using this mostly for honors thesis writing purposes and not for development.

## Deeper-dive into recent work referencing the research paper: "A New AI Evaluation Cosmos: Ready to Play the Game?"

The research paper discusses the manner in which AI agents can be evaluated for performance in different virtual environments where benchmarks can be tested against. This section dives into the background knowledge required to build intuition on how various AI systems can be benchmarked and evaluated. I have read and understood the following research papers on AI benchmarking and evaluation:

1. “AI Evaluation: On Broken Yardsticks and Measurement Scales” discusses how researchers deal with constantly changing AI benchmarks as a result of rapid innovation of AI systems in the modern era.
2. “Tracking AI: The Capability Is (Not) Near” discusses the creation of a platform called AICollaboratory, for evaluating AI agents based on many problems, and results to record AI agent performance.
3. “The Animal-AI Testbed and Competition” talks about evaluating AI agents on human-like tasks with 12 specific tasks picked out for seeing the performance of an AI agent.

**References**


1. https://docs2x.smartfoxserver.com/ - Smartfox Server documentation
2. https://community.konduit.ai/c/rl4j/12 - RL4J community forum
3. https://github.com/EhsanEI/gym-puddle - Python-based puddle world implementation repository
4. https://javadoc.io/doc/org.deeplearning4j/rl4j-core/latest/index.html - RL4J documentation
5. https://github.com/smarthi/rl4j/tree/master – RL4J API examples repository
6. https://gymnasium.farama.org/index.html - Gymnasium documentation
7. https://josephorallo.webs.upv.es/papers/AAAI_MetaEval_Workshop2020__PAPER-corrected.pdf - “AI Evaluation: On Broken Yardsticks and Measurement Scales” research paper
8. https://skemman.is/bitstream/1946/36536/1/Performance_of_an_AGI-Aspiring_System_and_Narrow-AI_Approaches_A_Systematic_Comparison.pdf - “Performance of an AGI-Aspiring System & Narrow-AI Approaches: A Systematic Comparison” research paper
9. https://github.com/Farama-Foundation/Arcade-Learning-Environment – Arcade Learning Environment AI game development platform GitHub repository
10. https://github.com/microsoft/malmo - Project Malmo GitHub repository
11. https://ebooks.iospress.nl/pdf/doi/10.3233/FAIA200451 - “Tracking AI: The Capability Is (Not) Near” research paper
12. https://proceedings.mlr.press/v123/crosby20a/crosby20a.pdf - “The Animal-AI Testbed and Competition” research paper