SRBTECHNOLOGY

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Generative AI Course Syllabus

Module 1: Introduction to Generative AI

- Overview of Artificial Intelligence and Machine Learning
- Evolution and significance of Generative AI
- Real-world applications: Text, image, and audio generation

Module 2: Mathematical Foundations

- Linear Algebra and Calculus essentials[Johns Hopkins Engineering Online+3pccoepune.com+3Udacity+3]
- Probability theory and statistical methods[Courses+2pccoepune.com+2Boston University+2]
- Optimization techniques in AI models

Module 3: Neural Networks and Deep Learning

- Architecture of neural networks[Business Insider+1pccoepune.com+1]
- Training processes and backpropagation
- Activation functions and regularization methods[pccoepune.com+1Boston University+1]

Module 4: Generative Models

- Variational Autoencoders (VAEs)
- Generative Adversarial Networks (GANs)
- Diffusion models and their applications[Johns Hopkins Engineering Online]

Module 5: Transformer Architectures

- Understanding attention mechanisms
- Exploration of models like GPT and BERT
- Fine-tuning pre-trained models for specific tasks

Module 6: Natural Language Processing (NLP)

- Tokenization and embedding techniques
- Text generation and summarizationpccoepune.com+1Udacity+1
- Building conversational agents and chatbots

Module 7: Computer Vision Applications

- Image synthesis using GANs
- Style transfer and image-to-image translation
- Evaluation metrics for generated images

Module 8: Audio and Speech Generation

- Text-to-speech (TTS) systemsCourses+2UTSA Academic Innovation+2Ivy Professional School+2
- Music and sound generation models
- Voice cloning and its ethical considerations

Module 9: Ethical and Societal Implications

- Bias and fairness in generative models
- Deepfakes and misinformation risks
- Regulatory frameworks and responsible AI practices

Module 10: Capstone Project

- Design and implementation of a generative AI application
- Project presentation and peer review
- Reflection on learning outcomes and future directionspccoepune.com