Carnegie Mellon University

17-692 Product Management Essentials

Product Idea Workbook

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About the course.
In this course, students choose a familiar customer problem space for their course project. This space becomes the basis for developing their skills with applying fundamental, customer-centric product management concepts. Students identify the customers, define a worthwhile problem to solve, conceive and define a product solution, and design a value proposition that is compelling for customers to buy and use it.

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Product Narrative

AIForge: Generative AI Toolkit for Game Developers

Introduction:

In the dynamic world of game development, the creation of compelling non-player characters (NPCs) stands as a critical yet time-consuming endeavor. Traditional methods often fall short, resulting in prolonged development cycles and escalating costs, undermining developers' ability to meet market demands. Enter AIForge, a revolutionary generative AI toolkit meticulously crafted to address the pressing challenges faced by game developers in NPC creation.

Market Overview:

The landscape of game development is teeming with opportunities and challenges, with developers striving to deliver captivating experiences that resonate with players. However, the creation of lifelike and dynamic NPCs poses a formidable barrier, often consuming excessive time and resources. AIForge emerges as a beacon of innovation, offering game developers a transformative solution to streamline NPC development, enhance creativity, and reduce production costs. From indie studios to AAA powerhouses, AIForge empowers developers of all calibers to unlock new realms of possibility and realize their creative visions with unprecedented efficiency.

Problem Category:

NPC Development Efficiency

Problem Statement:

NPC development efficiency remains a pressing challenge in the gaming industry. The average time taken to develop a game-ready NPC exceeds the desired timeframe by 3 months, while the average cost per NPC creation is 50% higher than desired. This inefficiency stems from the complexity of NPC design, the lack of efficient tools for NPC creation and integration, and the high expectations of game customers and critics. Each year, the average game developer works on 4 NPC projects, resulting in a loss of 12 months and $100,000 in costs compared to the desired benchmarks. This cumulative impact affects 26,870 game developers in the US, translating to 322,440 months and $2.69 billion in annual losses.

Problem Size:

Considering the 268,698 video game employees in the United States, with 10% involved in NPC creation, the problem affects 26,870 game developers annually. Each developer experiences a loss of 3 months and $25,000 per NPC project compared to the desired time and cost benchmarks. This equates to an annualized loss of 12 months and $100,000 per developer. Extrapolating to the entire US game development industry, the total impact amounts to 322,440 months and $2.69 billion annually.

Product Category:

Generative AI Toolkit for Character Generation in Game Development

Total Addressable Market (TAM):

The Total Addressable Market (TAM) for AIForge within the United States is approximately $65,096,000, considering segments such as indie game developers, AAA studios, and mobile game developers. This estimation accounts for the potential revenue generated from selling the product to each segment based on their market size and average annual spend on AI tools.

Product Description:

Product Name: AIForge

Purpose:

AIForge is a generative AI toolkit meticulously crafted to streamline and expedite NPC development for game developers. It offers a seamless solution for creating diverse and realistic 3D character models, empowering developers to focus on game design and storytelling.

Key Features:

1. **Automated NPC Generation:**
   AIForge leverages cutting-edge generative AI algorithms to automate the creation of diverse and realistic NPCs. From visual appearance to behavioral patterns, developers can effortlessly generate custom NPCs tailored to their game's genre, style, and narrative. By eliminating the need for manual laborious tasks, AIForge accelerates the NPC development process, enabling developers to focus on refining gameplay mechanics and storytelling.

2. **Adaptive Character Design:**
   Bid farewell to cookie-cutter NPCs with AIForge's adaptive character design capabilities. By analyzing gameplay data and player preferences, AIForge crafts NPCs with dynamic personalities and behaviors that evolve over time. Whether it's a cunning adversary or a loyal ally, AIForge ensures that each NPC is imbued with depth and authenticity, enriching the player experience and fostering deeper immersion within the game world.

3. **Streamlined Integration:**
   Integrating NPCs into game environments has never been easier with AIForge's streamlined integration tools. From rigging and animation to dialogue scripting, AIForge automates the entire integration process, seamlessly incorporating NPCs into the game world with minimal effort. With robust compatibility across leading game engines and platforms, AIForge ensures compatibility and flexibility, empowering developers to deploy their creations across a wide range of devices and platforms.

4. **Cost-Efficient Development:**
   AIForge significantly reduces the time and resources required for NPC development, offering developers substantial cost savings without compromising quality. By

streamlining workflows and automating repetitive tasks, AIForge enables developers to allocate resources more efficiently, maximizing productivity and minimizing overhead costs. Whether it's indie developers on a shoestring budget or AAA studios managing massive projects, AIForge offers a cost-effective solution tailored to every need.

5. **Continuous Improvement:**
   AIForge evolves alongside the developer community, with regular updates and enhancements based on user feedback and emerging trends. By fostering a collaborative environment, AIForge empowers developers to shape the future of NPC development, driving innovation and pushing the boundaries of what's possible in game design.

6. **Procedural Content Generation:**
   AIForge harnesses the prowess of cutting-edge AI algorithms to facilitate the seamless generation of diverse game worlds, characters, and assets. From sprawling landscapes to intricate dungeons, developers can swiftly populate their games with dynamic content, enriching the player experience with unparalleled depth and variety.

7. **Intelligent Level Design:**
   Bid farewell to manual level creation with AIForge's intelligent level generation capabilities. By analyzing player behavior and preferences, AIForge crafts immersive levels that adapt dynamically to each player's unique playstyle. This personalized approach ensures that players are continually engaged, fostering deeper connections with the game world.

8. **Natural Language Processing:**
   Interacting with AIForge is as intuitive as having a conversation. Developers can effortlessly issue natural language commands to AIForge, instructing it on various aspects of game development, from fine-tuning mechanics to crafting NPC dialogue. This intuitive interface streamlines the development process, empowering developers to focus on realizing their creative vision.

9. **Adaptive Gameplay Mechanics:**
   AIForge enables developers to imbue their games with adaptive gameplay mechanics that evolve in real time based on player actions and decisions. By dynamically adjusting game elements, developers can craft narratives that respond organically to player choices, delivering immersive experiences that resonate deeply with players.

10. **Collaborative Development Environment:**
    Collaboration lies at the heart of successful game development, and AIForge provides developers with a collaborative environment where they can share ideas, collaborate on projects, and learn from one another. With robust version control and project management tools, teams can collaborate seamlessly, regardless of their location or time zone, fostering innovation and creativity.

Target Audience:

AIForge caters to game developers seeking to streamline NPC development and enhance the quality and efficiency of their creations. From solo developers to large studios, AIForge offers a versatile toolkit tailored to the unique needs of each developer. By democratizing access to advanced AI technologies, AIForge empowers developers to unleash their creativity and deliver immersive gaming experiences that captivate audiences worldwide.

Conclusion:

AIForge represents a paradigm shift in NPC development, offering game developers a transformative toolkit to realize their creative ambitions with unprecedented efficiency. By harnessing the power of generative AI, developers can streamline workflows, reduce costs, and unlock new realms of possibility in game design. With AIForge, the future of NPC development is limitless. Join the revolution and elevate your game development journey with AIForge.

1. Customer Problem Space

Fertile land:

Generative AI in games

Actor:

Game Developer

JTBD:

Develop NPCs for games

I have worked as a Product Manager for a gamified financial literacy app where a part of my responsibilities involved conceptualization, development, integration, and deployment of different games for the platform. I have also been an avid gamer and enjoyed developing games in my time. The use of generative AI in games has significant potential in customizing user experience for a new age of games[1].

Use Cases:

1. Create dynamic and engaging interactions
2. Generate new and diverse scenarios
3. Guide the User

Outcomes:

1. Avg. time taken to develop a game-ready NPC
    - ➢ Actual Outcome: Avg. time taken to build a key NPC is 6 months.
    - ➢ Desired Outcome: Avg. time taken to build a key NPC will be 3 months.

2. Avg. cost incurred per NPC
    - ➢ Actual Outcome: Avg. cost per NPC is $55,000.
    - ➢ Desired Outcome: Avg. cost per NPC will be $25,000.

3. Code reusability percentage
    - ➢ Actual Outcome: Code reusability percentage is 30%[2].
    - ➢ Desired Outcome: Code reusability percentage will be 50%.

