

# Emotion-Driven Audio-Visual Experience

**Reality Architects**

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# Problem Statement

## The Issue

- Current multimedia experiences are static and do not adapt to a user's emotions in real-time.
- Lack of seamless integration of AI-generated audio and visual content based on user mood and input.

## Why it Matters

- Enhancing human-computer interaction through AI-driven emotional experiences.
- Potential applications in entertainment, therapy, meditation, and personalized media.



# Goal of the Project

To develop an AI system that generates personalized, immersive audio-visual experiences by understanding the emotional state and intent of the user based on the input provided.

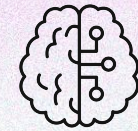
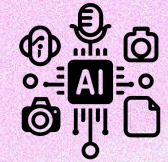
## Key Features:

- Generating music and visuals to align with user's mood and intent.
- Real-time interaction and enhancements with the environment via webcam and hand gestures.
- Iterative feedback loop to tune experience.



# What makes it interesting?

- Interactivity: Users influence the generated content based on mood and intent.
- Multi-modal AI: Combining music generation, generative art, and real-time input processing.
- Human-AI Collaboration: Users guide AI instead of just consuming predefined media.
- User Personalization: System can be tuned to learn a specific user's likes and dislikes





# Related Work

- Multimodal emotional cues enhance perception and processing efficiency [1].
- The link between paintings and music in emotional expression has been studied through AI-driven music generation [2].
- AI-driven text-to-video generation enhances music visualization by mapping textual descriptions to dynamic visuals [3].

[1]A. B. M. Gerdes, M. J. Wieser, and G. W. Alpers, "Emotional pictures and sounds: A review of multimodal interactions of emotion cues in multiple domains," Frontiers in Psychology, vol. 5, p. 1351, Nov. 2014.[Online]. Available: [Frontiers](#)

[2]T. Hisariya, H. Zhang, and J. Liang, "Bridging Paintings and Music – Exploring Emotion Based Music Generation Through Paintings," arXiv preprint arXiv:2409.07827, Sep. 12, 2024. [Online]. Available: [arxiv](#)

[3]V. Liu, T. Long, N. Raw, and L. Chilton, "Generative Disco: Text-to-Video Generation for Music Visualization," arXiv:2304.08551, Sep. 28, 2023. [Online]. Available: [arxiv](#)

