darkBot: an adaptive AI built upon nulbot

Darkling

December 7, 2017

darkBot is built upon NullBot (by NoQ) with the initial purpose of getting the AI to use ECM towers and turrets and since darkBot uses ecm it seems only fair that it should be susceptible to it as well. darkBot is not a non-cheating AI because it still uses deity for adaptation, however it will only target objects it can see or structures that it has seen. Although it will only target visible objects it does know the starting locations for players and locations of all oil resources (information that a player would know) and will scout those.

Along the way I found myself adding some additional features as well (repair droids) and trying to get the ai to be a little better with AA defences. It preserves the basic adaptation mechanism and weapon paths of NullBot but includes some tweaks to "improve" base building. One of the features of NullBot is that it can manage multiple attack groups (with sufficient resources) with each tasked to a different enemy although darkBot will prioritise enemies by how close their base is to its own.

darkBot was created to run on Warzone 2100 version 3.2.3.

Features

- This AI will build repair droids and incorporate them (and sensor droids) into its attack groups.

- darkBot will build ecm turrets and at hard or insane difficulty it will also build ecm tanks and incorporate them into its attack groups.

- Once it has researched VTOLs or it has seen enemy VTOLs it will have an increased probability of researching and building AA defences lasting for ten minutes. Each sub-personality has an AA weapon path available to it now (machine guns leads to hurricane and cyclone AA, rockets lead to sunburst, avenger, and vindicator AA, cannons will research flak AA).

- The AI is a little bit "smarter" about building its base and will place AA defences and artillery in a ring around the base and is less likely to place defences at the back of its base (although terrain within the starting location can still make a mockery of building placement).

- Each sub-personality has a chance to prefer using hovers even on maps without water. The flamer-cannon and flamer-rocket sub-personalities are more likely to go hover and the machine gun-cannon and machine gun-rocket sub-personalties are less likely to go hover. Once it has researched hover propulsion all ground based tanks it produces will be hovers and it will reorganise its attack groups to avoid potential pathing issues between hover and other ground propulsion units. (This feature was inspired by a game where I saw an AI building tracked dragons with dual plasmite flamers).

- If darkBot's base is being overwhelmed then it will ask for help and drop a beacon.

- darkBot won't steal oils that are close to an allies starting position.

- darkbot will destroy features that are close to its base.

- darkBot (similar to nullbot) organises its forces into different groups. There are the attack groups (one for each enemy player), the vtol group, the miscellaneous group for harassing enemy oils and collecting oil drums, and a small defence group. It will focus on the enemy with the closest starting location to its base although with sufficient resources also engage other enemies at the same time. In the event that it prefers hover propulsion and starts building hover tanks all cyborgs and remaining ground tanks without hover will be placed into an additional group that will focus on the closest enemy targets that it can reach.

- darkBot's defensiveness is determined by how many derricks it has and if it has only a few derricks then its probability of building defensive structures is low and but as it gains more derricks this probability will increase.

- darkBot will initially target the enemy that is closest to its starting location, but a player can tell allied darkBots which enemy they want it to target using chat commands.

Chat functions

darkBot uses the chat functions from NullBot. The following messages work the same way for both NullBot and DarkBot (!nb is retained from the NullBot code).

!nb who darkBot's response will consist of five components looking like **Player: # (db) MEDIUM ∼fr∼ ∼true∼**. The first three components identify the player id (where # is the player number) for the ai, the script and difficulty respectively. The fourth component is a two letter code identifying the flavour of its sub-personality (**mr**: machine gun and rockets, **mc**: machine gun and cannon, **fr**: flamers and rockets, **fc**: flamers and cannons). The last component will be either true or false where true indicates that its favoured ground propulsion is hover.

!nb set allows the sub-personality flavour to be set, for example !nb set mr would set all receiving allied darkBot AIs to the machine gun rocket sub-personality.

!nb truck is a request for a truck from allies. If darkBot has an available truck then they will hand them over. If darkBot has lost all their trucks and factories it will request a truck from its allies as well.

!nb power will request oil from allied darkBots. The AI will donate one third of it's current oil to the player but since darkBot often has a lot of items queued it is unlikely to have much on hand.

!nb help is a request for help. You'll need to place a beacon so that darkBot knows where you need help and if it has free troops then it will send them. If you send help but don't place a beacon it will ask you for one, You may occasionally not a plaintiff cry of **!nb help me!!** coming from a darkBot ally (with an associated beacon). This request means that its base is in danger of being overrun.

