

Unreal Touranment 2004 - GameBot Observations

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A* Pathfinding

Adding A* pathfinding allows the bots to navigate faster to their destination as the bots no longer need to meander to their destination. Navigation to the enemy flag from the home base with pathfinding enabled was more than halved.

Regular Jumping

Detecting if the bot is stuck takes too long, so jumping on a regular basis leads to faster navigation and improves bullet dodging ability. Those bots that jumped on a regular basis were able to travel further through open fire and leave their base faster.

Crouching during Combat

Crouching while in combat allows the bots to shoot more accurately and reduces their visible profile. When bots encounter each other, those able to crouch consistently win against those that cannot.

Trigger Inheritance

The provided software tools did not provide any way for competencies to inherit triggers from action patterns or behaviours. This would have been useful multiple times, two examples being the requirement for ammo to shoot, or knowing where the enemy base is to navigate there.

Single Defender Bot

Having a single defender bot should help keep the base clear of enemies and stop enemies stealing the flag. This is partially true, sometimes the enemies were able to pick up the flag and leave the base, however, the defender bot was able to combat enemies loitering in our own base.

Plan Execution Speed

The BOD framework did not run at a consistent speed between simulations. Especially when in 'Debug' mode. This dramatically affected bot performance, as bots on a faster loop time were able to react much faster to events, demonstrating that planning speed can impact bot performance.

Downsides of Culture

Runner bots with the same goals acted similarly when faced with danger. This was detrimental in some cases, for example bots standing in the way of other bots while shooting, which severely impacted combat performance in groups.

Benefits of Culture

By using three runner bots concurrently complete their goals, a much higher rate of flag retrieval is achieved. When two of the bots die the goal can still be achieved by the third bot. This is tested by using varying proportions of defender and runner bots.

Latches

Using latches enables behaviour persistence throughout multiple BOD cycles. When bot starts shooting and crouching for combat, it no longer has to stop shooting and stand up between cycles. This leads to more consistent and accurate combat.

Plan Simplification

Simplifying the plan makes the bot behaviour more predictable and easier to debug. A cycle of adding drives to the plan until the desired behaviour is observed, proceeded by making those drives as simple as possible made bot behaviour easy to modify throughout development.