COMPARATIVE ANALYSIS OF DIFFUSION MODELS FOR IMAGE GENERATION

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1 Introduction

The project aims at implementing and comparing different diffusion models that are used for image generation. We will evaluate the performance of these different models in generating such high-quality images from textual prompts. The well known models like FLUX, Stable Diffusion will be studied in detail and compared with each other on the basis of their strengths, weaknesses and applicability in different scenarios. This study aims to shed light on the effectiveness of text to image diffusion models.

2 Background and Motivation

Artificial Intelligence has witnessed a paradigm shift in techniques for image generation over the past few years. Generative Adversarial Networks(GANs) have been the go to approach for synthetic image creation for a long time. Diffusion models recently emerged as a powerful alternative, especially in the domain of text-to-image conversion [1].

Diffusion models were introduced in 2015 by Sohl-Dickstein et al.[2] and have gained popularity due to their ability to generate diverse images with high quality and remarkable fidelity. GANs rely on a generator-discriminator (adversarial) architecture to generate images. Unlike GANs, diffusion models use a gradual denoising process to generate images which has shown remarkable stability during training and better control over the generation process.

Diffusion models gained popularity due to their exceptional performance in generating images from text. Models like DALL-E 2, Stable Diffusion, FLUX.1 and Midjourney have captured public imagination with their ability to form real like images from textual descriptions. Our project "Comparative Analysis of Diffusion Models for Image Generation", is motivated by the need to understand the strengths and weaknesses of different diffusion model architectures. These models are evolving rapidly, and a comprehensive comparison is crucial and beneficial to both researchers and practitioners in this field.

3 Related Work

Literature Review goes here

4 Progress

5 Execution Plan

6 Workload Distribution

7 Headings: first level

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7.1 Headings: second level

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7.1.1 Headings: third level

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8 Examples of citations, figures, tables, references

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The documentation for `natbib` may be found at

`http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

Of note is the command `\citet`, which produces citations appropriate for use in inline text. For example,

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\citet{hasselmo} investigated\dots
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produces

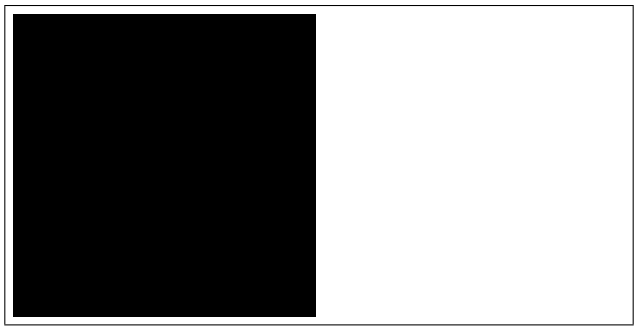

Figure 1: Sample figure caption.

Table 1: Sample table title

	Part	
Name	Description	Size (μm)
Dendrite	Input terminal	$\sim$100
Axon	Output terminal	$\sim$10
Soma	Cell body	up to 10^6

Hasselmo, et al. (1995) investigated...

`https://www.ctan.org/pkg/booktabs`

8.1 Figures

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8.2 Tables

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8.3 Lists

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[1] Sample of the first footnote.

9 Conclusion

Your conclusion here

Acknowledgments

This was was supported in part by.....

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