**Dr. Vishwanath Karad MIT-World Peace University (MIT-WPU)**

**School of Computer Science and Engineering**

**T.Y.B.Tech.CSE**

**T.Y. Semester-VI (24-25) Seminar Synopsis**



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| **Name of Student** | Faisal Irfan Shaikh |
| **PRN No.** | 1032231524 |
| **Roll No.** | 58 |
| **Panel No.** | E |
| **Date** | 04/02/2025 |
| **Topic** | **(GAN) Text-To-Image with Generative Adversarial Networks** |
| **Abstract (one paragraph of 200-300 words)** | Generative Adversarial Networks (GANs) have revolutionized artificial intelligence by enabling the synthesis of high-quality images from textual descriptions. **Text-to-Image GANs** aim to generate visually realistic images that align with given text prompts by learning complex relationships between language and visual data. Their architecture consists of two competing neural networks: the **Generator**, which creates images from text embeddings, and the **Discriminator**, which evaluates their realism and relevance.  Significant advancements in text-to-image synthesis have been made through models like **StackGAN, AttnGAN, and DALL·E**. StackGAN improves image resolution through a two-stage generation process, while AttnGAN utilizes attention mechanisms to enhance fine-grained text-image alignment. More recent transformer-based models, such as DALL·E, have demonstrated the ability to generate complex and diverse images from text, pushing the boundaries of AI-driven creativity.  This seminar explores the architecture, training methodologies, and applications of text-to-image GANs in **creative design, content generation, virtual reality, and medical imaging**. Despite impressive progress, challenges such as **mode collapse, training instability, and imperfect text-image alignment** remain. Researchers continue to improve these models by refining architectures, enhancing controllability, and reducing biases in generated outputs.  Understanding these advancements is essential for the future of AI-powered content creation, paving the way for innovations in **digital art, automated storytelling, and interactive media generation**. |
| **Keywords (3-5 words)** | GANs, Text-to-Image Synthesis, Deep Learning, Conditional GANs, AI Image Generation,  Artificial Intelligence (AI), Neural Networks |
| **References**  **(05-07 Research papers in IEEE format)** | 1. I. Goodfellow et al., "Generative Adversarial Networks," *Advances in Neural Information Processing Systems (NeurIPS)*, 2014. 2. H. Zhang et al., "StackGAN: Text to Photo-realistic Image Synthesis with Stacked Generative Adversarial Networks," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 41, no. 8, pp. 1947-1962, 2019. 3. P. Isola et al., "Image-to-Image Translation with Conditional Adversarial Networks," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017. 4. A. Radford et al., "Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks," *International Conference on Learning Representations (ICLR)*, 2016. 5. A. Ramesh et al., "Zero-Shot Text-to-Image Generation," *Advances in Neural Information Processing Systems (NeurIPS)*, 2021. 6. T. Xu et al., "AttnGAN: Fine-Grained Text to Image Generation with Attentional Generative Adversarial Networks," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. 7. J. Choi et al., "Text-to-Image Generation Using GANs: A Review," *IEEE Access*, vol. 9, pp. 162875-162894, 2021. 8. X. Wang et al., "Towards More Controllable Text-to-Image Generation with Self-Conditioned GANs," *IEEE/CVF International Conference on Computer Vision (ICCV)*, 2021. 9. R. Zhang et al., "Large-Scale Text-to-Image Generation with Flexible Object Layouts," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 45, no. 3, pp. 1-14, 2023. |

**Seminar Guide Name Seminar Coordinator Name**

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