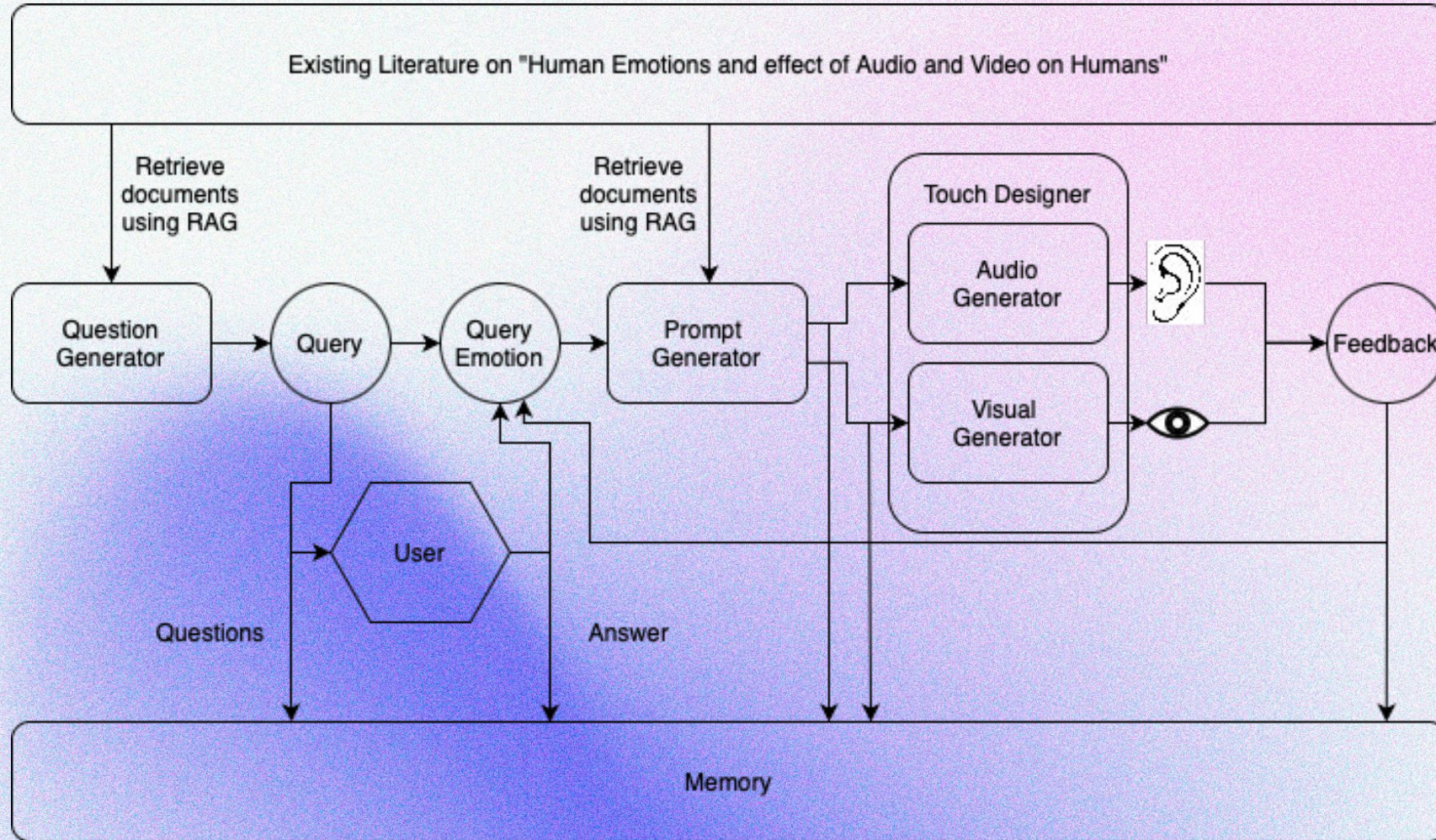


# Hypothesis

- Main Hypothesis:
  - AI-generated personalized audio-visual experience enhances user engagement and emotional impact compared to static media.
- Sub-Hypotheses:
  - Emotion-driven generative content can lead to deeper user immersion.
  - Interactive elements can increase perceived control and satisfaction.

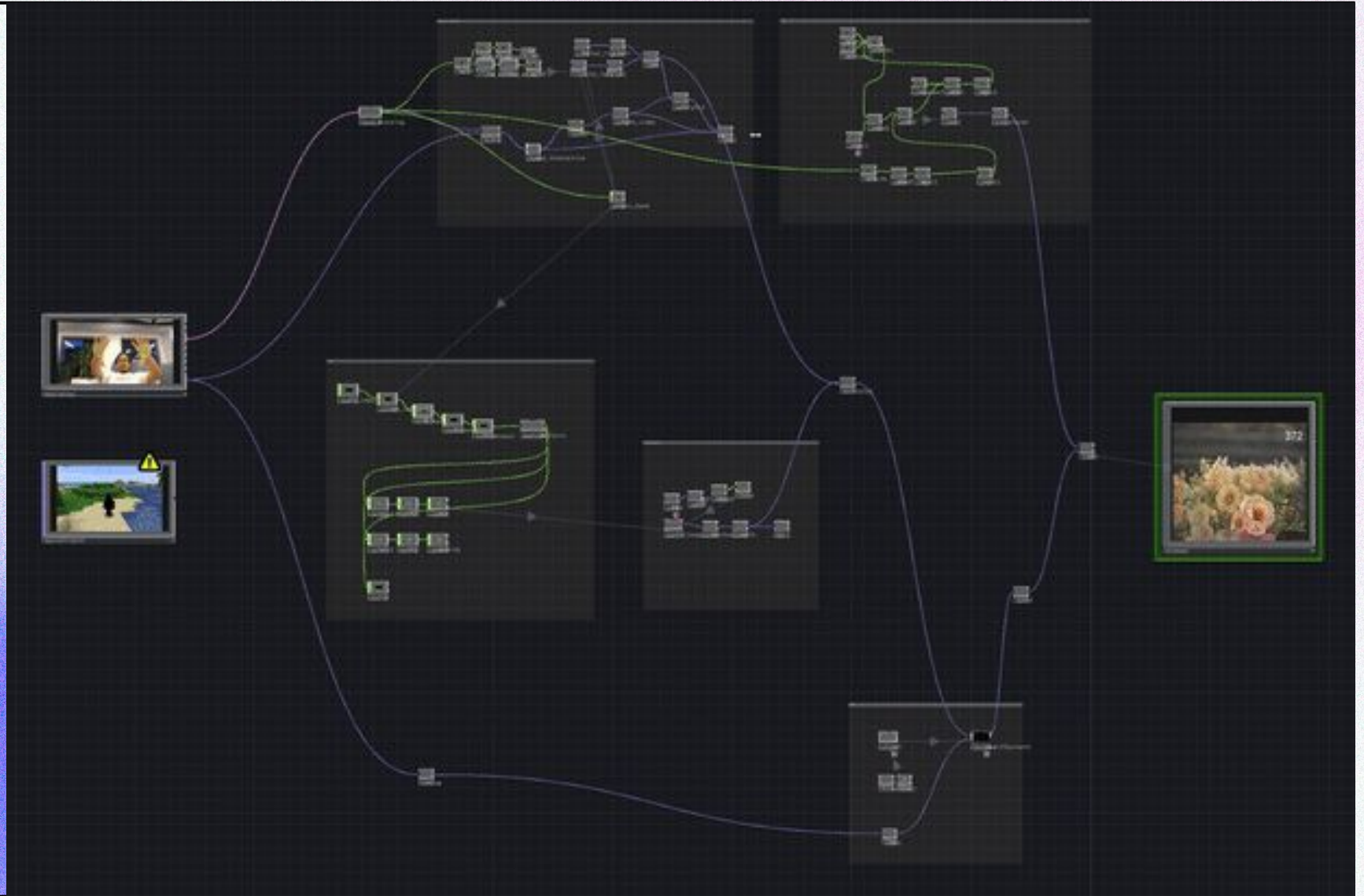


# Design





## TouchDesigner Pipeline





# Evaluation

1. Survey for users after using the system:
  - a. Users first experienced a start-to-end + feedback demo of the project.
  - b. Given a short survey to answer about their experience.
  - c. 5 point Likert Scale method used to present results.
2. Quantitative metric to check how much a user has interacted (proof of concept)



