

**FINAL YEAR PROJECT PLAN**

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**Project Title**

Automated Image Generation (CCDS24-0163)

**Project Summary**

This project will develop deep neural networks that is capable of generating various new images according to some pre-defined conditions or requirements.  
The generated images can be applied to train deep networks.

**Project Objectives**

1. Reimplementation  
   - Reimplement existing deep learning models for automated image generation
   1. (Generative Adversarial Networks (GANs)
   2. Variational Autoencoders (VAEs)
   3. Diffusion
   4. Transformer-Based Models
   5. Derivatives/modified versions of any of the aforementioned models
2. Benchmarking  
   - Benchmark these methods against various datasets and metrics.  
   - The list of metrics to be used (non-exhaustive):
   1. Fréchet Inception Distance (FID)
   2. Inception Score (IS)
   3. Kernel Inception Distance (KID)
   4. Precision
   5. Recall
   6. Perceptual Path Length (PPL)
3. Analysis  
   - Performance and limitations analysis of deep learning models  
   - Comparative analysis of deep learning models
4. Innovation (Potential)  
   - Potential implement new methods (new scarcely-researched models) or  
   modifications to existing methods to address identified limitations
5. Final Developed Product
   1. Finalize best performing automated image generation model. This includes:
      1. Best performing model implemented in 1 or 4
      2. Fine-tuning Pre-Trained Models
      3. Transfer learning
      4. Multi-model integration
   2. Create a functioning interface for the best performing automated image generation model
   3. Deployment

**Timeline**

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| **Time Period** | **Objective** |
| August  2024 | *Background Phase:*   1. Literature Review    1. Deep Learning Models (GANs, VAEs, Diffusion, ...etc.)    2. Performance Metrics (FID, IS, KID, PPL, ...etc.) 2. Learning Deep Learning Frameworks    1. TensorFlow    2. PyTorch 3. Understanding Image Processing Libraries    1. OpenCV    2. Pillow |
| September 2024 | *Background Phase:*   1. Literature Review    1. Deep Learning Models (GANs, VAEs, Diffusion, ...etc.)    2. Performance Metrics (FID, IS, KID, PPL, ...etc.) 2. Learning Deep Learning Frameworks    1. TensorFlow    2. PyTorch 3. Understanding Image Processing Libraries    1. OpenCV    2. Pillow |
| October 2024 | *Reimplementation Phase:*   * Build automated image generation models for the learned deep learning models   *Benchmarking Phase:*   * Assess every model built with a set of appropriate assessment metrics   *Analysis Phase:*   * Performance and limitation analysis of models * Comparative analysis |
| November 2024 | *Reimplementation Phase:*   * ­Build automated image generation models for the learned deep learning models   *Benchmarking Phase:*   * Assess every model built with a set of appropriate assessment metrics   *Analysis Phase:*   * Performance and limitation analysis of models * Comparative analysis |
| December 2024 | *Reimplementation Phase:*   * ­Build automated image generation models for the learned deep learning models   *Benchmarking Phase:*   * Assess every model built with a set of appropriate assessment metrics   *Analysis Phase:*   * Performance and limitation analysis of models * Comparative analysis |
| January 2025 | *Innovation Phase:*   * Literature Review of new scarcely-researched for (potential) implementation and analysis * (Potential) modifications to existing methods to address identified limitations   *Final Development Phase:*   * Finalize best performing automated image generation model. * Create a functioning interface for the best performing automated image generation model * Deployment   **27th January 2025: Submission of Interim Report** |
| February 2025 | *Project Finalization Phase:*   * Code refactoring (Submission preparation) * Final Deployment * Report Finalization * Work on Presentation |
| March 2025 | *Presentation Preparation and rehearsal*  **24th March 2025: Submission of Final Report** |
| April  2025 | *Presentation Preparation and rehearsal*  **18th April 2025: Submission of Amended Final Report** |
| May 2025 | **9, 12-14th May (To be Confirmed):**  **Oral Presentation** |