Artificial Intelligence

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The article about various data and elements of AI logics, modules, behaviours, and algorithms in Urban Assault.

(The page is currently under construction!)

1 Information

Artificial Intelligence (AI) in Urban Assault refers to all types of computer-controlled autonomous entities and their logics. Virtually all aspects of the game objects that are not directly controlled by players are controlled by AI. Therefore, AI is an integral part of the gameplay.

Urban Assault has quite advanced and optimised AI for its time period. The game engine can naturally support hundreds of independent AI units in a complex 3D environment full with obstacles and pathfinding, and both the Strategic AI and Tactical AI are well-represented in their own domains.

It is also worth noting that in Urban Assault, many aspects of these AI elements are purposefully designed to perform less optimally than the player. This design decision was made in order to provide various incentives to player intervention in many different types of gameplay situations. In other words, players are meant to turn the odds.

There is no difference between the AI of Urban Assault, Metropolis Dawn, and Urban Assault Trial. OpenUA also has the identical AI for the most part, but they may not be 100% same.

2 Overview

By definition, there are two main types of AI in Urban Assault: The Strategic AI, which constitutes the general thinking/reaction behaviours and decision-making capabilities of computer-controlled host stations which are exclusive to the single-player mode; and the Tactical AI, which constitutes the general behaviours and thinking capabilities of computer-controlled units and components, and therefore applies to both single-player and multiplayer aspects of the game.

In Urban Assault, the majority of internal AI codes and logic modules are hard-coded into the game engine. However, there are various types of parameters available in the scripts that can be used to adjust and control behaviours and capabilities of many AI elements during the gameplay. These include but are not limited to: The AI host station's activity frequency and budget ratios defined in each level or the unique pre-set 'attack pattern' modules of individual units.

Many aspects of AI elements during gameplay are also purposefully designed to perform less optimal than the player at various tasks, in order to give incentive to player intervention in a variety of gameplay situations. This is actually a key gameplay design element in Urban Assault, since the developers did not want the players to sit back and play the game via only RTS mode with map and squadron manager. Whilst also keeping the calculation-intensive AI in check.

It is worth noting that the AI player in Urban Assault does not cheat in any form. There is no built-in hack or artificial cheating module designed to give any advantages to the AI in any form at the game engine level, so the AI is considered cheat-free. This can be also easily demonstrated and proven by creating several testing environments as practised by numerous community mod authors before (or simply check OpenUA code!).

For example, AI cannot auto-generate its energy without power sources, and has to scout the map first to gather enemy information. In fact, considering the fact that AI cannot teleport their host stations, create multiple vehicles in quick succession, or enjoy various benefits of the first-person control in vehicles, the AI in UA is actually designed to be underpowered than the players are.

3 Strategic AI

Coming Soon.

4 Tactical AI

Coming Soon.

5 Level-specific Mission AI

The host stations/faction-wide strategic AI is further subdivided into a set of level-specific parameter modules, which primarily controls the frequency and initial delay values of certain strategic actions that individual AI host stations in level data files can perform. This design allows the effective simulation of different AI behaviours and their aggressiveness per each level to flexibly adjust the difficulty and personality of each AI host station defined in the levels.

There are total 8 different types of primary actions that can be assigned and adjusted for the individual AI host stations defined in a level data:

- Conquest: (Under Construction.)
- Defence: (Under Construction.)
- Reconnaissance: (Under Construction.)
- Robo (Attack): (Under Construction.)
- Power Station (Construction): (Under Construction.)
- Flak Station (Construction): (Under Construction.)
- Radar Station (Construction): (Under Construction.)
- Displacement: (Under Construction.)

Each action parameter is generally responsible for more than one type of strategic decisions and manoeuvres that AI can make. For example, the conquest module is not only responsible for creating a large strike force that is employed to strike a cluster of fortified enemy power station bases, but it also controls sending out a small-sized squad to quickly capture unprotected neutral/hostile power stations in their line-of-sight.

The detailed functions and syntaxes for these level-specific parameters will be covered in another article. It is also recommended to check the official Levelbuilder guide from the developers which covers this information as well.

5.1 Conquest Module

Under Construction.

5.2 Defence Module

Under Construction.

5.3 Reconnaissance Module

Under Construction.

5.4 Robo (Attack) Module

Under Construction.

5.5 Power Station Construction Module

Under Construction.

5.6 Flak Station Construction Module

Under Construction.

5.7 Radar Station Construction Module

Under Construction.

5.8 Displacement Module

Under Construction.

6 User and AI differences

There are numerous design differences between the AI layers and User (player) layers, which affect the core gameplay logics and mechanics in various ways.

In Urban Assault, the player generally possesses many direct advantages over AI which are fully intended by the developers. Which will be covered in the next section.

The comparison chart below shows the main differences between AI and User in regards to some key gameplay elements:

Comparison Chart	AI	Player
Virtual Presence Shift	No	Yes
Host Station Teleportation	No	Yes
Batch Unit Creation	No	Yes
Unit Creation Cost (in single-player)	Dynamic	Static

These designs are entirely intended by the developer after the beta testers feedback.

7 AI Disadvantages

As mentioned above, the AI in Urban Assault does not cheat in any form. The AI in UA does not have any built-in cheats or 'hacks' which give them unfair advantage over the players at an engine level. Therefore, the AI in Urban Assault is cheat-free.

For example, just like the players, the AI cannot generate any energy income without a power source, and must peel back the fog-of-war on the map to secure the line-of-sight in order to gather intelligence and enemy information around the level, which they assess to make adequate decisions accordingly.

In fact, the AI players in UA have several distinct disadvantages compared to the human players during the gameplay.

Some examples of the AI-only host station disadvantages are:

- The AI cannot teleport to move their host stations unlike the players, which greatly limits their mobility and strategy around the level. It also renders AI unable to use the player's strategy of beaming directly into enemy bases.
- The AI cannot use Virtual Presence Shift (the ability to manually assume the first-person control of the vehicles) to receive a significant bonus to the firepower, shielding, and manoeuvrability for the units, unlike the players.
- The AI cannot create multiple vehicles simultaneously unlike the players, and they are always subject to the hard-coded '2 seconds delay period' between each vehicle creation. Which restricts their unit production capacity.
- The AI cannot create units at a same cost since they are subject to the dynamic 'unit upkeep/maintenance cost' system, which constantly increases their further unit creation costs proportional to the currently controlled units.

In the majority of the single-player campaigns, the only real advantage the AI opponents have over the human player is faster energy recharge rates (see also: Energy Math) that are defined individually inside the level scripts. Which are not a hardcoded function per se and can be adjusted easily per level data.

8 Notes

Under Construction.