INTERNSHIP COMPLETION REPORT

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Internship Organization: Prodigy Infotech
Internship Domain: Generative AI
Internship Duration: July 2025 (1 Month)

Declaration

I, A. Hemalatha, hereby declare that the report titled "Internship Completion Report – Prodigy Infotech (Generative AI)" is a record of original work completed during my one-month internship in July 2025. The contents of this report are genuine and based on real-time tasks executed as part of the Generative AI internship program.

Date: August 2025
Signature: *(A. Hemalatha)*

Acknowledgement

I express my heartfelt gratitude to **Prodigy Infotech** for giving me the opportunity to explore Generative AI through this internship. The experience gained by completing real-time tasks helped bridge the gap between academic learning and industry expectations. I sincerely thank the mentors at Prodigy Infotech for their guidance and constant encouragement.

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1. Introduction

As part of my post-graduation learning journey, I undertook a one-month internship at Prodigy Infotech under their **Generative AI Internship Program**. The focus was on applying cutting-edge AI techniques in real-time applications like text generation and image synthesis using state-of-the-art models.

2. Company Profile

Prodigy Infotech is a reputed organization offering internship and training programs in areas like Artificial Intelligence, Web Development, and Data Science. They emphasize hands-on learning through guided projects and real-world use cases. Prodigy provides flexible, remote internships and professional mentorship.

3. Internship Objectives

- Gain hands-on experience in **Generative AI**.
- Learn to use pre-trained models like **GPT-2** and **Stable Diffusion**.
- Build user interfaces using **Gradio**.
- Understand both neural and statistical text generation methods.
- Train and deploy **Pix2Pix** model for image-to-image translation.

4. Work Done / Task Descriptions

Task 1: Text Generation with GPT-2

Objective: Build a text generator using Hugging Face's pre-trained GPT-2 model.
Tech Stack: Python, Transformers, Gradio
Key Features:

- Beam search decoding
- Gradio UI for interactive prompt-response text generation

Outcome: Generated coherent stories and essays based on user prompts.

Task 2: AI Image Generator using Stable Diffusion

Objective: Create an image generator using the Stable Diffusion model from Hugging Face.
Tech Stack: Python, diffusers, Gradio, Google Colab
Key Features:

- Generates 512x512 images from simple text prompts
- Hugging Face token integration

Outcome: Successfully generated visually rich images from user-input descriptions.

Task 3: Text Generation with Markov Chains

Objective: Implement a text generation algorithm using word-level Markov Chains.
Tech Stack: Python, Gradio
Key Features:

- Prefix-length-based generation
- Reuses vocabulary from training input

Outcome: Created grammatically correct, context-aware sequences based on sample input.

Task 4: Image-to-Image Translation with Pix2Pix

Objective: Build a Pix2Pix model to convert edge sketches into realistic face images.
Tech Stack: TensorFlow, Pix2Pix, Gradio
Key Features:

- cGAN-based training using edge2face dataset
- U-Net Generator + PatchGAN Discriminator

Outcome: Trained model capable of generating realistic faces from input sketches.

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5. Challenges Faced

- Handling GPU memory and runtime limits on Colab
- Understanding nuances between beam search and greedy decoding in GPT-2
- Managing prefix length limitations in Markov models
- Fine-tuning Pix2Pix with limited dataset size

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6. Key Learnings

- Generative models architecture: GPT-2, Pix2Pix, Markov Chains
- Hugging Face tools: transformers, diffusers
- Deployment using Gradio
- How conditioning influences GANs (cGANs)
- Improved debugging and model tuning skills

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7. Conclusion

The Prodigy Infotech internship was an enriching experience where I learned how to apply cutting-edge Generative AI techniques. From building AI-powered UIs to training GANs, the hands-on exposure has prepared me to contribute effectively to real-world AI projects and further my career in Machine Learning.

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8. References

- https://huggingface.co/
- https://www.tensorflow.org/tutorials/generative/pix2pix
- https://github.com/CompVis/stable-diffusion
- https://www.gradio.app/docs
- https://en.wikipedia.org/wiki/Markov_chain

GitHub Repo: PRODIGY_GenAI_Internship

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