# Realistic Character Progression

**(vector based character advancement)**

**[IMAGE OF PROTOTYPE]**

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**Last Updated: 06/10/2023**

# Technical Field

Game Programming.

# Background Information

My favorite game genre is RPG. Most RPGs today are either based off of experience or skill values, I want to make a system that allows you to progress more based on how you play, than being focused on increasing a certain skill to gain stat points.

# Prior Art (legal term)

While there are games that offer dynamic character progression systems, such as The Elder Scrolls series and Ultima Online, these systems are primarily based on experience or skill values. In these games, character progression is tied to the use of skills and the accumulation of experience points. However, there are currently no known games that employ a vector-based system to track character stats. This project aims to pioneer the use of n-dimensional vectors for character progression, offering a new and innovative approach to character development in RPGs.

# Project Description

This project aims to develop a novel vector-based character advancement system for RPG games, which will use an n-dimensional vector to track all stat changes. This system will revolutionize the way character progression is handled in RPGs, focusing on player behavior and playstyle, rather than the traditional experience or skill-based progression.

In this system, each character stat (such as strength, intelligence, agility, etc.) will be represented as a dimension in an n-dimensional vector space. Every action or decision made by the player will result in a vector in this space, with the direction and magnitude of the vector determined by the nature of the action and its impact on the character's stats.

For example, if a player's action results in an increase in strength and agility, the resulting vector will point in the direction of the 'strength' and 'agility' dimensions and its length will correspond to the magnitude of the increase. Over time, the sum of these vectors will form a trajectory in the n-dimensional space, representing the character's progression.

This approach allows for a more nuanced and dynamic progression system. Instead of simply accumulating experience points or increasing skill values, the player's actions and decisions will have a direct and meaningful impact on the character's development. This system will allow for a more organic and personalized progression, making the gaming experience more immersive and engaging.

# Innovation Claim

The innovative aspect of this project lies in the application of vector mathematics to character progression in RPGs, a concept that is currently unexplored in the gaming industry. This vector-based system introduces a new dimension to character development, providing a more dynamic, responsive, and personalized progression path.

Unlike traditional systems that rely on static experience points or skill values, this vector-based system adapts to the player's unique style and decisions, creating a progression path that is as unique as the player themselves. This innovation not only enhances the player's immersion and engagement but also adds a new layer of strategic depth to the game, as players must consider the potential impact of their actions on their character's development.

Furthermore, this system's flexibility allows it to be adapted to various game genres and styles, making it a versatile tool for game development. The introduction of this system could potentially redefine the standards for character progression in RPGs and beyond, paving the way for more innovative and player-centric game designs in the future.

# Usage Scenario

Consider a player named Alex who starts a new game with our vector-based character advancement system. Alex's character begins as a blank slate with base stats. As Alex starts exploring the game world, every action taken contributes to the character's development.

In the early stages, Alex prefers using stealth tactics to avoid combat and uses diplomacy (charisma) to resolve conflicts. These actions result in vectors pointing towards the 'stealth' and 'diplomacy' dimensions in the character's stat space. Over time, as these vectors accumulate, Alex's character naturally develops advanced stealth and diplomacy skills.

Later in the game, Alex decides to explore the magic system. As Alex starts using magic spells, new vectors are added in the 'magic' dimension. The character starts developing magic abilities while maintaining the previously developed stealth and diplomacy skills.

In a critical game event, Alex decides to use a combination of stealth, diplomacy, and magic. Thanks to the vector-based character advancement system, Alex's character has developed a unique set of skills that perfectly suits this approach. The character's successful performance in this event further strengthens these skills, reinforcing the character's development in these dimensions.

This scenario demonstrates how the vector-based character advancement system can create a unique, dynamic, and immersive RPG experience, where the character's progression is closely tied to the player's actions and decisions.

