# **Final Year Project: Multiplayer Online Game with AI - Progress Report**

## **Progress Chart**

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| **Agenda\Week** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| Determine project direction |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Find out feasibility of Mahjong AI |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Explore Unity |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Study Machine Learning |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Research on TensorFlow & Pytorch |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Research and understand Machine Learning agents (ML-agents) in Unity |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Try out demo game using ML-agent in Unity |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TicTaeToe AI Game Development |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Unity Multiplayer Plugin: Mirror |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Unity Multiplayer Plugin: PUN2 (under Photon) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Gin Rummy Game (Base Game on single screen) |  |  |  |  |  |  |  |  |  |  |  |  |  |

## **Tasks Completed**

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| **Date** | **Number of hours** | **Task Completed** |
| 12-AUG-20 | 1 | Determine project direction:  Discuss and decide game direction |
| 12-AUG-20 | 1 | Determine project direction:  Plan project stages |
| 17-AUG-20 | 1.5 | Find out feasibility of Mahjong AI:  Understand Mahjong logic and available Mahjong AI on market |
| 17-AUG-20 | 1 | Find out feasibility of Mahjong AI:  Research and understand Suphx development (Microsoft’s Mahjong AI) |
| 19-AUG-20 | 0.5 | Explore Unity:  Download Unity |
| 19-AUG-20 | 1.5 | Study Machine Learning:  Understand core Machine Learning concepts |
| 19-AUG-20 | 1 | Study Machine Learning:  Research on Machine Learning framework: TensorFlow vs Pytorch |
| 24-AUG-20 | 1 | Explore Unity:  Research and understand Machine Learning agents (ML-agents) in Unity |
| 24-AUG-20 | 2 | Explore Unity:  Try out demo game using ML-agent in Unity |
| 31-AUG-20 | 3.5 | Tic Tac Toe AI Game Development:  Developed a 2 player Tic Tac Toe game on Unity3D.    Features:   * 2 player game * Take turns to make their next move * Able to tell apart a draw or a win     Option to restart and play again after a draw or win is concluded |
| 2-SEP-20 | 2 | Tic Tac Toe AI Game Development:  Researched on how to implement ML-agent on a game (that is not from the demo list). Currently still trying to figure out how to use ML-agent. |
| 8-SEP-20 | 3 | Tic Tac Toe AI Game Development:  Researched on how to implement ML-agent on a game (that is not from the demo list). Most are MiniMax, trying to explore other options |
| 14-SEP-20 | 4 | Research on Development of iOS & Android Game via Unity3D  Research on Multiplayer System Architecture |
| 16-SEP-20 | 3 | Research on Unity’s multiplayer networking architecture  Research on Mirror and Photon functionalities |
| 16-SEP-20 | 3 | Unity3D 2020 file were corrupted, figuring out how to run 2 versions of Unity at the same time (2019 and 2020). Troubleshooting  Research on Mirror and Photon Demos |
| 21-SEP-20 | 4 | Space Shooter Multiplayer game with Unity3D, using Mirror (Multiplayer) |
| 23-SEP-20 | 1 | Space Shooter Multiplayer game with Unity3D, using Mirror (Multiplayer) |
| 24-SEP-20 | 1 | Searching for good multiplayer demo game using Photon plugin to learn from and learn the photon framework |
| 28-SEP-20 | 2 | Try out networking of Multiplayer game with Unity3D, using Photon (PUN2) |
| 30-SEP-20 | 3 | Try out networking of Multiplayer game with Unity3D, using Photon (PUN2) |
| 05-OCT-20 | 3 | Try out networking of Multiplayer game with Unity3D, using Photon (PUN2)  Research on: Dedicated Game Server vs Client Server vs P2P |
| 07-OCT-20 | 2 | Research on: Photon Master Server and better understand the Photon demo done |
| 08-OCT-20 | 2 | Re-evaluate the Photon demo codes and understand networking structure  Searching for Turn-based multiplayer game using Photon (want to test out using Player UI that does not require networking and synchronisation, networking and game servers are reserved for exchanging information but not require to store and load scenes for player to “gather” in) |
| 12-OCT-20 | 2.5 | Discuss and research on possible game idea for 2nd game |
| 19-OCT-20 | 2 | Game logic research and troubleshooting  -Had issues with card shuffling & card spawning logic (could not find the problem) |
| 21-OCT-20 | 3.5 | Game logic research and troubleshooting  - Had issues with card shuffling & card spawning logic (could not find the problem)  -Had issues with card faces and card name not tallying  -Redo shuffling and card spawning (with faces) using another method |
| 26-OCT-20 | 2.5 | Discussion regarding difficulties faced and the ideal game structure (to match up with the AI programming)  Game logic research and troubleshooting  -Grouping (forming of melds) and sorting (numerical) |
| 28-OCT-20 | 2 | Game logic research and troubleshooting  -Deadwood score  -Discarding of card  -Taking card from fresh pile |
| 7-DEC-20 | 3 | Gin Rummy - Game logic research and troubleshooting  -Rearranging cards  -Drag & Drop |
| 9-DEC-20 | 3 | Gin Rummy - Game logic research and troubleshooting  -Fresh Pile card flow fixing |
| 11-DEC-20 | 3 | Gin Rummy - Game logic research and troubleshooting  -Fresh Pile card flow fixing  -Turn based game flow |
| 14-DEC-20 | 4 | MahJong Game Logic Research  -Assets Research  -Research win function game logic  -Game flow testing |
| 16-DEC-20 | 5 | MahJong Game Logic Research  -Game UI Planning  -Chow function  Project Discussion with Jun Leong  -Chow function  -Tile arrangement discussion |
| 18-DEC-20 | 5 | Mahjong Game Flow  -Shuffling and Distribution  -Tile flipping with correct face  -Debugging |
| 21-DEC-20 | 3 | Mahjong Game Flow  -Discard and Draw new card  -Auto discard  -Click to discard  -Debugging |
| 4-JAN-21 | 2 | Mahjong Game Flow Combination  -Code combination required more discussion  -Could not combine due to difference in indexing and style of identifying tiles |
| 7-JAN-21 | 4 | Mahjong Game Flow Combination  -Redo tile indexing and combine to accommodate both indexing style  -Attempted to standardize indexing  -Debugging due to error when trying to chow tiles (some was able to and some couldn’t, no specific pattern) |
| 11-JAN-21 | 5 | Mahjong Game Flow Combination  -adding chow function to main game flow  -debugging  -attempted to add pong/gang function |

## **Upcoming Tasks**

1. Continue with Mahjong Game Logic
2. Prepare Final Report
3. Turn Mahjong Game into multiplayer game using Photon (over local network)