Measurement Method	
Avg. time taken to develop a game-ready NPC	*Measured in months* This is the total time needed to build an NPC from scratch for a game. It includes the development, cosmetics, animations, interactions, behavior, voice acting, gameplay, etc.
Avg. cost per NPC	*Measured in USD* This is the total cost involved in building a game-ready NPC. It includes the cost of development, cosmetics, animations, interactions, behavior, voice acting, gameplay, etc.
Code reusability percentage	*Measured in percentage* Determined by calculating the average amount of code that can be reused by editing an existing NPC model to suit the needs of the new use case.

The above measurements were determined by taking a sample size of 10 games with an average game size of 80GB[3] calculating the number of key* NPCs per game and calculating its average.

This metric was then used to calculate the average time taken to develop an NPC, which varies from a couple of weeks to a couple of months. As the fertile land I have chosen is Generative AI in games the time taken is toward the upper limit of this range. A sample of an AI NPC was taken and applied to reach the actual outcome.

Problem:

Primary Problem: The average time taken to develop a game-ready NPC is 3 months longer than the desired time.

Additional Problem: The average cost incurred per NPC creation is 50% higher, i.e. $25,000 greater, than desired.

Causes:

- The complexity and diversity of NPC design require a lot of creativity, skill, and effort to create realistic, immersive, and engaging NPCs that can fit the game's genre, style, and narrative.
- The lack of efficient and effective tools and frameworks for NPC creation and integration limits the game developer's ability to automate, simplify, and optimize the NPC development process and reduce the time and cost involved[4].
- The high expectations and demands of the game customers and critics, who want more lifelike, interactive, and dynamic NPCs that can offer different gameplay possibilities and challenges[5].

Problem Size:

According to LinkedIn, there are 268,698 video game employees in the United States as of 2023[6]. Assuming that 10% of them are game developers who are involved in NPC creation, the number of game developers in the US is 26,870. Assuming that the average game developer works on 4 NPC projects per year, the frequency of occurrence of the problem per year is 4.

Per Instance:

The game developer loses 3 months and $25,000 of cost per NPC project that they work on, compared to the desired time and cost.

➢ This is based on the assumption that the desired time and cost for developing a game-ready NPC are 3 months and $25,000, respectively, and the actual time and cost are 6 months and $50,000, respectively. Therefore, the difference between the actual and desired outcomes is 3 months and $25,000.

Per Actor:

The game developer loses 9 months and $75,000 of cost per NPC project that they work on, compared to the average time and cost in the industry.

➢ This is based on the assumption that the average time and cost for developing a game-ready NPC in the industry are 4.5 months and $37,500, respectively, and the actual time and cost are 6 months and $50,000, respectively. Therefore, the difference between the actual and average outcomes is 1.5 months and $12,500.

Assuming that the game developer works on 4 NPC projects per year, the annualized difference is 9 months and $75,000.

Annualized, all actors ("Total Impact"):

The game developer loses 12 months and $100,000 of cost per year on NPC projects, compared to the desired time and cost.

- This is based on the assumption that the game developer works on 4 NPC projects per year, and the per-instance difference between the actual and desired outcomes is 3 months and $25,000. Therefore, the annualized difference is 12 months and $100,000.

Annual Growth Rate:

The game development industry in the US loses 322,440 months and $2.69 billion of cost per year on NPC projects, compared to the desired time and cost.

- This is based on the assumption that 26,870 game developers in the US work on NPC projects, and the per your Actor (user) difference between the actual and desired outcomes is 12 months and $100,000. Therefore, the total impact is 322,440 months and $2.69 billion.

Problem Category:

NPC Development Efficiency

Problem Statement:

We are solving an NPC development efficiency problem. We aim to reduce the average time taken to develop a game-ready NPC from 6 months to 3 months, and the average cost incurred per NPC creation from $50,000 to $25,000, the time and cost that the typical game developer expects when they develop an NPC. That's a 50% savings in time and cost. The current inefficient NPC development is due to the complexity and diversity of NPC design, the lack of efficient and effective tools and frameworks for NPC creation and integration, and the high expectations and demands of the game customers and critics. Each year, the average game developer works on 4 NPC projects and loses 12 months and $100,000 in cost, compared to the desired time and cost. That's a total impact of 322,440 months and $2.69 billion of cost across the 26,870 game developers in the US who work on NPC projects each year, where they want to create dynamic and engaging interactions.

Actor	JBTD	Use Case	Actual Outcome	Desired Outcome	Problem	Cause	Problem Size

2. Market Space

Target Market:

Name: Video Game Developers Market

Size: 26,870 game developers in the United States

Source: LinkedIn data[6]

Proposal:

The proposed product is a Generative AI Toolkit for Game Developers. The main function of the product is to streamline and enhance the NPC development process in game development. This toolkit will leverage generative AI technology to automate and optimize the creation of non-player characters (NPCs) within games. It aims to provide game developers with a more efficient and effective way to generate dynamic and engaging interactions, diverse scenarios, and user guidance within their games. This product embodies cutting-edge AI technologies and is designed to empower game developers to create more immersive gaming experiences while reducing development time and costs.

Market Segments Profile:

1. Segment Name: Indie Game Developers
   - Segmentation Variable: In professional settings with a smaller company size
   - Segmentation Values: Solo Developers, Small Teams (2-10 members), Medium Teams (11-50 members)
   - Segment Size: Estimated 8,000 developers
   - Segment Growth Rate: Steady
2. Segment Name: AAA Game Studios
   - Segmentation Variable: In professional settings with a larger company size
   - Segmentation Values: Large Teams (51-200 members), Huge Teams (200+ members)
   - Segment Size: Estimated 10,000 developers
   - Segment Growth Rate: Slow
3. Segment Name: Mobile Game Developers
   - Segmentation Variable: Platform Focus
   - Segmentation Values: iOS Developers, Android Developers, Cross-Platform Developers
   - Segment Size: Estimated 8,870 developers
   - Segment Growth Rate: Fast

Note:

- The Geographic Region is limited to the United States for each market segment.
- The segment size is estimated on the size of the companies in the gaming industry concerning the market size.

Reasoning for Segments:

1. Indie Game Developers:
   This segment represents smaller studios or individual developers who often have limited resources but are known for innovation and creativity. They might be more open to adopting new technologies like generative AI to compete with bigger studios.
2. AAA Game Studios:
   These are large, established companies with significant budgets and resources. They might be interested in generative AI to streamline their NPC development process and reduce costs.
3. Mobile Game Developers:
   With the rise of mobile gaming, this segment represents developers focused on platforms like iOS and Android. They could benefit from generative AI to create more dynamic and engaging experiences on smaller devices. This segment remains divided based on platform focus, acknowledging that developers may have specialized knowledge and requirements depending on their chosen platform.

Competition:

1. Direct Competitor: Unreal Engine's "Behavior Tree" system
   - Brand: Unreal Engine
   - Product Category: Generative AI Toolkit for Game Developers
   - Competitive Positioning: Offers a visual scripting tool for designing NPC behavior, known for its ease of use and flexibility.
2. Direct Competitor: Unity's "NavMesh" system
   - Brand: Unity
   - Product Category: Generative AI Toolkit for Game Developers
   - Competitive Positioning: Provides AI navigation solutions for game developers, offering seamless integration within the Unity game development environment.
   - Product Examples:
     1. Product Name: Artomatix Company: Artomatix Ltd.
     2. Product Name: RunwayML Company: RunwayML Inc.
     3. Product Name: Promethean AI Company: Promethean AI Ltd.
3. Indirect Competitor: Manual NPC Development
   - Product Category: Manual NPC Development
   - Competitive Positioning: Offers complete control over NPC development but can be time-consuming and labor-intensive compared to AI-driven solutions.
   - Product Examples:
     1. Product Name: Autodesk Maya Company: Autodesk, Inc.
     2. Product Name: Blender Company: Blender Foundation
     3. Product Name: Adobe Animate Company: Adobe Inc.

Positioning Analysis:

Step 1: Take the customer's perspective

- Understand the choices that game developers perceive they have in terms of NPC development tools and technologies.
- Recognize how game developers make decisions to adopt and use different solutions for NPC creation.