# Challenges

- We could not find a good API based model for music generation. Setting up the MusicGen from Meta was more challenging than expected.
- We wanted to create a UI for the user to interact with. Using Streamlit as the UI was challenging.
- Setting up the pipelines in TouchDesigner took longer than expected.











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 The first part of the document introduces the topic and provides a brief overview of the research objectives and scope. It also outlines the structure of the report and the key findings that will be discussed in the subsequent sections.

2. **Methodology**  
 This section describes the research methods used to collect and analyze data. It includes a detailed explanation of the experimental design, the data collection process, and the statistical techniques employed to interpret the results.

3. **Results**  
 The results section presents the findings of the study in a clear and concise manner. It includes tables, figures, and graphs that illustrate the data and support the conclusions drawn from the analysis.

4. **Conclusion**  
 The conclusion summarizes the main findings of the study and discusses their implications for the field of research. It also identifies any limitations of the study and suggests areas for future research.

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6. **Appendix**  
 The appendix contains supplementary material that is not included in the main body of the report. This may include raw data, additional figures, or detailed descriptions of the experimental procedures.

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# Potential Application of the system



System

Emotion: Angry  
Intent: Venting

Emotion: Happy,  
content  
Intent: Relax, Reflect

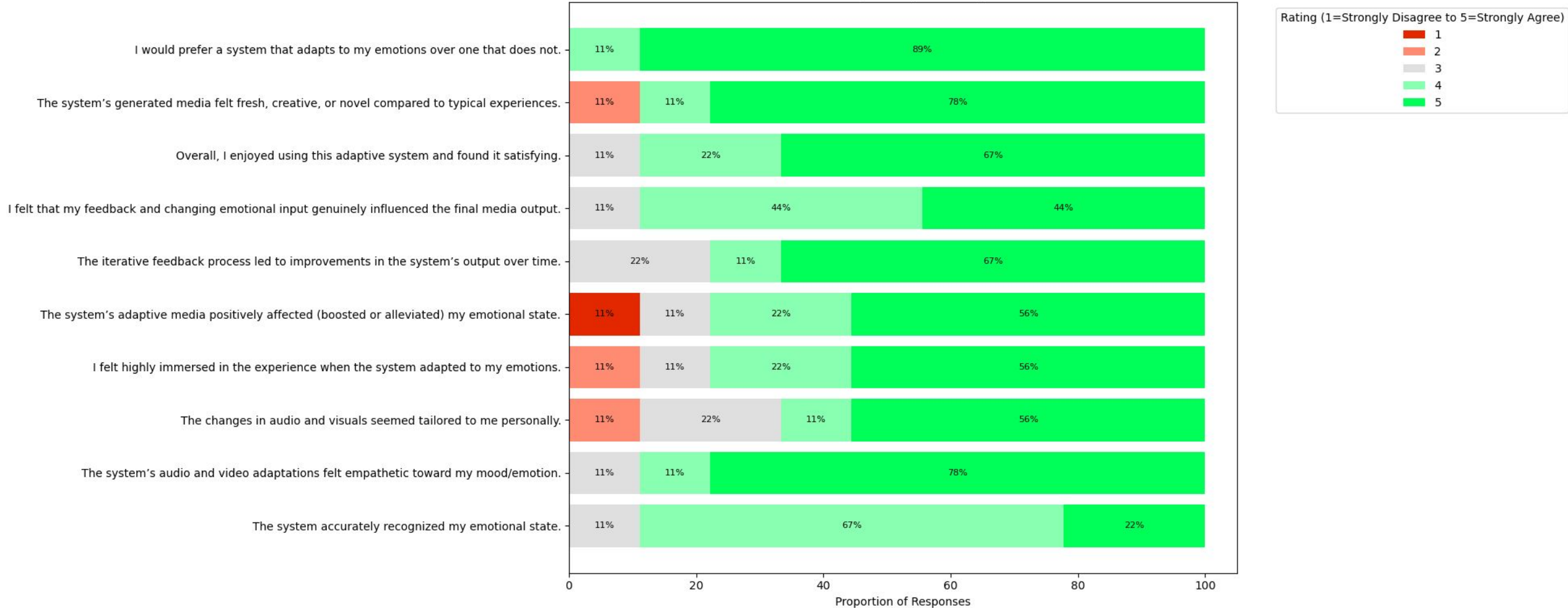
Emotion: Dejection,  
Frustration  
Intent: Feel hopeful





# Survey Results

Likert Scale Responses per Survey Question





**Thank You!**