Using machine learning to detect bots in World of Warcraft

Creating a decision tree based on play styles to classify between a human and a program

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What is a bot

- A game bot is an automated program that is designed to perform certain tasks within a game.

- Game bots are mostly used for: levelling up a character, farming certain items, or/and making a task easier for a player.

- Popular bot programs in WoW include honer buddy and Lazy bot.
How bots ruin the game

- Players that use bots to level up misrepresent their proficiency in the game.
- Take all the item drops away for paying player.
- Gives players an unfair advantage.
- Ruin the in game economy.
Earlier forms of bots

- People farming items and selling them for real money

- Prison camps in China. Made prisoners farm items.

- Other forms of bot
  - Social media
  - Chat bots
How they go undetected

- User can change the setting of the bot to tell it how to act.

- Game bot companies update their product to counter act new bot detection methods.
Current bot detection short falls

- All bot detection method used currently suffer for one short fall or another.
  - Increases the latency of the game.
  - Ruin the emersion of the game.
  - Invade users privacy, current WoW bot detection system.
The aim of my thesis

- Develop a bot detection method that
  - avoids the short falls in current bot detection methods.
  - Make it hard for a company to counter this detection method by focusing on aspects on game play easily over looked.
  - Have a low computational cost. Try to record and process as few factors as possible.
Factors of game play

- Percentage of Items Gathered.
- Distance between the player and item drop when farming.
- Enemies engaged.
- Time between item collections.
- Which drops are gathered.
Main Research questions

• How effective is this method at detecting bots?
  ◦ What percentage of bots are detected?
  ◦ How does increasing the training size effect the outcome?
  ◦ How many humans are classified as bots?

• How much does each factor contribute to classifying a WoW avatar?

• Can bots be identified with fewer factors?

• How well does it classify bot profile outliers?
Mining the data

- Percentage of Items Gathered/Distance between player and item drop when farming.
  - The location of the player.
  - The location of all item in the area.

- Enemies engaged
  - The location of enemies.

- Which items were gathered.
  - When the player is farming.

- Time between item collection.
  - The Time.

- This information is saved every 0.5 seconds to a data base.
The participants

- Advanced players: Players who have levelled up multiple characters to level 80.

- Intermediate players: Players who have played multiple hours of WoW but just levelled up a single character to level 80.

- Beginner players: Players who haven’t played much/any WoW but know the basics.
Conducting the experiment

- Each participant will be asked to perform four ten minute farming sessions starting at different location.

- They will play on a server I set up with Jeuties Repack.

- They will all use the same character.

- They will be told to farm a specific item, Saronite ore.
The bot programs

- Lazybot and Honorbuddy.
- 72 test cases in total, 10 min each.
- Three different routes.
- Two different “Do not approach target with certain number of enemies around” number.
- Two different combat approaches, casting different spells.
- Each route will be tested three times starting at a different location.
Classifier

- C.4.5 decision tree in weka

  1st test
  - Trained with 20 bot and 9 human cases.
  - Test with 52 bot and 39 human cases.

  2nd test
  - Trained with 30 bot and 18 human cases.
  - Test with 42 bot and 30 human cases.

  3rd test
  - Repeat 1st and 2nd trained
  - Test with 30 new bot profiles, a lot of which are outliers
Test with less factors

- Drop the factor with the least information gain.

- Repeat all three tests, compare results.
Looking at other methods

- Online game bot detection based on party-play log analysis. Identified 95.92% of bot cases.
  - Bots don’t always form parties.

- A Behaviour Analysis-Based game bot detection approach considering various play Styles. Identified 95.35% of bot cases.
  - High computational cost.
Future work

- Test on a larger scale.
- Test how easy it is to develop a bot to go unnoticed.
- If bad results, add more factors.
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