Step 2: Identify the options the customers perceive to be available to them

1. Direct Competitor: Unreal Engine's "Behavior Tree" system
2. Direct Competitor: Unity's "NavMesh" system
3. Indirect Competitor: Manual NPC Development

Step 3: Identify the criteria THE CUSTOMERS will use to evaluate their options

- Ease of use
- Flexibility and customization
- Integration with existing game development tools and engines
- Cost-effectiveness
- Speed and efficiency of NPC creation
- Quality and realism of NPC behaviors and interactions

Step 4: Create a positioning map to identify the available positions

- X-axis: Criteria such as ease of use, integration, cost, speed, quality
- Y-axis: Score indicating the relative performance of each option on the criteria

Positioning Guidance:

- Plotting the average or median of each criterion for each competitor.
- Recognizing that high and low scores can be attractive depending on the preferences of different segments of game developers.
- Considering gaps in the market that may change over time as new technologies and solutions emerge.

This positioning analysis will help identify the competitive landscape and available positions for the Generative AI Toolkit for Game Developers, enabling effective product positioning and differentiation.

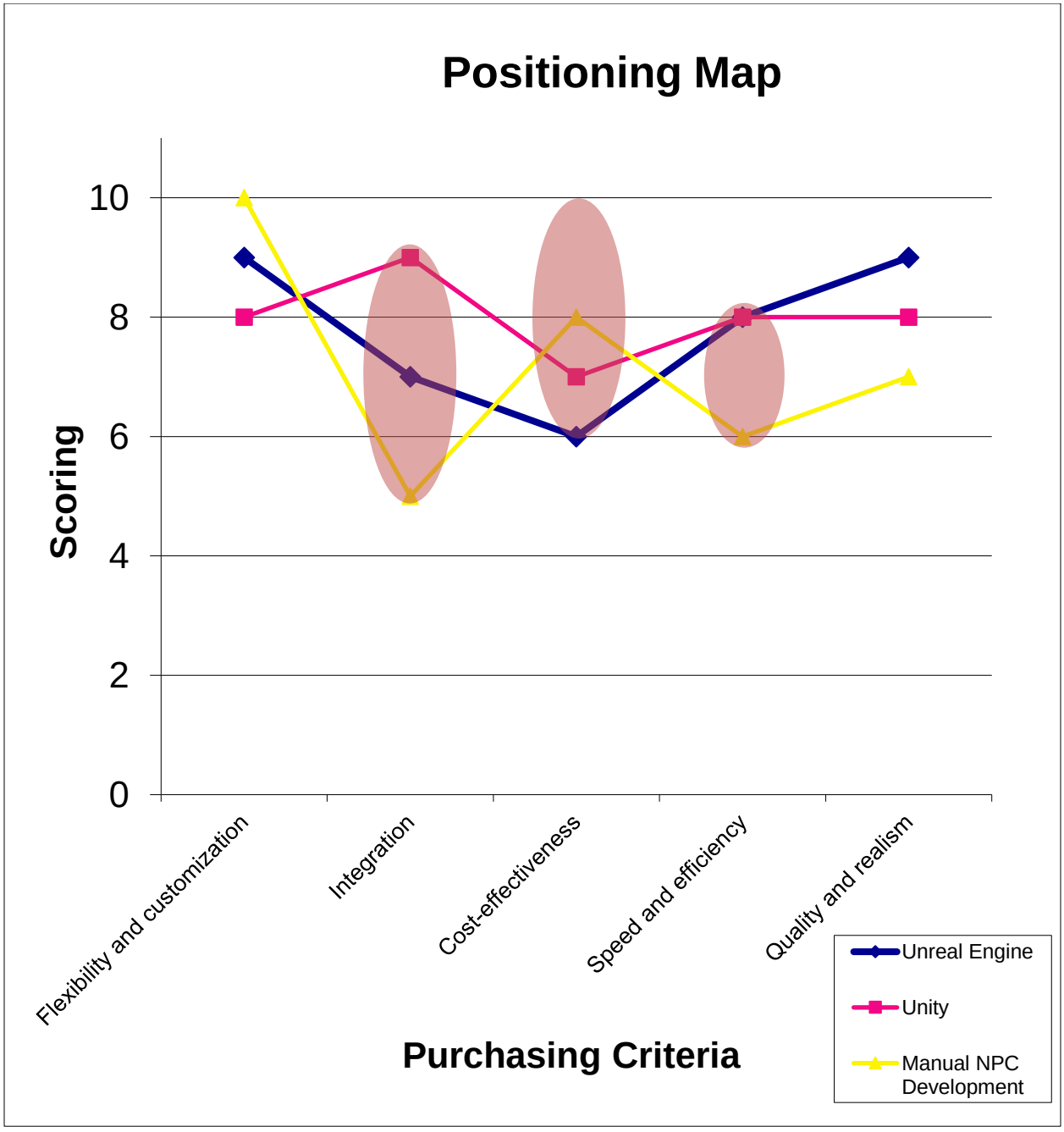


Figure 1: Positioning Map

Total Addressable Market (TAM):

The TAM for AIForge can be estimated based on the total number of game developers and studios globally and the average expenditure on character generation tools and services. According to industry reports, the global gaming market is projected to reach $200 billion by 2023, with a significant portion allocated to game development and asset creation. Assuming a conservative market penetration of 5% within the first year of launch, the TAM for AIForge can be estimated at $10 billion annually [7].

To calculate the TAM, we will consider the size of each market segment within the United States and estimate the potential revenue from selling the product to each segment.

1. Indie Game Developers:
    - Segment Size: 8,000 developers
    - Assuming an average annual spend per developer of $1,000 on AI tools.
    - Total TAM for Indie Game Developers: $8,000,000 (8,000 developers * $1,000 annual spend per developer)

2. AAA Game Studios:
    - Segment Size: 10,000 developers
    - Assuming an average annual spend per developer of $5,000 on AI tools.
    - Total TAM for AAA Game Studios: $50,000,000 (10,000 developers * $5,000 annual spend per developer)

3. Mobile Game Developers:
    - Segment Size: 8,870 developers
    - Assuming an average annual spend per developer of $800 on AI tools.
    - Total TAM for Mobile Game Developers: $7,096,000 (8,870 developers * $800 annual spend per developer)

Total TAM = TAM for Indie Game Developers + TAM for AAA Game Studios + TAM for Mobile Game Developers

Total TAM = $8,000,000 + $50,000,000 + $7,096,000 = $65,096,000

Therefore, the Total Addressable Market (TAM) for the Generative AI Toolkit for Game Developers in the United States is approximately $65,096,000.

3. Solution Space

Market Focus:

Problem:

The Generative AI Toolkit will solve the problem of quickly and efficiently generating diverse and realistic 3D character models for game developers. This includes creating NPCs with unique appearances, animations, and behaviors tailored to the game's narrative and gameplay mechanics.

Market Segment:

Our target customers include both independent game developers and mid-sized game development studios. These developers often lack the resources of larger studios but still require high-quality assets to compete in the market.

Market Niche:

Within our target segment, our toolkit can address the unique needs of both indie developers working on limited budgets as well as mid-sized game development studios. These developers often struggle to create diverse character assets due to resource constraints, making our affordable and efficient toolkit particularly appealing to them.

Position-to-Own:

Our toolkit's unique value proposition lies in its combination of speed, quality, and affordability. We aim to offer the fastest generation time without compromising on the realism and diversity of outputs. Additionally, our pricing model will be tailored to the budget constraints of indie developers, ensuring accessibility without sacrificing quality.