# Evaluation Criteria

1. **Dynamic Adaptability**: The system should accurately track and respond to a wide range of player actions and decisions (ideally we will track everything that happens). It should be able to adapt the character's progression based on the player's unique playstyle and choices.
2. **Statistical Accuracy**: The vectors representing the character's stats should accurately reflect the magnitude and direction of stat changes resulting from the player's actions. The system should ensure that all stat changes are correctly represented in the n-dimensional vector space.
3. **Player Experience**: The system should enhance the player's gaming experience by providing a more personalized and immersive character progression. Player feedback should indicate a high level of satisfaction with the system's ability to reflect their playstyle in the character's development.
4. **Balance**: Despite the dynamic nature of the system, it should still maintain game balance. No single playstyle should provide an unfair advantage or disadvantage. The system should encourage diverse playstyles and strategies.
5. **Performance**: The system should operate smoothly and efficiently, without causing significant performance issues or delays. It should be able to handle the complex calculations involved in vector-based character progression without negatively impacting the game's performance.
6. **Integration**: The system should integrate seamlessly with other game mechanics. It should not disrupt or conflict with other aspects of the game, such as combat, exploration, or story progression.
7. **Replayability**: The system should contribute to the game's replayability. Players should be able to explore different playstyles and strategies in subsequent playthroughs, with the system providing different character progression paths each time.

# Objectives and Tasks Associated with the Project

1. **Conceptualization and Design**
   - Description: Define the overall concept and design of the vector-based character advancement system. This includes defining how each stat will be represented as a dimension in the n-dimensional vector space and how player actions will result in vectors in this space.
2. **System Architecture Development**
   - Description: Develop the architecture for the vector-based system. This includes designing the data structures and algorithms for representing and manipulating vectors in the n-dimensional space.
3. **Integration with Game Mechanics**
   - Description: Design and implement the integration of the vector-based system with other game mechanics. This includes defining how player actions in the game will result in vectors and how these vectors will affect the character's stats.
4. **Balance and Tuning**
   - Description: Test the system to ensure game balance. Adjust and tune the system as necessary to ensure that no single playstyle provides an unfair advantage or disadvantage.
5. **Performance Optimization**

o   Description: Optimize the system to ensure smooth and efficient operation. This includes optimizing the algorithms for vector calculations and ensuring that the system does not cause significant performance issues or delays.

6. **User Interface Design**
    o   Description: Design a user interface that allows players to easily understand and interact with the vector-based system. This includes displaying the character's stats and progression in a clear and intuitive way.

7. **Playtesting and Feedback Collection**
    o   Description: Conduct playtesting sessions to gather feedback on the vector-based system. This includes collecting feedback on the system's adaptability, accuracy, player experience, balance, performance, and integration.

8. **Iteration and Improvement**
    o   Description: Based on the feedback collected, iterate on the system design and implementation to make necessary improvements. This includes refining the system's adaptability, accuracy, balance, performance, and integration.

9. **Final Testing and Deployment**
    o   Description: Conduct final testing to ensure that the system is ready for deployment. This includes testing the system in a variety of scenarios and with a diverse range of playstyles. Once the system has passed final testing, deploy it in the game.

# Description of Design Prototype

The design prototype for this project will be a simplified RPG game that incorporates the vector-based character advancement system. The game will be designed to test the functionality, adaptability, and effectiveness of the system.

In the game, players will have the opportunity to make decisions and take actions that will influence their character's progression. Each character stat, such as strength, intelligence, agility, etc., will be represented as a dimension in an n-dimensional vector space. Player actions will result in vectors in this space, with the direction and magnitude of the vectors determined by the nature of the action and its impact on the character's stats.

The game will feature a variety of scenarios that will allow players to engage in different types of activities, such as combat, exploration, diplomacy, magic, etc. These scenarios will be designed to test the system's ability to accurately track and respond to a wide range of player actions and decisions.

The user interface of the game will be designed to clearly display the character's stats and progression. Players will be able to see how their actions are affecting their character's development, providing a visual representation of the vector-based system in action.

