Tel: +1-929-672-1814
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Course Title: GenAI/ML Engineers

Introduction to Generative AI Models
Overview of generative models in artificial intelligence and machine learning
Review of essential probability and statistics concepts relevant to generative modeling
Autoencoders and Variational Autoencoders (VAEs)
Understanding the architecture and working principles of autoencoders
Introduction to variational autoencoders and their applications in generating new data samples.
Generative Adversarial Networks (GANs)
Exploring advanced GAN architectures and techniques for stable training
Deep Reinforcement Learning for Generative Models
Applications of generative models in sequential decision-making tasks
Applications of Generative Models in Computer Vision
Generating realistic images using GANs and VAEs
Understanding recent advances and applications in computer vision using generative models
Applications of Generative Models in Natural Language Processing (NLP)
Text generation using recurrent neural networks (RNNs) and GANs
Conditional text generation and text-to-image synthesis
Sentiment analysis and language modeling with generative models
Evaluation Metrics and Techniques for Generative Models

COURSE TITLE: GenAI/ML Engineer			
Course Number (*)	GENAI-102		
Pre/Co-Requisites	None		
Department	Training		
Instructor Name (*)	Irshad Mohammad	**Email (*)**	info@genai-training.com
Office Location	On-line	**Class Hours**	TT: 9:00pm – 10:30PM EST
Telephone No.	+1-929-672-1814		
Class media	Google Meet	**Class Recordings**	GenAI Portal

COURSE INFORMATION/ DESCRIPTION OF THE COURSE

- Mastering Generative Models: Students will gain a deep understanding of generative models, including variational autoencoders (VAEs), generative adversarial networks (GANs), autoregressive models, and their variants.
- Implementing Deep Learning Techniques: Through hands-on projects and assignments, students will learn how to implement and train generative models using popular deep learning frameworks such as TensorFlow and PyTorch.
- Exploring Applications: The course will cover a wide range of applications for generative AI/ML, including image synthesis, text generation, music composition, data augmentation, and more.
- Optimization and Fine-Tuning: Students will learn techniques for optimizing and fine-tuning generative models to achieve desired performance metrics, such as image quality, text coherence, or music realism.
- Ethical Considerations: Ethical considerations and potential biases in generative AI/ML systems will be discussed, and students will learn how to implement fairness and transparency mechanisms.

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- Deployment and Integration: The course will cover the deployment and integration of generative models into production systems, including scalability, efficiency, and compatibility considerations.
- Innovation and Research: Students will have the opportunity to innovate and experiment with novel architectures, loss functions, and training strategies to push the boundaries of generative AI/ML research.
- Collaboration and Communication: Collaboration skills will be emphasized, with students learning to work effectively in multidisciplinary teams and communicate technical concepts and findings to stakeholders.
- Staying Updated: The course will teach students how to stay updated with the latest research advancements and trends in generative AI/ML, ensuring they remain at the forefront of the field.
- Real-World Applications: Students will gain the confidence to tackle real-world challenges and contribute to cutting-edge projects in industries such as healthcare, entertainment, finance, and more, leveraging the power of generative AI/ML technology.

*LEARNING RESOURCES

Books:

- Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play" by David Foster - Provides a comprehensive introduction to generative models and their applications in various domains.
- Deep Learning by Ian Goodfellow, Yoshua Bengio, and Aaron Courville - Offers in-depth coverage of deep learning techniques, including generative models like GANs and VAEs.
- Hands-On Generative Adversarial Networks with TensorFlow 2.0" by Keras inventor François Chollet - Provides practical guidance and examples for implementing GANs using TensorFlow 2.0.
- Online Courses:
- Coursera's "Generative Adversarial Networks (GANs) Specialization" - A series of courses covering the fundamentals of GANs, including theory, implementation, and applications.
- Tutorials and Articles:
- OpenAI's "Generative Models" - Provides an overview of various generative models, including GANs, VAEs, and autoregressive models, along with code examples.
- Papers with Code - A platform that lists research papers along with code implementations, allowing you to explore the latest advancements in generative AI/ML.
- Towards Data Science - A blog platform with numerous tutorials and articles on generative models, written by experts in the field.
- Documentation and Frameworks
- TensorFlow - The official TensorFlow documentation includes guides and tutorials for implementing generative models, such as GANs and VAEs.
- PyTorch - The PyTorch documentation provides resources for building generative models using PyTorch, along with code examples and tutorials.
- Research Papers:
- Generative Adversarial Nets" by Ian Goodfellow et al. - The seminal paper that introduced GANs, providing the foundational framework for generative modeling.
- Auto-Encoding Variational Bayes" by Diederik P. Kingma and Max Welling - Introduces Variational Autoencoders (VAEs), a popular generative model for learning latent representations.
- The Unreasonable Effectiveness of Deep Learning in Artificial Intelligence" by Yann LeCun et al. - Discusses the role of deep learning, including generative models, in advancing AI research.

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- These resources cover a wide range of topics, from theoretical foundations to practical implementation and applications, and should provide a solid foundation for anyone interested in becoming a Generative AI/ML Engineer

*COURSE OUTCOMES

- Mastery of fundamental concepts and techniques in generative artificial intelligence and machine learning, including variational autoencoders, generative adversarial networks (GANs), and autoregressive models.
- Proficiency in implementing and training state-of-the-art generative models using deep learning frameworks such as TensorFlow and PyTorch.
- Ability to apply generative models to a wide range of applications, including image synthesis, text generation, music composition, and data augmentation.
- Skill in optimizing and fine-tuning generative models to achieve desired performance metrics, such as image quality, text coherence, or music realism.
- Understanding of ethical considerations and potential biases in generative AI/ML systems, and proficiency in implementing fairness and transparency mechanisms.
- Experience with deploying and integrating generative models into production systems, including scalability, efficiency, and compatibility considerations.
- Capability to innovate and experiment with novel architectures, loss functions, and training strategies to push the boundaries of generative AI/ML research.
- Collaboration skills to work effectively in multidisciplinary teams, communicating technical concepts and findings to stakeholders with varying levels of expertise.
- Ability to stay updated with the latest research advancements and trends in generative AI/ML and adapt learning strategies accordingly to remain at the forefront of the field.
- Confidence to tackle real-world challenges and contribute to cutting-edge projects in industries such as healthcare, entertainment, finance, and more, leveraging the power of generative AI/ML