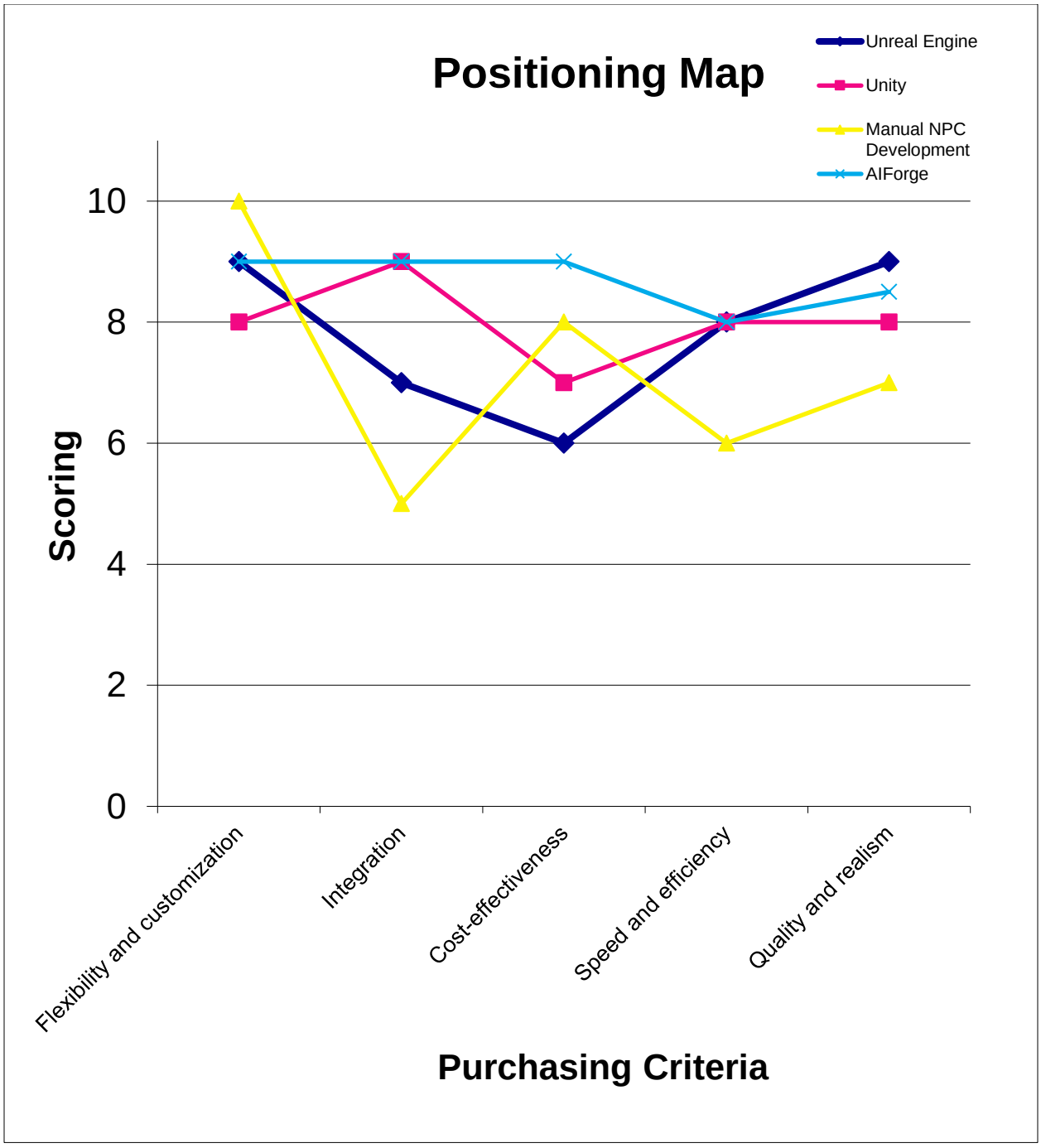


Figure 2: Future State Positioning Map

Product Focus:

Product Category:
Generative AI Toolkit for Character Generation in Game Development

Product Description:

Product Name:
AIForge

Purpose:
AIForge is a generative AI toolkit designed to simplify and accelerate NPC development for game developers, reducing the time and resources required for character creation. It streamlines the process of creating diverse and realistic 3D character models for game developers, allowing them to focus more on game design and storytelling.

1. Main Features:
   - AI-powered generation of 3D character models with customizable attributes such as appearance, animations, and behaviors.
   - Seamless integration with popular game engines like Unity and Unreal Engine for easy implementation into game projects.
   - Real-time previews and adjustments to fine-tune character designs within the toolkit's interface.
   - Affordable pricing model tailored to the budget constraints.

2. Technology:
   - Advanced machine learning algorithms for rapid and realistic character generation.
   - Integration with game engines via APIs for smooth workflow and compatibility.
   - Cloud-based storage for easy access to generated assets from any device.

3. Requirements:
   - Internet connectivity for cloud-based features and updates.
   - AIForge platform.
   - API keys for integration with game engines.
   - Minimal system requirements for running the toolkit on Windows, macOS, or Linux.

4. Properties:
   - Software-based solution
   - Compatible with Windows, macOS, and Linux operating systems

How AIForge Works:

1. Data Collection and Training:
   - AIForge begins by collecting vast amounts of data on 3D character models from various sources, including existing game assets, character databases, and professional designs.
   - This data is then used to train the underlying machine learning algorithms, allowing AIForge to understand the intricate details and patterns of character design, anatomy, and animation.

2. Customization and Parameterization:
   - Game developers interact with AIForge through an intuitive user interface, where they can specify their desired character attributes, such as gender, age, body type, clothing, and accessories.
   - Additionally, developers can input specific requirements for their game, such as art style preferences, genre-specific traits, or narrative elements that the characters need to convey.

3. AI Generation Process:
   - Once the parameters are set, AIForge leverages its trained models and neural networks to generate a wide range of character variations that align with the provided specifications.
   - The AI algorithms take into account factors such as realism, diversity, and coherence to ensure that the generated characters meet the quality standards expected in modern game development.

4. Real-time Feedback and Iteration:
   - AIForge provides developers with real-time previews of the generated characters, allowing them to evaluate and iterate on different designs within the platform.
   - Developers can make adjustments to various attributes, such as facial features, clothing styles, or pose animations, and instantly see the effects reflected in the generated models.
5. Export and Integration:
   - Once satisfied with a particular character design, developers can seamlessly export the model and associated assets in formats compatible with popular game engines like Unity or Unreal Engine.
   - AIForge provides integration plugins and APIs that streamline the importing process, ensuring that the generated characters can be easily incorporated into game projects without any compatibility issues.

6. Continuous Learning and Improvement:
   - AIForge continuously learns from user interactions and feedback, allowing it to refine its generation algorithms over time.
   - As more developers use the platform and provide input, AIForge adapts to evolving trends, preferences, and industry standards, ensuring that it remains at the forefront of character generation technology in game development.
   - By simplifying and automating the character creation process, AIForge empowers game developers to focus their time and creativity on other aspects of game design, ultimately accelerating the development cycle and enhancing the overall quality of gaming experiences.

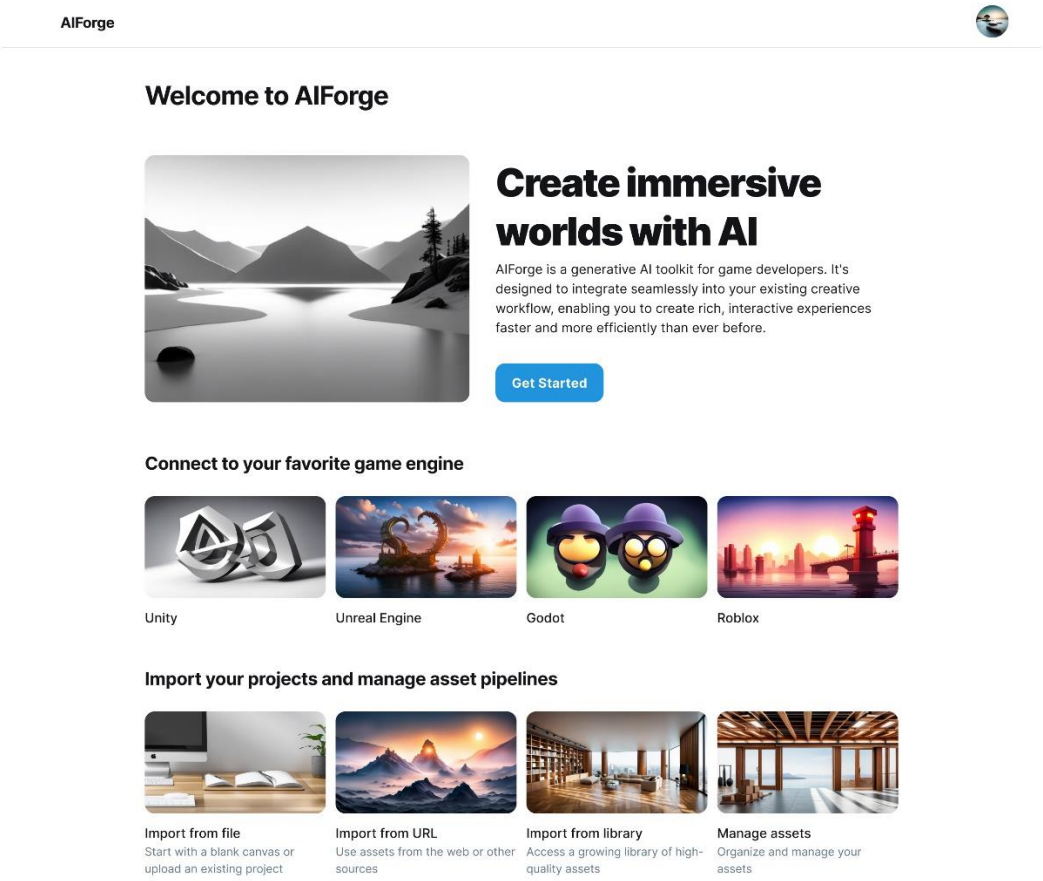
Product Requirements:

