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Game and Media Technology

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Games and Agents

Project Proposal

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I. Introduction

For this project we have chosen to create agents for a capture the flag (CTF) game. We would like to make those agents aware of all the aspects of the game. The agents should be able to make logical decisions based on the environment and team strategy and should also communicate with other agents providing each other with information about decisions and the current game situation.

There are multiple layers of strategy and decisions for a CTF game, a global (team-like) layer and lower level layer for each agent, this is explained in the next chapters. This document also has a short goal and agent aspect overview and a planning chapter.

II. CTF strategy

Winning is the highest goal within a CTF game and this can be done by scoring more points than the opposite team. Scoring a point can be done by capturing the enemy flag and bringing it to your own base (there can only be scored when your own flag is at your own base). There are a lot of different decisions and strategies which can be considered during a game. For example our flag has been captured should I try getting our flag back or should I try to take their flag (since without their flag they can't score a point) or maybe something else. Decisions can be influenced by a lot of different aspects, like a (predefined) team strategy, current location, information given to you by other players (agents), health, the score etcetera. We have chosen to take the goal of winning and define it as smaller goals for the agents so when these goals are put together should achieve the higher goal.

The first step is to break down CTF into smaller entities that are easier to define and program.

Capture The Flag

- T.A.B. (Tactical Advance to Battle)
  - This term is used within the British military. It is used to describe a long-distance march carrying full kit.
  - In a CTF game we can break it down to:
    - Enemy presence
    - Rules of Engagement
    - Team Identity
    - Agent identity
    - Etc.
  - The environment plays a big role
  - Having the enemy flag or losing your flag changes the strategy
- Map Control
  - In every map, certain positions have higher values as they might provide a better overview of the enemies or be favorable to defend against an enemy advance. Therefore controlling these positions will give our team a higher chance of achieving our
high level goal.
- Positions that enhance a defensive operation
- Positions that enhance an offensive operation
- Also item locations (item control)
- Item control
  - Weapons and ammunition
    - In general no player in the game starts with all weapons
    - Each weapon is better suited for a type of engagement
    - Having the required weapons will enhance the execution of a certain strategy
    - No weapon has infinite ammunition
  - Health, armor,...
    - Throughout the game players receive damage, which might be able to be replenished by items
    - Acquiring armor increases a player's survivability rate in an engagement
  - Other items: there might be other power-ups and items that may come into play in some stage of the game such as the double or quad damage.

III. Agent behavior

The agents' behavior on a higher level is based on the team strategy and on a lower level based on agents' own personality. Agents can communicate with the environment through small actions such as move, shoot, crouch, etc. Each agent ideally has a personal preference as to how it would approach a certain goal within the game. After implementing the basic agent behavior, we would like to add personalities for each agent if we have enough time.

Agent
- General personality
  - Aggressive
  - Defensive
  - Evasive
  - Backstabber
  - Etc.
- Weapon preference
  - Long range
  - Close range
  - Hit-scan weapons (snipers, machine guns,...)
  - Weapons with splash damage (rocket launcher, shotgun, ...)
  - Projectile weapons (grenade launchers, ...)
- Communicating with the team
  - Strategy change
  - Chosen route
  - Agent status

IV. Implementation

We would implement this project from a bottom-up approach, meaning that at first we implement simple logical behavior such as a route to the enemy base, evading damage, etc. and then use these simple
behaviors for creating a higher level task that we have in mind for the agents.

**V. In short**

Goal is to let agents work together as a team (teamwork) which is done by making decisions based on the team strategy. Agents should also react to its environment while keeping the team strategy in consideration.

Teamwork is required to execute the strategy of the team (probably called by a team leader). Adaptive game AI is required to adapt the strategy of the team (when enough time) and also to adapt based on the environment, current health, information from other agents etcetera. When there is enough time, personalities of agents will be considered which could effect the playstyle of the agents.

**VI. Planning and Timetable**

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