



Procedurally Generated Natural Language Text for the Purpose of Player Navigation

Nephi Anderton – LupusSolitarius590@gmail.com – https://github.com/lupus590/Uni_MajorProject

Abstract

An experiment to determine if natural language directions are a viable and more immersive alternative to waypoints in video games.

There are many ways to guide a player through a game world, each with varying degrees of immersion or realism. This project is an attempt to reintroduce and improve an old technique for guiding a player through a virtual space by using modern navigation technologies from both games and other technological industries.

A algorithm was created and placed within a tech demo. This demo was uploaded to the internet to allow people to play and produce data. This data and other feedback from the play testers indicated that they liked the concept but the algorithm did not generate clear instructions.



[Fig6]



[Fig2]

Common Modern Techniques for Directing the player

- Nav markers: also called waypoints or map markers, these markers give no indication of route as they just point to the destination. Multiple markers can be used to approximate a route.
- Lighting and environment: players are naturally drawn to illuminated area within the game world, other environmental cues can be used too. Like nav markers it is difficult to show a clear route without excessive use.



[Fig5]

- Follow an NPC: players can be instructed to follow a non-player character through the game world. Unlike the two above, this shows the player a route but on its own doesn't tell the player their destination. Additionally, the player is dependent on the NPC, the player may get bored or lost if the NPC travels too fast or too slow. If combat is part of the game then the NPC may get killed, possibly leaving the player with out help in travelling to the goal.



[Fig1]



Interactive demo!
Just ask to play.

[Fig1] 'Skyrim Quest Marker', [Online]. Available: <https://lh1.redbubble.net/image.120427234.5270/fiat.800x800.075.f.u.1.jpg>. [Accessed: 20-Jan-2017].
[Fig2] 'Paper Map', [Online]. Available: <https://s-media-cache-ak0.pinimg.com/originals/3a/a5/34/3aa534b2c3fceb7df9615767b2b6705.png>. [Accessed: 24-Jan-2017].
[Fig3] 'google-maps-logo.png' (PNG Image, 900 x 916 pixels) - Scaled (73%). [Online]. Available: <http://logonoid.com/images/google-maps-logo.png>. [Accessed: 24-Jan-2017].
[Fig4] 'tomtom-no-background-2.png' (PNG Image, 340 x 228 pixels). [Online]. Available: <http://www.caravanguard.co.uk/news/wp-content/uploads/2012/05/tomtom-no-background-2.png>. [Accessed: 24-Jan-2017].
[Fig5] 'ducks.jpg' (JPEG Image, 859 x 559 pixels). [Online]. Available: <http://www.lifealongtheroad.com/wp-content/uploads/ducks.jpg>. [Accessed: 24-Jan-2017].
[Fig6] 'Compass1.jpg' (JPEG Image, 3000 x 2286 pixels) - Scaled (29%). [Online]. Available: <http://jasonvbarger.com/wp-content/uploads/2015/04/Compass1.jpg>. [Accessed: 06-May-2017].
[Background] 'dsc_00131.jpg' (JPEG Image, 640 x 316 pixels). [Online]. Available: https://halimawdixon.files.wordpress.com/2015/03/dsc_00131.jpg?w=739&h=364. [Accessed: 06-May-2017].
[Footprints] 'trak-clipart-13.jpg' (PNG Image, 2519 x 916 pixels) - Scaled (44%). [Online]. Available: <http://clipground.com/images/trak-clipart-13.jpg>. [Accessed: 06-May-2017].

Known Limitations of the Algorithm

- It is expected that there will be a road for the player to follow between instructions.
- Landmarks have to be tagged by the level designer. Also, there needs to be, attached to the landmark, a description of its appearance. This description needs to be written and updated by the designer, it is possible that the model or texture of the landmark could be changed without updating the description, causing the algorithm to identify the object incorrectly.

Results

Online testers were given two sets of destinations, the first with directions produced with the algorithm, the second with a nav marker.

All players managed to get to the destinations which were marked with the nav marker, however only one player was successful on one route with the text directions. Feedback clarified that the text instructions were unclear, the author believes that this is due to some of the techniques used by the algorithm to generate the directions.

It should be noted that there were a few bugs in the tech demo which affected the collection of data, more testing should be done to assure the reliability and validity of these results.



[Fig3]

Further work

- Fix the flaws in the algorithm
- Investigate and fix the cause of the bad directions
- Add line of sight checking when searching for landmarks
- Avoid reuse of landmarks
- Limit the search range for landmarks
- Have the algorithm generate good directions even without valid landmarks
- Give the algorithm more variety in its phrasing
- Add features which allow more complex language descriptions "continue past the clock tower"
- Add features which allow large iconic landmarks to be used from a distance "head towards the market"
- Allow landmark like objects to be traversed "cross the bridge"
- Test performance, how much resources does it need?
- Test the game within a real game like environment



[Fig4]

Scan for contact
details



copyright Halima Washington-Daniel