Requirement ID	Feature	Description
REQ-001	Intuitive User Interface	As a game developer, the toolkit must have an intuitive user interface that allows me to easily navigate through its features and functionalities.
REQ-002	Integration with Game Engines	As a game developer, AIForge should seamlessly integrate with popular game engines like Unity and Unreal Engine to facilitate the incorporation of generated assets.
REQ-003	Customization Options	As a game developer, I must be able to customize various attributes of generated assets, including character models, environments, and props.
REQ-004	Real-time Preview	As a game developer, the toolkit should provide real-time previews of generated assets, enabling developers to visualize and iterate on designs efficiently.
REQ-005	Export Compatibility	As a game developer, AIForge must support exporting generated assets in formats compatible with common game development pipelines and file formats.
REQ-006	Diversity and Variation	As a game developer, the toolkit should be capable of generating diverse characters, environments, and other assets to accommodate different game genres and styles.
REQ-007	Quality and Fidelity	As a game developer, AIForge must prioritize the quality and fidelity of generated assets, ensuring that they meet industry standards and match the intended art style.
REQ-008	Performance Optimization	As a game developer, the toolkit should optimize performance to minimize processing times and resource usage during asset generation, ensuring smooth workflow experiences.

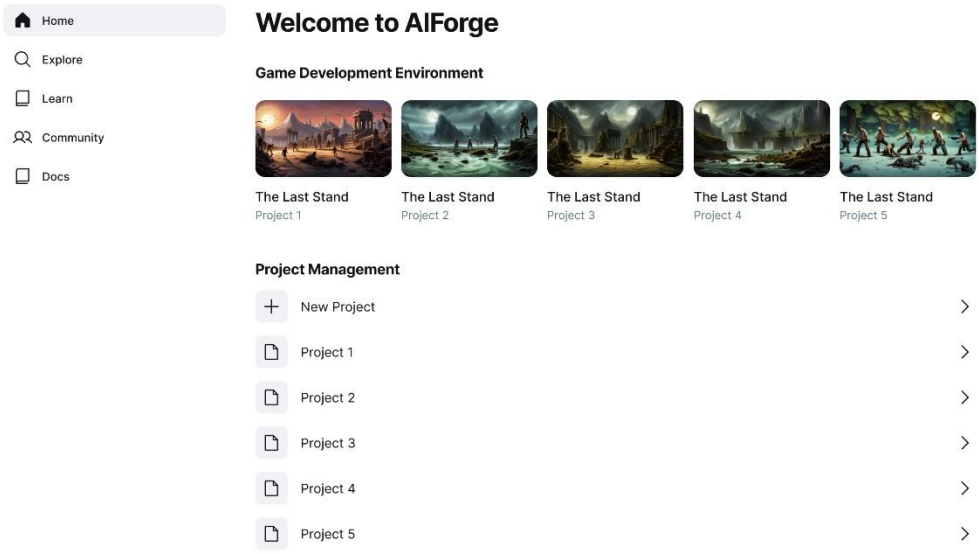
REQ-009	Scalability	As a game developer, AIForge must be scalable to handle large datasets and complex generation tasks, accommodating projects of varying sizes and complexities.
REQ-010	Documentation and Support	As a game developer, comprehensive documentation and support resources should be provided to assist me in effectively using AIForge and troubleshooting issues.
REQ-011	Continuous Learning and Improvement	As a game developer, the toolkit should incorporate feedback mechanisms to continuously learn and improve its generation algorithms based on my interactions.
REQ-012	Security and Data Privacy	As a game developer, AIForge should adhere to stringent security and data privacy standards to safeguard my data and intellectual property throughout the platform.
REQ-013	Realism and Coherence	As a game developer, generated assets should exhibit realism and coherence in their design, ensuring that they are visually convincing and cohesive within the game environment.

User Views:

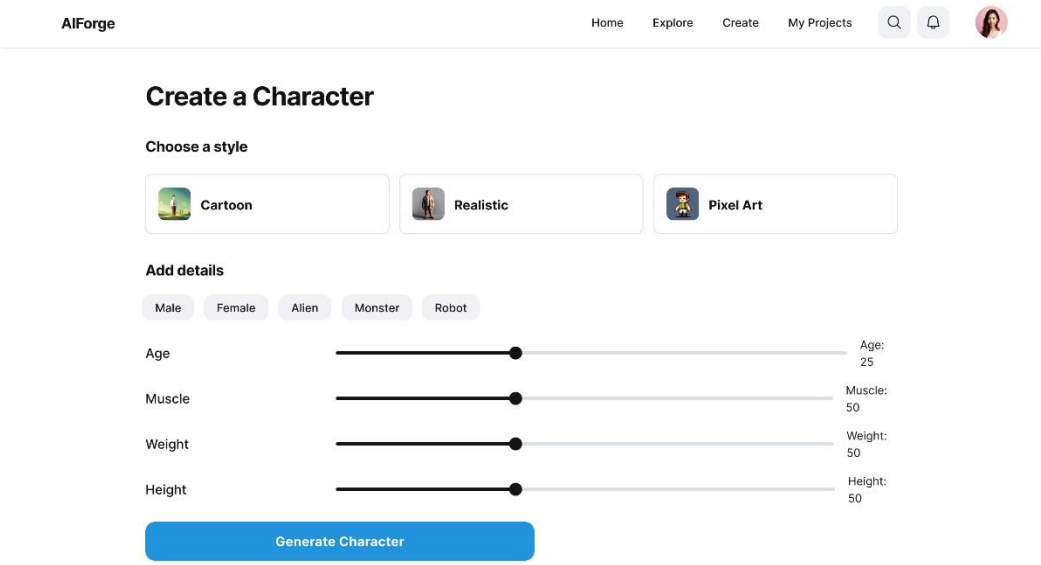
1. Get Started:
   The Home View/Landing View of AIForge is the central hub for game development activities, providing access to essential features such as:
   - Game Development Environment:
   - Navigation Pane:
   - Project Management Section:
   - Toolbox and Asset Library:
   - Real-Time Preview Window:
   - Tutorial and Help Section:
   - Community and Forum Integration:



