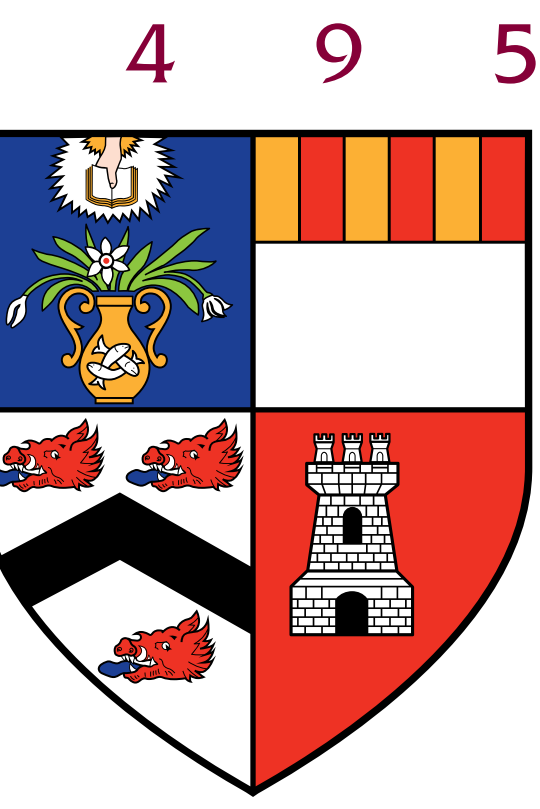


# RLEREWOLF – REINFORCEMENT LEARNING AGENT DEVELOPMENT FRAMEWORK FOR THE SOCIAL DEDUCTION GAME WEREWOLF

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## Werewolf Rules

- Werewolf is a game where players, **from 5 to 75**, are randomly assigned specific roles, at the start of a game.
- The game is split into turns which consist of **day** time and **night** time.
- Roles can be one the two factions – **evil** and **good**. The goal of the **good** faction is to kill off all **evil** members and vice-versa:
  - **Villager** – Part of the **good** faction; can vote during the **day** to execute a **Player**.
  - **Guard** – A member of the **good** faction; can protect players, including himself, during the **night** from being attacked.
  - **Seer** – A member of the **good** faction; can find out the role of a player during the **night**.
  - **Werewolf** – **Villagers** that turn into **Werewolves** during the **night**; member of the **evil** faction and have the ability to attack other players during the **night**.

## Research Question

- Can we offer a **platform** for both multiple non-expert **Agents** to play the game and **developers** to **train Agents**?
- How can we improve the existing **communication protocol** for the **Agents**?
- How do different **Agent** behaviour models affect the winning rate?

