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# Integrating Generative AI into Game Development Pipelines: A User-Centered Approach to Creative Efficiency

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## Overview

This journey started with a game design course at EPFL, which motivated me to pursue a master's in information systems. Along the way, I discovered a passion for AI and programming, which led me to an internship at Ubisoft, where I worked on integrating Generative AI (GenAI) into game development pipelines.

The thesis explores how GenAI tools like Stable Diffusion (Stability AI[1]) can support artists during the ideation phase of game production. To assist concept artists[2] in visualizing game worlds and characters, we developed a tool that simplifies the open-source model parameters (e.g., denoising strength, samplers, CFG scale, etc.). This enables artists to generate images quickly from sketches, facilitating the creation of diverse design options for the artistic director's consideration.

## Research Questions

The thesis addresses the following research questions:

- RQ1: Can GenAI be meaningfully integrated into concept artists' workflows?
- RQ2: Can it help boost creative output and speed up concept development?
- RQ3: Do guided workflows and custom UIs (Figure 2) make GenAI tools more accessible to non-technical users?

## Context & Background

Although GenAI has made waves across industries, its integration into creative fields like game development presents unique challenges. Concept artists often face tight timelines and shifting requirements. GenAI promises to support ideation, but the tools rarely adapt to artists' needs or workflows.

The thesis investigates how this gap can be addressed through design research and technical innovation.

## Methodology

Using the Action Design Research (ADR) methodology, as described by Sein et al. (2011), the project was conducted in a real-world setting at a game studio (Figure 1). It involved the creation and evaluation of two main artifacts:

[1] https://stability.ai/

[2] https://www.nfi.edu/concept-art/

1. A workflow (Figure 4), using the Stable Diffusion WebUI[3] and providing a structured approach to prompting and image generation.
2. A custom-built ArtistUI (Figure 3), a simplified user interface that automates prompt creation and parameter selection. This UI consists of four steps for the artist to follow. The first step is to enter a prompt, after which the tool generates four different character sheets[4]. The artist then selects one of the four output images to proceed with. In the second step, the tool upscales the chosen image. In step three, the image is sent to Photoshop, where the artist quickly sketches something on top of the image. The sketch is then processed by the diffusion model back in the tool. Finally, the image undergoes upscaling to produce the finished artwork.
3. Feedback was collected through surveys and interviews with game studio professionals, including concept artists, technical directors, and developers.

