Procedural Storyline in Games Using Language Processing

# Terrific Disposition by Justin Alexander Shanks

## Abstract

Although procedural generation of game content has been seen in games, the use of this mechanic in the generation of a storyline has been largely avoided. Through the

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# Introduction

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# Technical Considerations

## Processing Speed and Core Functionality

Although a brief exploration of the languages considered will be explored, it should be noted that in the end C++ was chosen as the game’s main processing language for the reasons listed.

### C++ and SFML

Due to years of experience both inside and outside of academia a solid knowledge of C++ ensures the development of the project. Aside from the familiarity with the language, C++ is well regarded as having good memory management and high performance, meaning that it would pair very well with a slower language such as Python (discussed later on) for the task at hand.

## Natural Language Processing

Although the above languages were considered for their processing and graphics capabilities, they did not have a large readily-available library of language processing packages. As a result, other languages had to be considered for this functionality as an extensive and efficient language processer was necessary for the proper implementation of this project.

In the end, Python and spaCY.io were chosen for the implementation of the language processing, but it should be noted that other combinations were considered for this functionality.

### Python and spaCY.io

Python, efficient, powerful, accurate

## Semantic Fields

### Sectors or Subjects

* Descriptions – Adjectives and adverbs.
  + Emotion, Taste, Weather, Social, Tactile, Motion, Position
* Actions or Interactions – Verbs
  + Physical, Optical, Motion, Vocal, Auditory

### Intensity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Descriptions | Constructive | Positive | Neutral | Negative | Deconstructive |
| Taste | Delicious | Tasty | Plain | Nasty | Disgusting |
| Emotion | Happy | Pleased | Calm | Sad | Mad |
| Weather | Sunny | Warm | Overcast | Rainy | Torrential |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Interactions | Constructive | Positive | Neutral | Negative | Deconstructive |
| Physical | Secure | Acquire | Touch | Shove | Attack |
| Optical | Precise | Clear | Simple | Ambiguous | Obscure |
| Motion | Sprint | Run | Walk | Stand | Sit |

# Implementation

## Essential Game Objects

### Interactables and Environment

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## Language Processing

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## User Interface Design Decisions

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## User Calibration

### “Escape the Room” Scenario

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### Continuous Processing

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## World Generation

### World Size and Difficulty

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total Tiles | Plot Positions | Dangerous | | Deadly | |
| Total Tiles | Percentage | Total Tiles | Percentage |
| 16x16 | 256 | 12 | 36 | **14.06%** | 4 | **1.56%** |
| 32x32 | 1024 | 24 | 196 | **19.14%** | 36 | **3.52%** |
| 64x64 | 4096 | 48 | 1156 | **28.22%** | 324 | **7.91%** |
| Table x – Percentage of World Deemed Dangerous or Deadly | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16x16 | | | | | 32x32 | | | | | | | | | 64x64 | | | | | | | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  | C | C | C | C | C | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  | C | C | C | C | C | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  | C | C | C |  |  | C | C | D | D | D | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  | C | D | C |  |  | C | C | D | D | D | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  | C | C | C |  |  | C | C | D | D | D | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  | C | C | C | C | C | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  | C | C | C | C | C | C | C |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | D | D | D | D | D | D | D | D | D | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16x16 | | | | | 32x32 | | | | | | | | | 64x64 | | | | | | | | | | | | | | | | | | |
| Table x – Graphical Depiction of Danger Clusters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# Evaluation

## Testing

### Integration and Unit Testing

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### Play Testing

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# Works Cited

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## Appendix

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