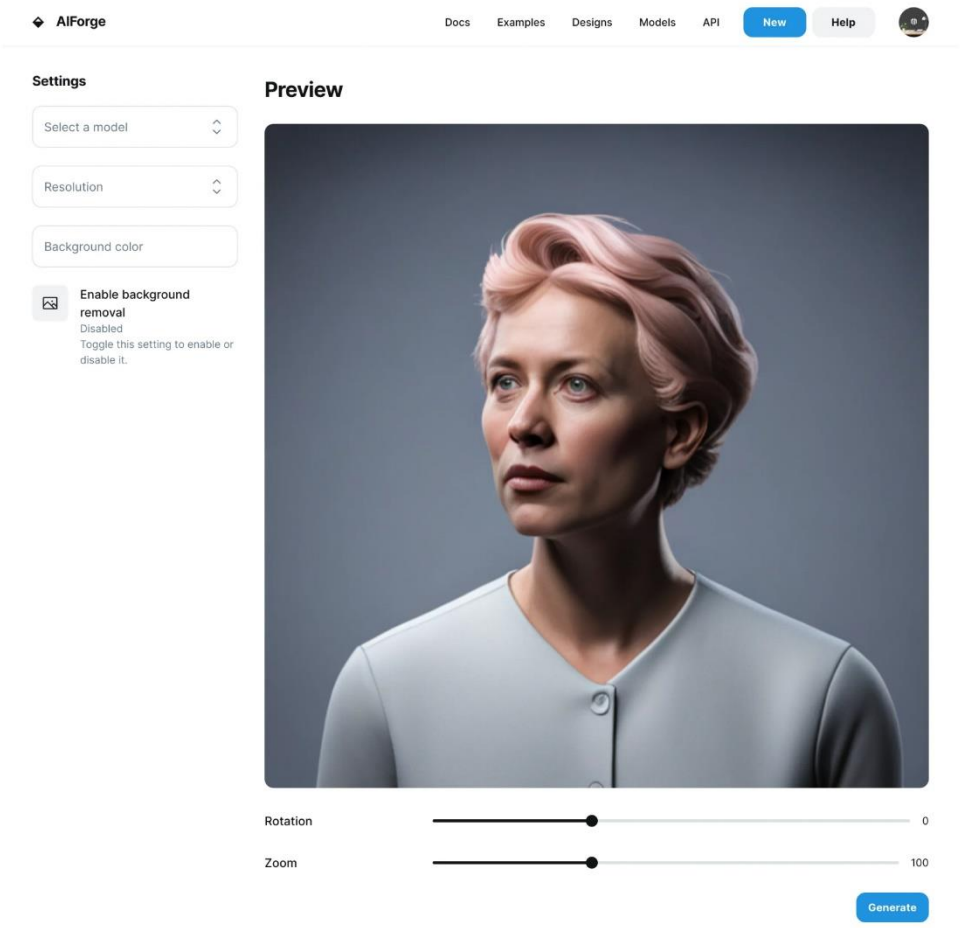
2. Welcome to AIForge:
   The welcome page of AIForge is a game development environment that allows users to create, explore, and manage their projects. Users can preview their previous projects and access various resources such as tutorials, community forums, and documentation.



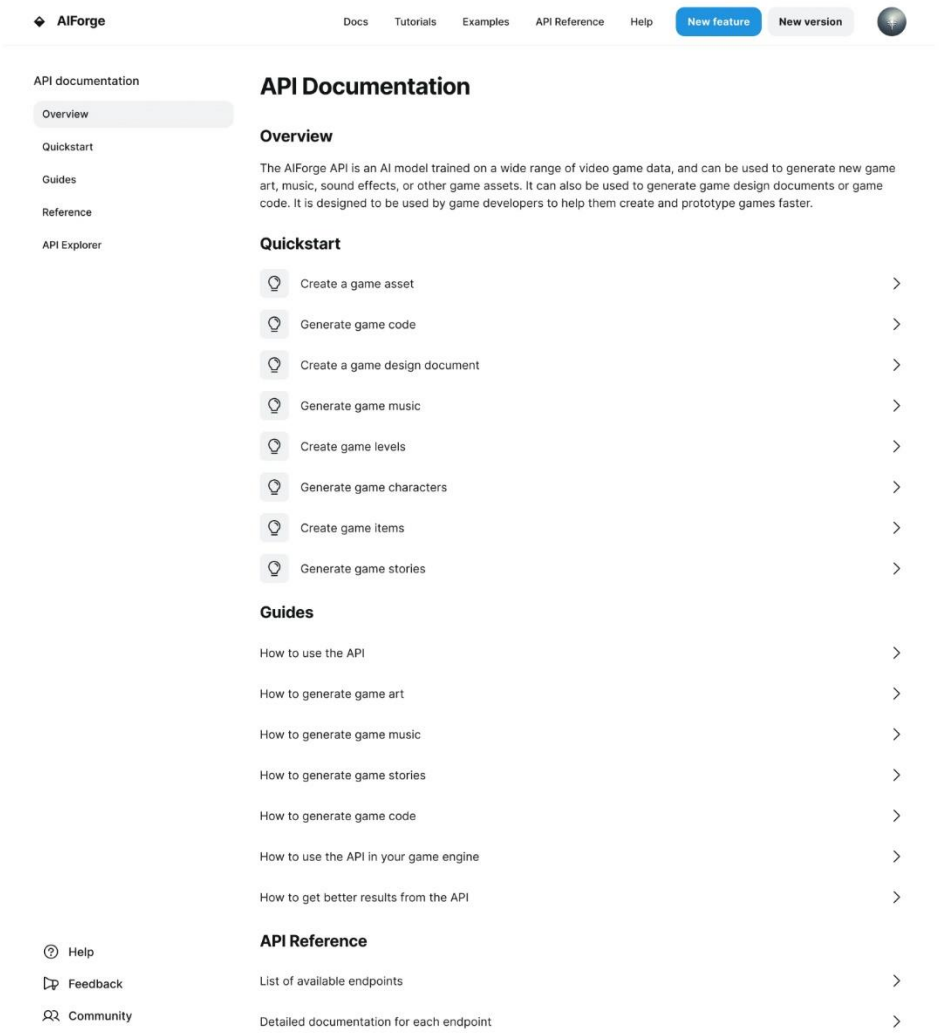
3. NPC creation:
   The NPC creation page is a webpage that lets users create their non-player characters for games. Users can select a style, such as cartoon, realistic, or pixel art, and customize the character's appearance, such as gender, type, age, muscle, weight, and height. Users can then generate the character with a click of a button.



4. Preview:
   Show a real-time preview of generated assets within the interface.



5. API Documentation:
   The API documentation page is a webpage that provides information on how to use the AIForge API, an AI model that can generate various game assets. Users can learn about the overview, quickstart, guides, and API reference sections of the documentation. Users can also access tutorials, start a free trial, or check out the new version of the API. The API documentation page has a clear and informative design that helps users understand and utilize the AIForge API.



Note: All images were generated using Galileo AI and further refined in Figma.

Non-Functional Requirements:

1. Performance:
   - Availability: AIForge must be available to users at least 99.5% of the time during business hours (8:00 AM to 5:00 PM PST, Monday to Friday).
   - Response Time: The average response time for AIForge to generate content should be less than 5 seconds for common use cases.
   - Load: AIForge should be able to handle concurrent requests from 100 users without significant performance degradation (e.g., exceeding response time requirements).

2. Interoperability and Compatibility:
   - Interoperability: AIForge should be interoperable with existing game development tools and engines (e.g., Unity, Unreal Engine) through standard APIs or plugins.
   - Compatibility: AIForge should be compatible with major operating systems (e.g., Windows, macOS, Linux) and hardware configurations commonly used by game developers.