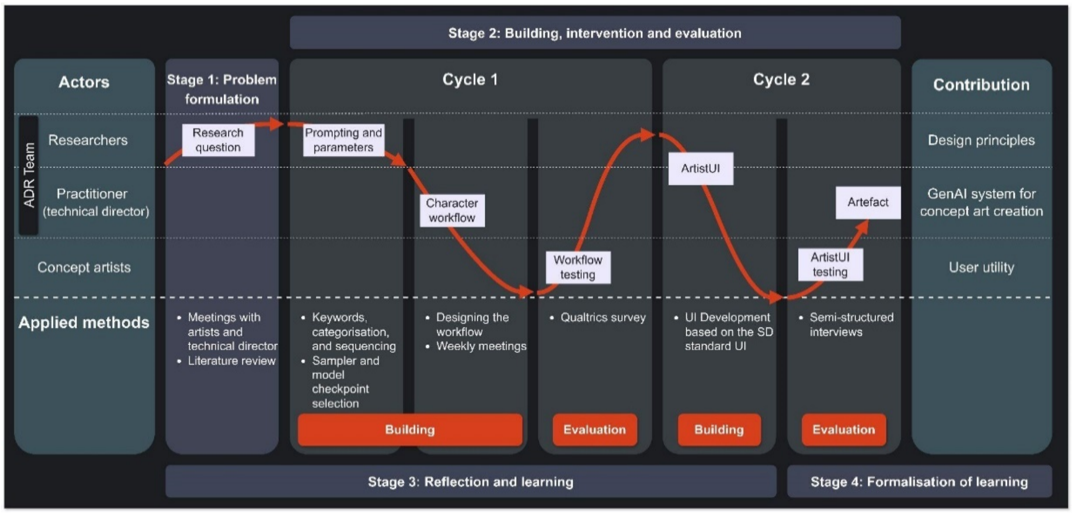


**Figure 1. Research Design**

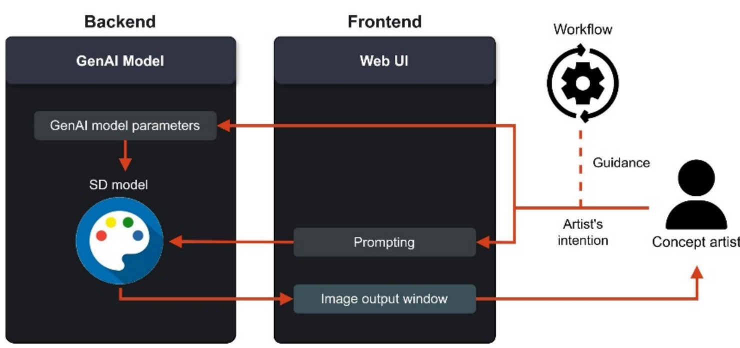


**Figure 2. High-Level Overview of Artifacts**

[3] https://github.com/AUTOMATIC1111/stable-diffusion-webui
[4] In game development, character sheets are concept art of a game character from different angles or with different animation poses. They are needed during the pre-production phase to indicate the intended artistic direction and provide details that make the character unique.