!nb tx this message will let allied darkBots know that you no longer need their help. darkBot will also send this message once its base is no longer in danger (it allows the AI to reset targets).

!nb res This message will allow you to specify research paths for darkBot. The particular path to be researched can be set by adding an additional text which could be one of:

- **mg** The machine gun path (mc and mr).

- **fl** The flamer path (fc and fr).

- **cn** The cannon path including gauss weapons (fc and mc).

- **cnaa** The flak cannon (fc and mc).

- **cnas** The plasma cannon (fc).

- **mo** The mortar path including howitzers (mc and fc).

- **fm** The incendiary mortar and incendiary howitzer (fr and fc).

- **rx** The anti-tank rocket path for rockets and missiles (mr and fr).

- **rxarty** The artillery rocket path for rockets and missiles (mr and fr).

- **rxas** The bunker-buster rocket (mr and fr).

- **rxaa** Anti-air rocket and missile weapons including the suburst, avenger and vindicator (mr and fr).

- **ls** The laser path (fc and fr).

- **aa** The hurricane and whirlwind anti-air weapons (mc and mr).

- **lxaa** The stormbringer anti-air weapon (fc and fr).

- **nx** Nexus tech including the emp cannon, nexus tower, and emp morter (mr,mc,fr,fc).

- **bm** bombs for VTOLs (mr,mc,fr,fc).

- **ftxm** The missile fort (fr and mr).

!nb res cl will clear the current research path and darkBot will choose its own research

!nb res no will stop any new research from starting.

!nb res fn will research fundamental technologies.

The research paths are specified in the file called standard.js located in the db_rulesets directory. Fundamental technologies are listed in fundamentalResearch within that file and consist of systems technologies and upgrades. I've broken down the original weapon paths used by NullBot somewhat since some of the weapons have different roles. As an example the various forts are included within their weapon paths. The cannon and gauss forts are in the cannon path and the rocket bastion is in the rocket path, however the missile fort has it's own entry here since it can hit both air and ground targets.

Chat functions specific to darkBot

I've added several additional chat commands as well.

!nb hover This message will tell allied darkBots to set their preference for hover tanks to true so that any new ground tanks that they produce will use hover propulsion (assuming it has access to hovers).

!nb noh This message will tell allied darkBots to set their preference for hover tanks to false so that any new ground tanks that they produce will use either wheels, half-tracks, or tracks.

!nb defaa This message will tell allied darkBots to build AA defences. It's actual effect is to darkBots probability of building AA defences is increased for ten minutes from when the message is sent. darkBot will also send this message to allies when it first spots an enemy VTOL.

!nb target This message will ask allied darkBots if they are targeting a team target (a target specified by the player) or if they are targeting the closest enemy to them individually.

!nb st ind this message will tell allied darkbots to target the enemey that is closest to them individually.

!nb st # (where # is a number from 0 to the maximum number of players) this message will tell allied darkBots to target a particular enemy.

Installation

The Wartune FAQS goves guidance for how to install a mod. Within the warzone directory there is a folder called mods. darkbot.wz can either be placed within \mods\multiplay or it can be placed in \mods\autoload. Mods that are placed in autoload are automatically loaded when the game starts whereas mods placed into the multiplay folder need to be specified at the command prompt when you start warzone

```
--mod_mp=darkbot.wz
```

Where a mod is installed varies a little between operating systems. I normally run Ubuntu so these suggestions are specific to that flavour of linux. You can find warzone files in your home directory nad place darkbot.wz in either

```
.warzone2100-3.2/mods/autoload
```

or

```
.warzone2100-3.2/mods/multiplay
```

If you have placed it within the multiplay folder then you can get warzone 2100 to load it during startup by using the command

```
warzone2100 --mod_mp=darkbot.wz
```

in terminal to start warzone.

If you're playing on a windows 10 system then the mods folder will be located in

```
C:\Users\<username>\Documents\Warzone 2100 3.2
```

where username is your login name. If you've placed darkBot within the \mods\multiplay folder then you need to edit the target line in the shortcut (left click and select properties) and add

```
--mod_mp=darkbot.wz
```

to so that it reads

```
"C:\Program Files (x86)\Warzone 2100-3.2.3\warzone2100.exe" --mod_mp=darkbot.wz
```

assuming that Warzone 2100 on your installation is installed in the folder

```
"C:\Program Files (x86)
```

If you're using a Mac system then warzone FAQs is your best guide.

Although the file layout for darkBot is thh same as NullBot's the folder names have been changed so installing darkBot will not affect Nullbot.