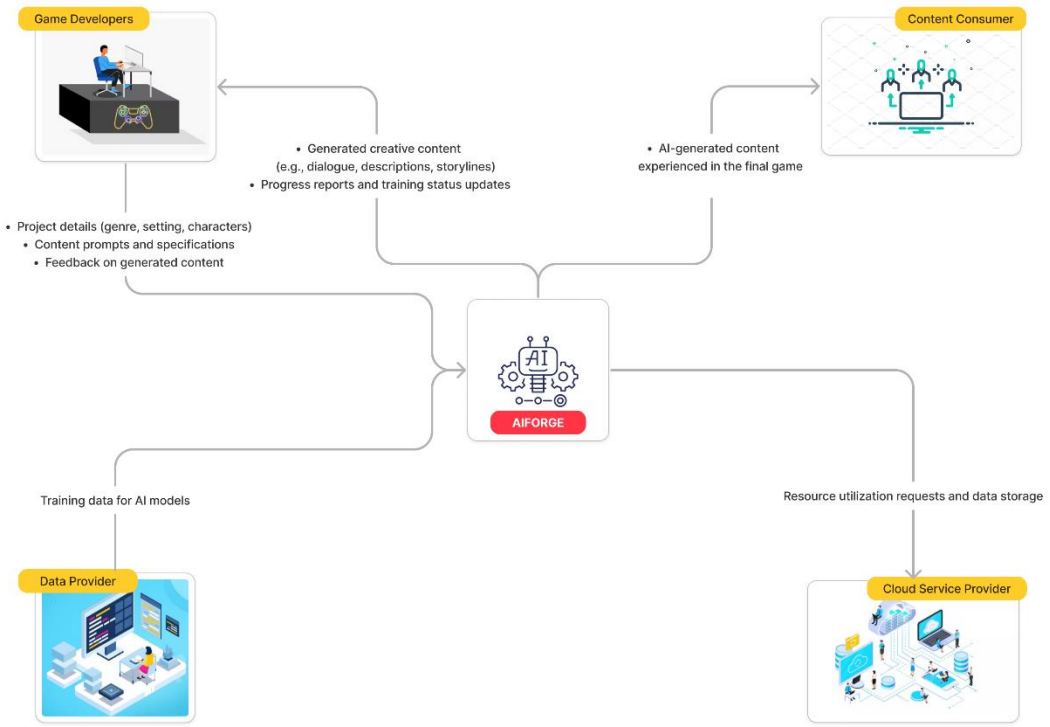
3. Other Non-Functional Requirements:
   - Security: AIForge must comply with industry best practices for data security and privacy, including secure storage of user data and access control mechanisms.
   - Scalability: AIForge should be designed to be scalable to accommodate future growth in user base and data volume.
   - Usability: AIForge should have a user-friendly interface that is intuitive and easy to learn for game developers with varying levels of technical expertise.

4. Other Non-Functional Requirements:
   - Security: AIForge must adhere to stringent security standards to protect user data and intellectual property. This includes encryption of sensitive information, secure authentication mechanisms, and regular security audits to identify and mitigate potential vulnerabilities.
   - Scalability: The AIForge platform should be designed to scale horizontally to accommodate growing user demand and increasing data volume. This involves implementing scalable architecture, distributed computing, and efficient resource allocation to ensure optimal performance under varying workloads.
   - Usability: AIForge should feature an intuitive user interface with clear navigation and user-friendly controls. Comprehensive documentation and tutorials should be provided to assist users in learning the platform quickly and efficiently.
   - Reliability: AIForge should demonstrate high reliability and robustness in operation, minimizing the occurrence of system failures or errors. Automated monitoring and alerting systems should be in place to detect and respond to any issues promptly.

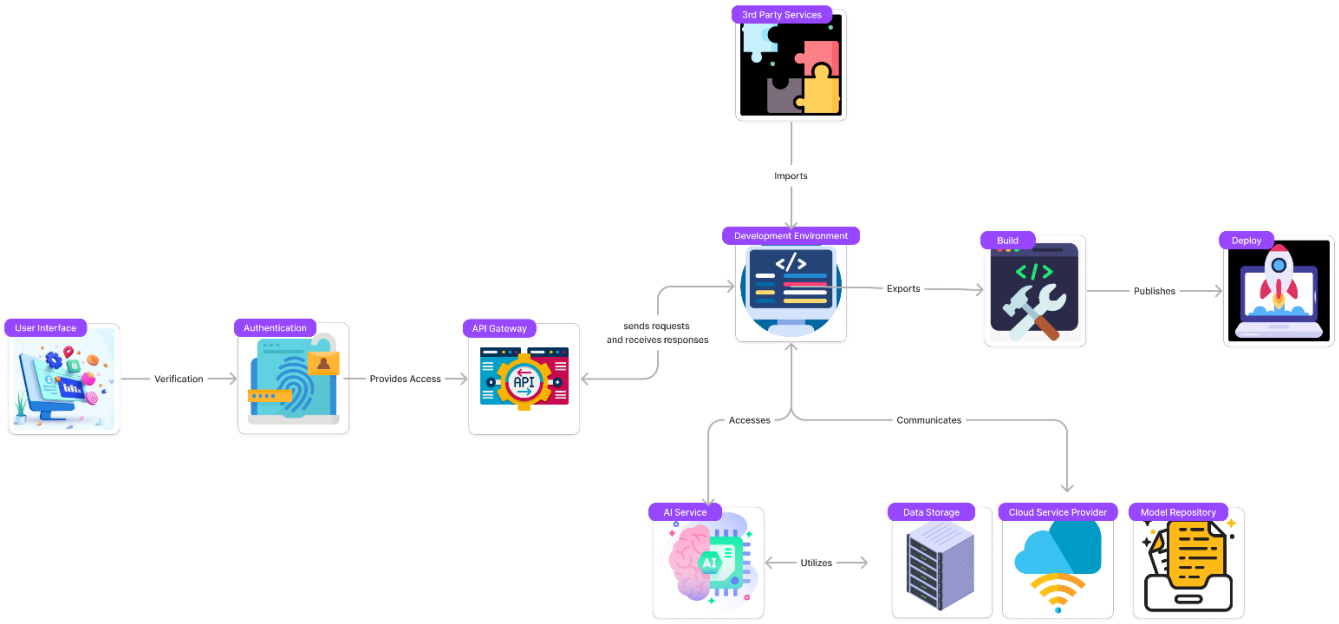
Assumptions and Estimates:

- The availability target of 99.5% is based on industry standards for SaaS applications.
- The response time target of 5 seconds is based on user research and feedback indicating that faster response times are crucial for maintaining user productivity.
- The concurrent user load of 100 is based on an initial market analysis of the target audience size. These estimates may be adjusted based on future market data and user feedback.

Context View Diagram:



Deployment View Diagram:



4. Customer Value Space

Product Features-Benefits Table:

Feature	Benefit
AI-powered character generation	Rapidly create diverse and realistic 3D character models for games
Seamless integration with game engines	Easily incorporate generated assets into Unity and Unreal Engine projects
Real-time previews and adjustments	Iterate rapidly on character designs within the toolkit, saving development time
Cloud-based storage	Access generated assets from anywhere and ensure data security
Advanced machine learning algorithms	Ensure high-quality and lifelike character generation
Easy-to-use interface	Lowers the learning curve and increases accessibility for game developers of all skill levels.
Pre-trained AI models for various game genres	Saves development time and resources by providing a starting point for character dialogue, world descriptions, and other creative content.
Customization options for AI models	Allows game developers to fine-tune generated content to fit their specific game style and vision.
Integration with game development tools	Enables seamless integration of AI-generated content into existing development workflows.
Cost-effective pricing model	Makes AI technology accessible to a wider range of game developers, including indie studios and solo developers.
Comprehensive documentation and support	Assist users in effectively using AIForge and troubleshooting issues
Scalable architecture	Accommodate growing user demand and data volume without sacrificing performance
Robust security measures	Protect user data and intellectual property from unauthorized access or breaches

Pricing Model:

Price Setting Strategy:

AIForge will adopt a value-based pricing strategy, where the price is determined by the perceived value of the product to the customer rather than the cost of production. This approach aligns with the unique features and benefits offered by AIForge, catering to the needs of game developers seeking efficient and high-quality character generation solutions. We will further refine our pricing strategy to ensure competitiveness and capture a larger market share. The pricing will be revisited every 6 months to adjust to the market trends and demand.

Price(s):

The pricing metric for AIForge will be based on a subscription model, offering tiered pricing plans based on usage levels and feature access. The subscription plans will include a monthly fee based on the number of characters generated or the level of API access required. Additional features such as real-time previews and advanced customization options will be available at higher subscription tiers.

1. Starter Plan: Designed for indie game developers with limited budgets and smaller-scale projects.
   - Price: $99 per month
   - Features: Basic character generation capabilities and essential tools for game development.
   - Limitations: Limited customization options and lower character generation limits compared to higher-tier plans.
   - Analysis: While the Starter Plan offers affordability and accessibility to indie developers, there is potential to further refine the pricing by introducing a tier with even lower entry-level pricing, perhaps through a limited-feature freemium model or a discounted introductory offer.