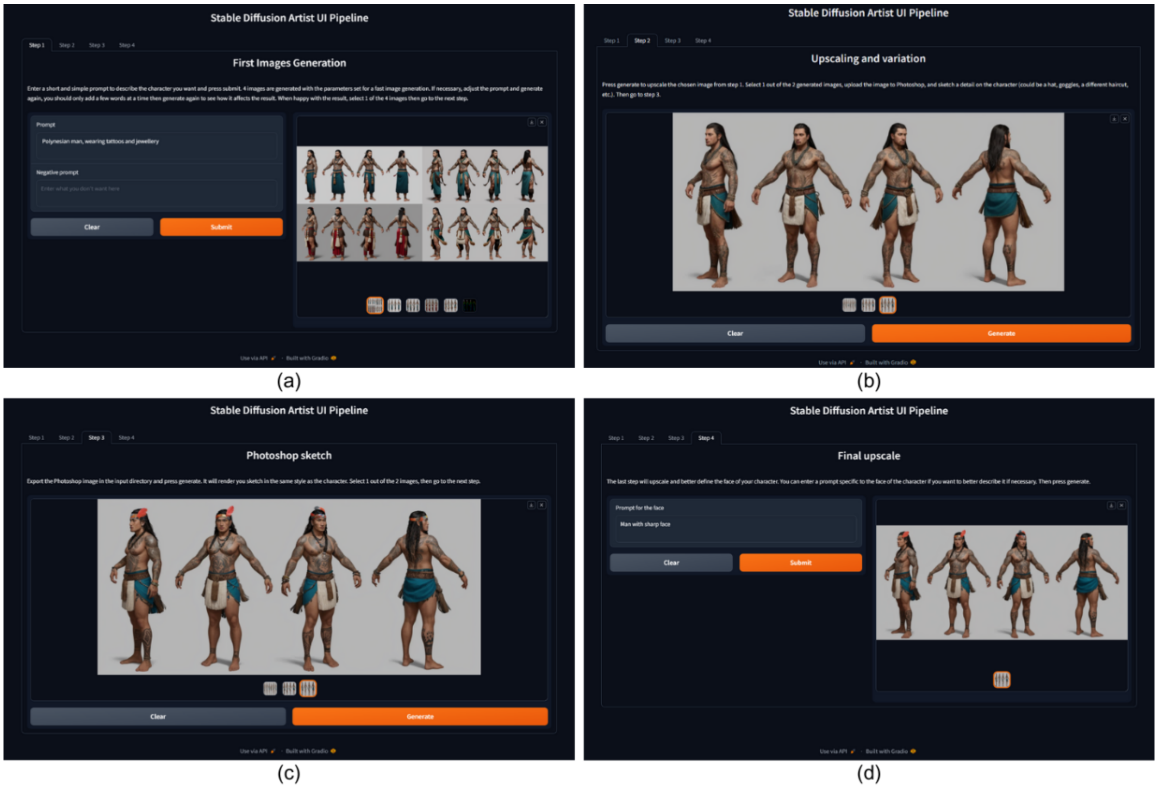


**Figure 3. User Interface of the ArtistUI, Step 1 (a) to Step 4 (d)**

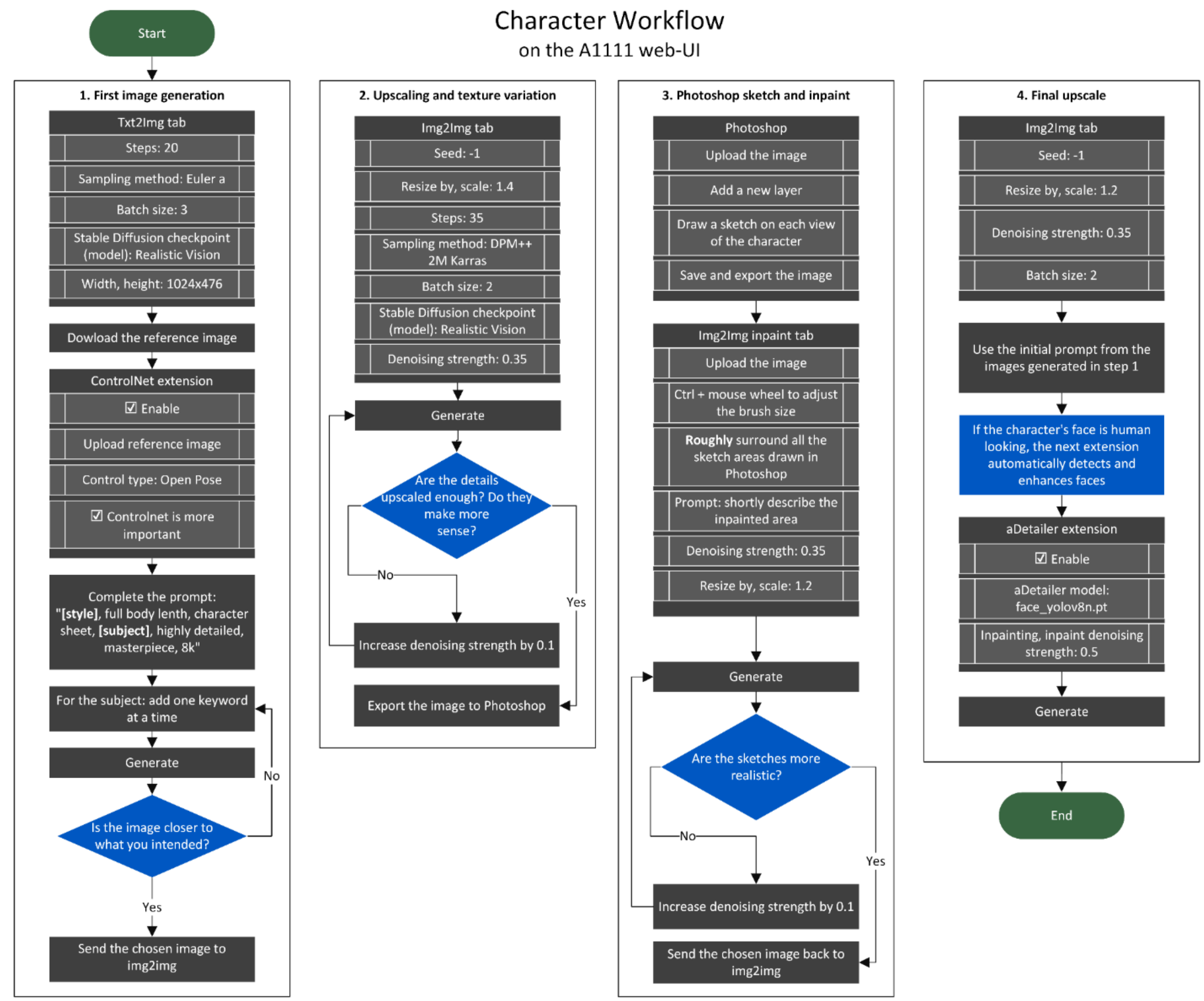


**Figure 4. Concept Art Generation Workflow**

## More information

More information about the author: www.linkedin.com/in/yonah-bole/

More information about the thesis: https://zenodo.org/records/15488290

## Declaration of AI

While preparing this work, the author used ChatGPT from OpenAI[1] to help summarize the thesis. Other GenAI tools were used during the thesis work. The thesis is primarily about the use of Stable Diffusion by Stability AI, but various other GenAI tools for generating images, videos, and 3D models were used for testing and comparison purposes.

## References

Sein, M. K., Henfridsson, O., Purao, S., Rossi, M., & Lindgren, R. (2011). Action Design Research. MIS Quarterly, 35(1), 37–56.

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