

## Contact Info

### Project Members:

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## Tenets

1. **Proper Conversion of text to image:** The output generated by the model should represent the description provided in the text.
2. **Rapid Generation of Output:** The model should be able to generate the outputs rapidly in order to account for rapid prototyping.
3. **User Feedback:** The user should be able to add feedback to the image generated which the model can interpret and provide necessary changes.

Executive Summary

This document proposes the "DecorAIze" project, aimed at revolutionizing architectural visualization through an AI-powered system that automates the conversion of textual descriptions into detailed interior designs. The initiative addresses the challenge of the time-consuming and subjective nature of traditional sketching processes, which require significant manual effort and expertise. By leveraging AI to understand and generate sketches inspired by Indian architectural styles, such as the intricate designs of Mughal architecture, the project seeks to enhance efficiency, promote cultural preservation, and foster creativity in design exploration. The proposed solution includes developing a text-to-sketch model, an intuitive user interface for easy input and customization, and features for ensuring accuracy, realism, and cultural style variability. This approach aims to democratize architectural visualization, making it accessible to a wider audience and fostering innovation within the architectural and design communities.

## Measures of Success

1. Successful conversion of text descriptions into rendered sketches, ensuring that the generated sketches accurately reflect the architectural elements described in the text. This involves maintaining a balance between creative interpretation and faithful representation, to produce visuals that are both innovative and true to the original design concepts.
2. Traditional architectural rendering can be time-consuming and expensive. Generative AI can automate parts of the rendering process, generating multiple design options quickly and reducing the overall time and cost required for design iterations.
3. Positive feedback from users on the usability and effectiveness of the application.

## In Scope

1. Development of a Generative AI model for interior design
2. Creation of a user interface for inputting design descriptions.
3. Integration of the AI model with the user interface.
4. Providing User feedback for regeneration of images

## 

## Out of Scope

1. 3D modeling of exterior/interior architectural elements.
2. Physical construction of designed spaces.

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## Open Issues

1. Optimal dataset for fine tuning of LLM.
2. Ensuring the AI-generated designs meet architectural standards.
3. Comparison the before-and-after prompts for their efficiency.

## 

## Use Cases

1. **Quick Visualization for Brain-Storming:** In this scenario, an architecture student utilizes a quick concept visualization tool during brainstorming sessions. The primary goal is to expedite the generation of visual concepts, particularly for class projects or creative design discussions.
2. **Client Presentation:** In this scenario, an architecture professional employs a quick concept visualization tool to present design ideas effectively to a client. The primary goal is to streamline the process of visualizing and communicating concepts for a project.

## Proposed Solution Summary

The project proposes the development of a generative application that utilizes Large Language Models (LLMs) and image generation techniques to convert textual descriptions into architectural renderings. This involves fine-tuning LLMs with a dataset relevant to interior design and integrating these models with an image generation module to produce detailed sketches.

## Other Solutions

1. **Manual sketching and rendering:** More time-consuming and less efficient.
2. **Standard CAD software:** Lacks the AI-driven personalization and rapid prototyping capabilities.
3. **3rd-Party Drag-and-Drop Applications:** Here the user is provided with the facility of individually choosing each aspect of the room based on their requirement without any base idea which is also time consuming.

## Dependencies

1. Access to LLMs and image generation APIs.
2. A comprehensive dataset of architectural designs for model training.
3. A stable internet connection.

## Functional Requirements

1. The application must accept text input and convert it into architectural renderings.
2. It should support a wide range of architectural styles and elements.

## Non-functional Requirements

1. The system shall ensure user data privacy and security.
2. It must be scalable to accommodate a growing number of users.

## Metrics

1. User satisfaction rate.
2. Accuracy of the AI-generated designs compared to the text descriptions.
3. Comparison of prompt before-and-after fine tuning, maybe BLEU or Perplexity.

## Alarms

1. System downtime.
2. Unusual spikes in processing time for design generation.
3. API down.
4. LLM unable to convert the user prompt.

## Appendix

* Glossary: Definitions of key terms related to Generative AI and architectural design.
* FAQ: Answers to common questions about the application and its use.
* API Definitions: Detailed specifications for any APIs used in the project.