## Conclusion

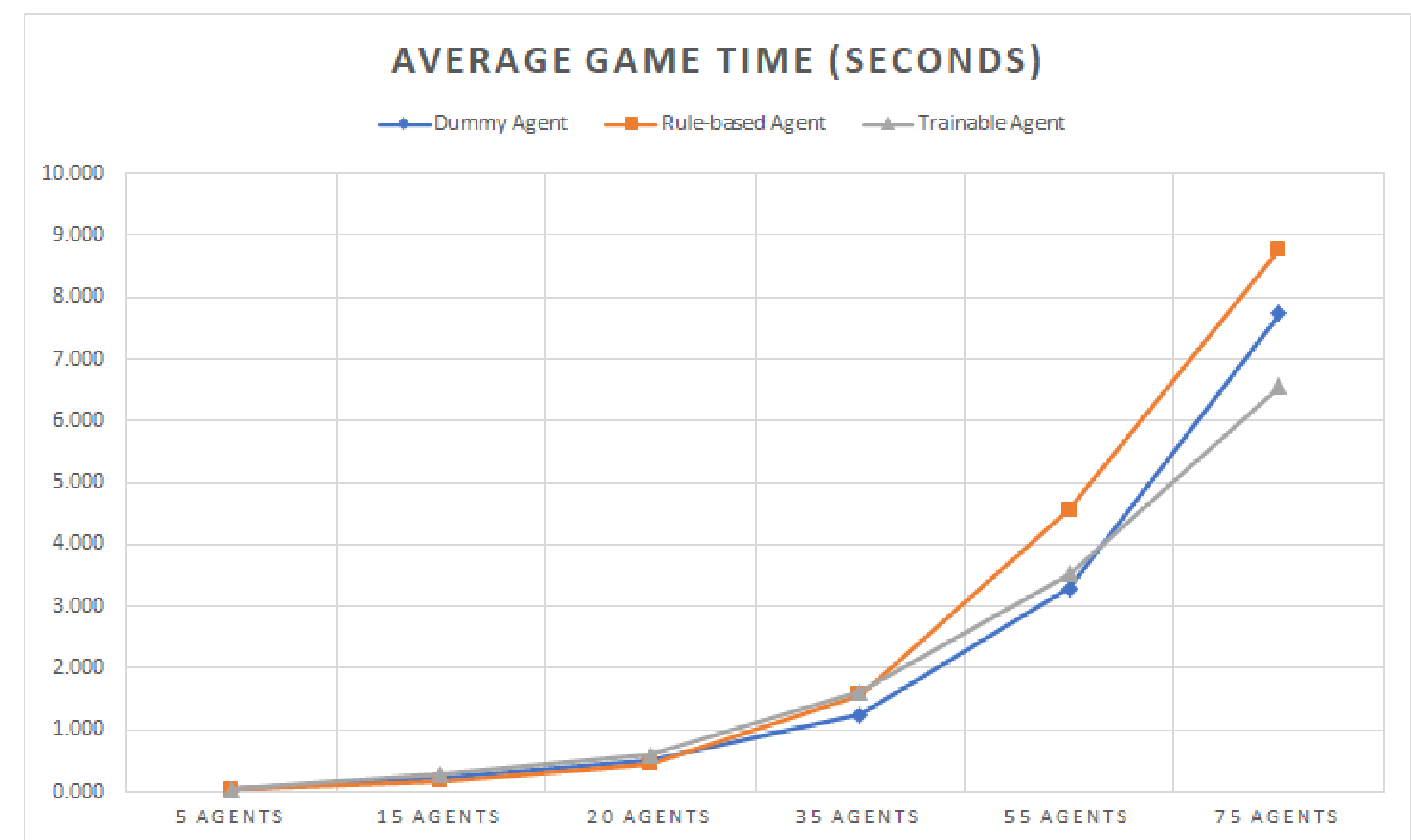
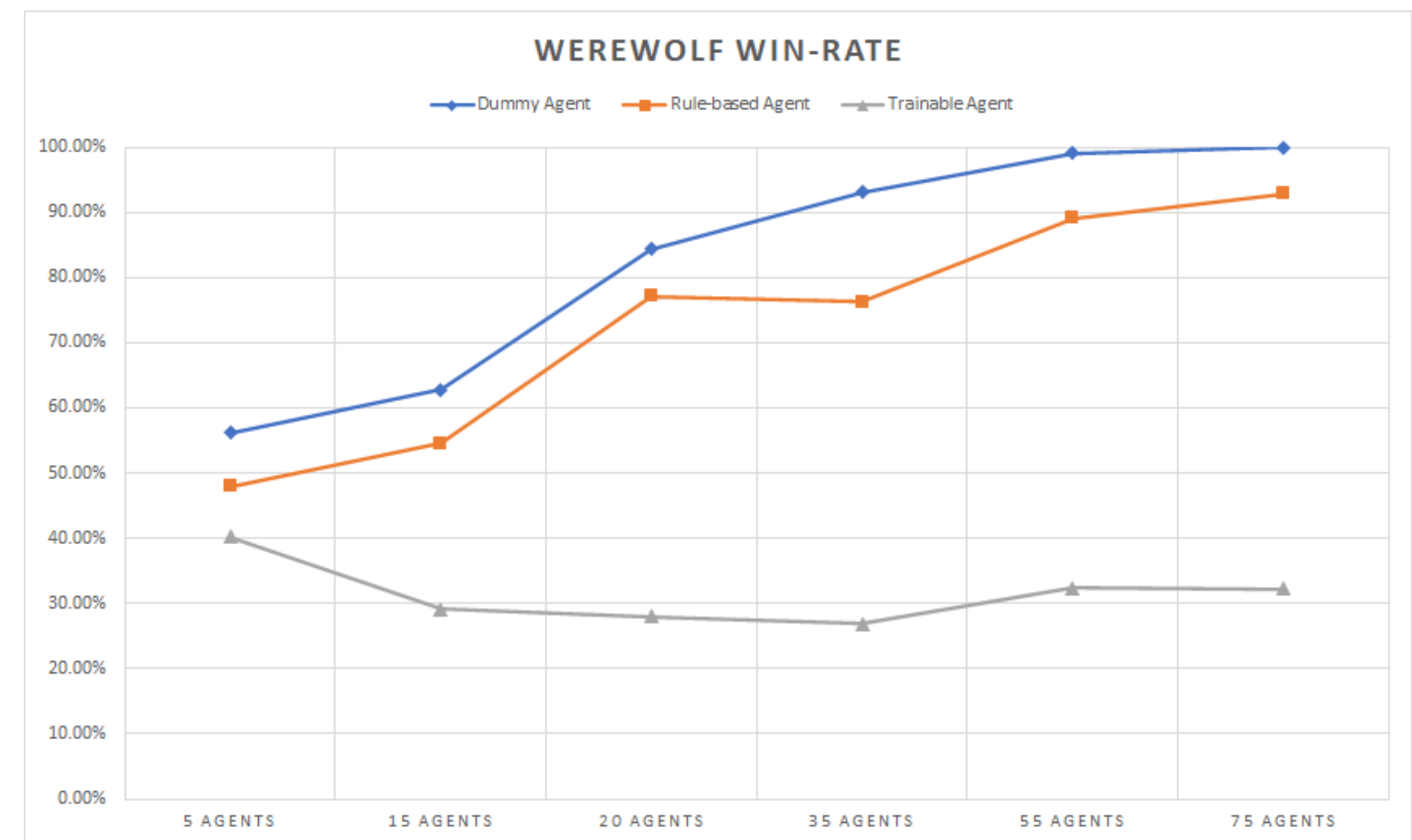
- Insufficient time in order to complete the project. Resulted in unfinished **Agents**.
- Built-in **Agents** do not reach the performance of **AiWolf's Agents**.
- Potential for the development of **Agents** whose performance is not entirely bound on the **Game** implementation.
- Metrics and analysis tools the framework provides are not currently provided by any existing framework.