The design prototype will serve as a practical testbed for the vector-based character advancement system, allowing us to evaluate its performance and gather valuable feedback for further refinement and improvement.
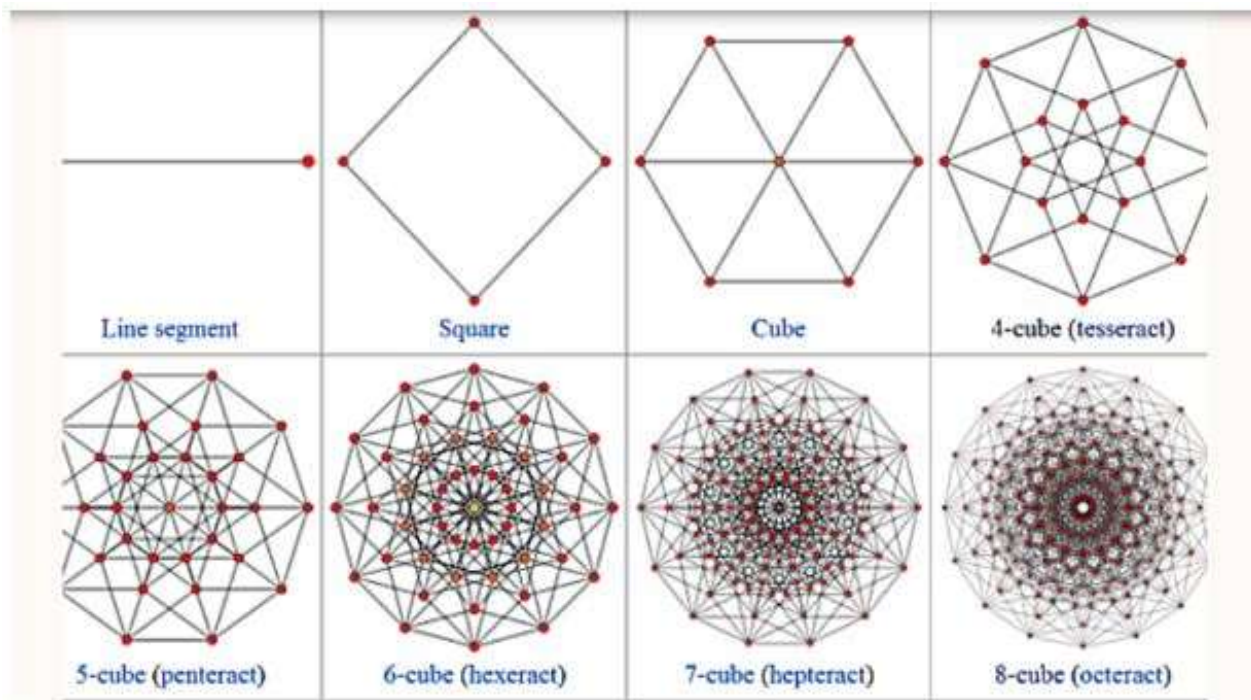
# Evaluation Plan

1. **Prototype Development**: Develop the initial prototype of the vector-based character advancement system within a simplified RPG game environment. This will serve as the basis for all subsequent testing and evaluation.
2. **Self-Testing**: Play the game, taking different actions and making different decisions to test the system's adaptability and accuracy. Check if the system is correctly tracking and reflecting these actions in the character's stats.
3. **Bug Identification and Fixing**: Identify any bugs or issues in the system. This could include problems with the vector calculations, issues with the integration of the system with other game mechanics, or glitches in the user interface. Fix these issues as they are identified.
4. **Performance Evaluation**: Evaluate the system's performance. Check if the system is operating smoothly and efficiently, and if it is causing any significant performance issues or delays. Optimize the system as necessary to improve its performance.
5. **Balance Testing**: Test the game balance. Play the game with different strategies and playstyles to see if the system maintains balance and does not favor any particular playstyle.
6. **User Experience Evaluation**: Evaluate the user experience. Consider how intuitive the system is, how well it reflects the player's actions and decisions in the character's development, and how much it enhances the overall gaming experience.
7. **System Refinement**: Based on the results of the testing and evaluation, refine and improve the system. This could involve making adjustments to the vector calculations, improving the integration with other game mechanics, enhancing the user interface, or making other improvements to enhance the system's adaptability, accuracy, balance, performance, and user experience.
8. **Final Evaluation**: Conduct a final evaluation of the system. Check if the system meets all the evaluation criteria and if it successfully demonstrates the concept of vector-based character advancement. Document the results of the evaluation for future reference.

# Project Completion Assessment

This is in the beginning phases still, I have restarted the actual project many times, but I think I finally landed on an actual base for the level I plan on using, I kept changing my mind between 2d and 3d for what I wanted to use, but I am pretty sure it would make a better demo if it were in a 3d space.

# Appendices

Appendix A:  A representation of dimensions 1-8



| | | | |
|---|---|---|---|
| Line segment | Square | Cube | 4-cube (tesseract) |
| 5-cube (penteract) | 6-cube (hexeract) | 7-cube (hepteract) | 8-cube (octeract) |

Appendix B: References

OpenAI. (2021). ChatGPT. https://www.openai.com/chatgpt/

Other than talking to chatgpt about how to make this look better, there are no real references as this does seem to be a new idea.