LESSONS LEARNED

Technical Lessons Learned:-

1. **Importance of Data Quality and Diversity**: The training data's quality and diversity have a significant impact on a GAN's performance. This experiment demonstrated how a large and varied dataset are necessary for the model to be able to train and produce realistic images. The model's capacity to generalise and generate high-quality outputs may be restricted by inadequate diversity of data.
2. **Difficulties in GAN Training**: Since the generator and discriminator must be balanced, GAN training is intrinsically difficult. The substantial generator loss in this project highlighted how difficult it is to achieve this equilibrium. It was discovered that the stabilisation of GAN training requires the use of sophisticated training methodologies and the fine-tuning of hyperparameters, such as learning rates and batch sizes.
3. **Model Architecture Is Important**: The performance of the GAN is greatly influenced by the architecture of the discriminator and generator. This study demonstrated how crucial it is to carefully design the model architecture, taking into account layers, activation functions, and loss functions that match the unique properties of the data and the intended result.
4. **Value of Iterative Experimentation:** Improving GAN performance requires iterative experimentation. While the original model did not yield the expected outcomes, the process of fine-tuning the architecture, training procedure, and hyperparameters yielded insightful information. The iterative process is necessary to improve the model's performance step by step.
5. **Recognising Model Limitations:** This project made it clear how important it is to be aware of the model's limitations and know when it's time to look into alternate strategies or improvements. The model was trained extensively, but it was unable to produce realistic images, which meant that alternative GAN variations or supplementary methods needed to be investigated.

Non-technical Lessons Learned:-

1. Effective planning and time management is crucial for project management, and it's one of the most important things learnt over a project semester. Timely completion of project milestones is contingent upon the possession of critical skills such as multitasking, realistic deadline setting, and organisational maintenance. Maintaining progress and preventing stress at the last minute need knowing how to divide a big project into smaller, more manageable tasks and how to prioritise them.
2. Working on a project frequently requires cooperating with others, which highlights the value of effective communication, teamwork, and dispute resolution. The project will succeed if all team members know how to use their strengths, share responsibilities equitably, and collaborate towards a common objective.
3. Critical thinking and problem-solving: Most projects require overcoming a variety of obstacles, whether they be interpersonal, logistical, or technical. As a result of this experience, you will be able to approach problems methodically, exercise critical thought, and come up with original answers. Because failures are frequently a part of the process, it also teaches resilience.

4. Application of Technical and Practical Skills: One way to close the knowledge gap between classroom instruction and real-world application is to apply theoretical knowledge to a practical project. This practical experience improves technical proficiency, broadens comprehension of the subject, and frequently highlights the potential and constraints of the ideas covered in the classroom.

5. Flexibility and Adaptability: Since projects seldom proceed as planned, flexibility and adaptability are crucial. Being able to pivot and adapt to new conditions is a crucial lesson, whether it involves altering tactics, expanding the scope of the project, or quickly picking up new tools and technology.

6. Self-Reflection and Ongoing Education: The value of self-reflection is also emphasised in project semesters. The process of assessing what went well, what didn't, and what may be improved encourages a continual learning and development perspective. For both professional and personal development, this process is essential.

7. Presentation and Documentation abilities: Presenting the findings and recording the procedure, which is the project semester's last step, polishes communication abilities. In future academic and professional endeavours, knowing how to effectively communicate complicated concepts to an audience through written reports or oral presentations is a crucial talent.