## Contribution 1: Client

- Easily expandable with the developed framework GUI pipeline which employs Pygubu builders and custom built renderers.
- An access point for users to play the game Werewolf with other humans or **Agents** on the targeted **RLereWolf Server**.

## Contribution 2: Built-in Agents

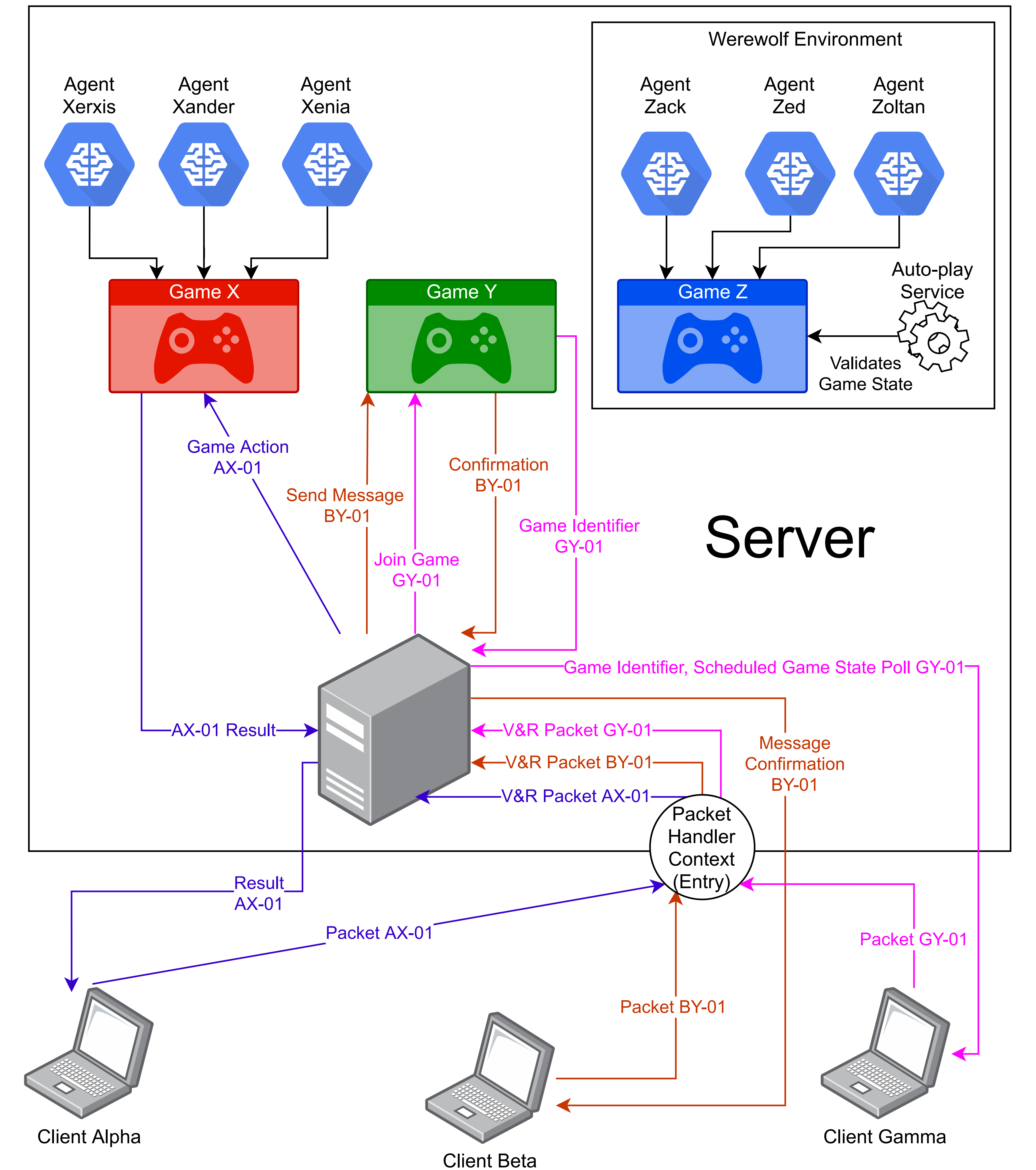
- **Dummy Agent** – A stochastic **Agent** that does random **valid** actions.
- **Rule-based Agent** – An **Agent** with an **honesty** factor who votes for the least **trustworthy**, according to them, **Player**.
- **Trainable Agent** – An **Agent** that can learn from playing multiple games of the current Werewolf **Game** implementation. Has no pre-existing knowledge of the game and needs to **train** in order to learn the game's rules and how to optimally play it.



## Contribution 3: Development Framework

The development framework consists of:

- The Werewolf game implementation.
- The analytic utilities provided by the built-in training **Environment**.
- Comprehensive **Server** & **Game** activity logging.
- The modular implementation of the four subsystems: **Client**, **Server**, **Game**, and **Environment** (see graph below).



✂ Tool  
tinyurl.com/RLereWolfFramework

📄 Dissertation  
tinyurl.com/RLereWolfPaper

🌐 LinkedIn  
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