PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement

facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS141/II/2024

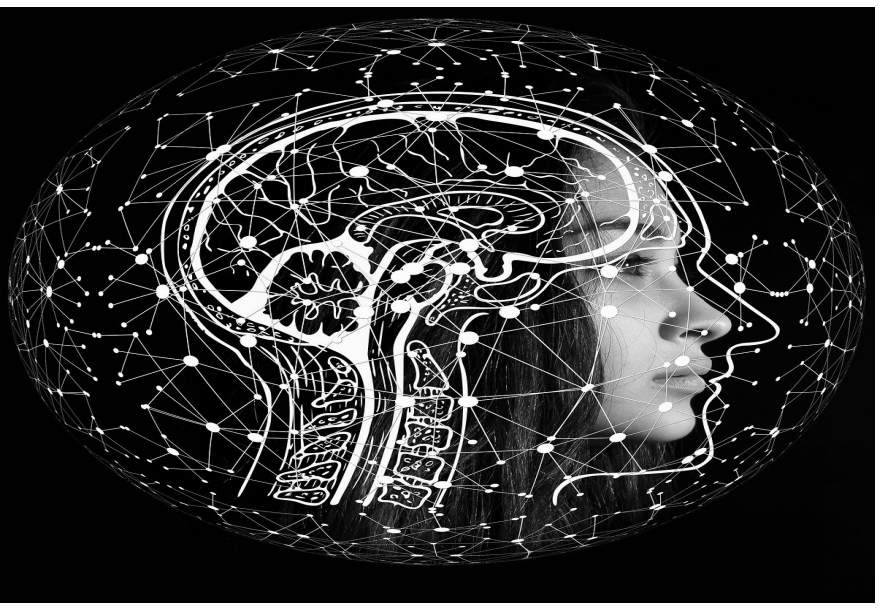
Generative Learning: From VAEs to Diffusion Models

Name of the PMRF student

PIYUSH LALITKUMAR TIWARY

Required background of the students taught

1. Familiarity and strong foundations in Probability Theory.
2. Prior knowledge of basic Deep Learning.
3. Some background in Optimization Theory



Details of the content of the module

The session will start from basics of generative modelling, starting from VAEs and will go all the way to Diffusion models and Flow Matching.

1. Variational Autoencoders (VAEs)
2. Hierarchal VAEs (HVAEs)
3. Diffusion Models as HVAEs
4. Diffusion Models as Stochastic Sampler
5. Denoising Score Matching
6. Score Matching Langevin Dynamics (SMLD)
7. Stochastic Differential Equations (SDEs)
8. Diffusion Models and SMLD as SDEs
9. Flow Matching
10. Current Trends in Diffusion Models
11. Generative Adversarial Networks (GANs)
12. VAEs - GANs - Diffusion Models: The Generative Trilemma

Schedule of the module

Start Date: August 27

Timings:

Tuesday & Thursday 11AM - 12PM

Sometimes the classes might be recorded and uploaded depending on circumstances.

Meeting link : Will be shared later

Link

Contact email ID: isss.forum@gmail.com

piyushtiwary@iisc.ac.in

Registration link:

https://forms.gle/9q3rrrSWLfVwQ3Nd6