2. Professional Plan: Tailored for mobile game developers seeking intermediate features and functionality.
   - Price: $199 per month
   - Features: Intermediate character generation capabilities, moderate customization options, and tools optimized for mobile game development.
   - Limitations: This may not fully meet the needs of larger studios or high-end game development projects.
   - Analysis: The Professional Plan strikes a balance between affordability and functionality for mobile game developers. However, further refinement could involve offering specialized add-ons or customization options tailored specifically for mobile gaming platforms to enhance the value proposition.

3. Enterprise Plan: Geared towards AAA game studios and large-scale development projects.
   - Price: $299 per month
   - Features: Advanced character generation capabilities, extensive customization options, and tools for complex game development requirements.
   - Limitations: Higher price points may be prohibitive for smaller studios or indie developers.
   - Analysis: The Enterprise Plan caters to the demanding needs of AAA game studios but may require additional flexibility in pricing, such as volume discounts or custom pricing packages, to accommodate budget constraints while ensuring scalability and profitability for AIForge.

Pricing Metric(s):

1. Market Segmentation:
   Conducting further market research to identify niche segments within each target market, such as genre-specific developers or geographic preferences, can inform the development of specialized pricing plans tailored to unique needs and preferences.

2. Value-Based Pricing:
   Continuously evaluating the perceived value of AIForge's features and capabilities relative to competitor offerings can guide adjustments in pricing to better align with customer expectations and market dynamics.

3. Customer Feedback:
   Soliciting feedback from existing customers and prospects regarding pricing preferences, pain points, and desired features can provide valuable insights for refining pricing structures and introducing new pricing tiers or options.

4. Flexibility:
   Exploring alternative pricing models, such as usage-based pricing or pay-as-you-go options, can offer greater flexibility and customization for customers with varying usage patterns and budgets. Introducing a tier with even lower entry-level pricing, perhaps through a limited-feature freemium model or a discounted introductory offer, can attract cost-conscious customers while providing a pathway to upsell to higher-tier plans as their needs grow.
   Providing additional flexibility in pricing, such as volume discounts or custom pricing packages, accommodates budget constraints while ensuring scalability and profitability. This incentivizes larger studios with extensive development needs to negotiate favorable pricing terms based on their usage volume, fostering long-term partnerships and revenue growth.

5. Specialization:
   Offering specialized add-ons or customization options tailored specifically for mobile gaming platforms, such as features optimized for mobile performance or integration with popular mobile development frameworks, enhances the value proposition for mobile game developers.

By iteratively refining the pricing model based on market insights, customer feedback, and competitive analysis, AIForge can optimize its pricing strategy to maximize revenue generation while maintaining competitiveness and value proposition for game developers across all segments.

Payment Structure:

Customers will have the option to choose from monthly or annual subscription plans, with discounts offered for annual commitments. Payments will be processed securely through credit card transactions on a recurring basis, ensuring convenience and ease of use for customers. The source of payment will be directly from the customer's designated payment method, ensuring seamless billing and uninterrupted access to the AIForge platform.

Customer Justification:

Cost Items Incurred by Customers:

- Time and effort spent learning to use AIForge effectively.
- Potential additional costs associated with integrating AIForge into existing game development pipelines.
- Cost of potential technical support or training services required for utilizing advanced features.
- The opportunity cost of not using alternative character generation tools or services.

Assessment of Compellingness:

- Value Proposition Alignment: Evaluate how well AIForge addresses the pain points and needs of game developers compared to existing solutions. Highlight the unique features and benefits that set AIForge apart from competitors.
- Perceived ROI: Assess the perceived return on investment for customers using AIForge, considering factors such as time saved, quality of output, and potential revenue generation from enhanced game characters.
- Customer Feedback: Gather feedback from pilot users or beta testers to gauge their satisfaction with AIForge and identify areas for improvement.
- Competitive Analysis: Compare AIForge's pricing, features, and performance against competitors to ensure competitiveness in the market.
- Ease of Adoption: Consider how easy it is for customers to integrate AIForge into their existing workflows and how quickly they can start realizing its benefits.
- Customization and Scalability: Highlight the flexibility and scalability of AIForge to accommodate the diverse needs of game developers, from indie studios to AAA companies.
- Risk Mitigation: Address any potential concerns or risks associated with adopting AIForge, such as technical support availability, data security, or compatibility issues.

Appendix

*Key NPC: A key NPC is defined as a programmable character that affects a game's storyline and outcomes.

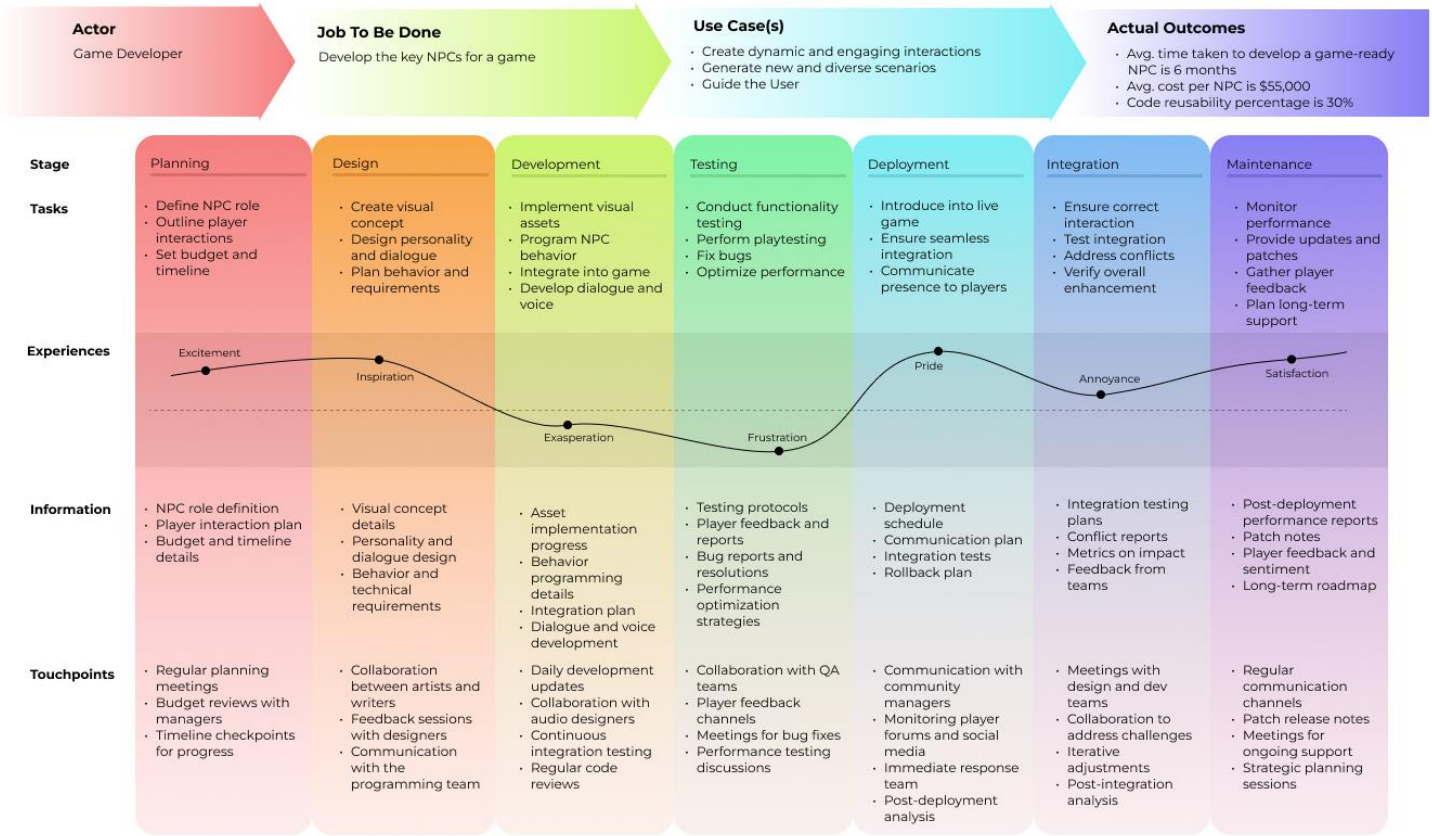


Figure 2: Customer Journey Map

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