

Tutorial on Probabilistic Deep Generative Models

July 3-5, 2024 (9.00 AM to 12.00 PM)

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Tutorial Organization

The tutorial will be organized across three days, each day consisting of three hours of sessions.

Day 1: Foundations of Probabilistic Generative Models

- **9.00 AM to 9.30 AM** - Introduction to probabilistic models, their importance and applications
- **9.30 AM to 10.30 AM** - Overview of traditional probabilistic graphical models
- **10.30 AM to 10.50 AM** - Break + Q/A
- **10.50 AM to 12.00 PM** - Inference and Learning in graphical models

Day 2: Probabilistic Circuits as Expressive and Tractable Generative Models

- **9.00 AM to 9.30 AM** - Popular generative models & their tractability for probabilistic inference
- **9.30 AM to 10.30 AM** - Probabilistic Circuits: Representation and Inference
 - *Representing probability distributions as computational graphs*
 - *Achieving tractability for inference queries via structural properties*
- **10.30 AM to 10.50 AM** - Break + Q/A
- **10.50 AM to 11.20 AM** - Learning Probabilistic Circuits
 - *Structure and parameter learning*
 - *Random Tensorized Structures, Knowledge Intensive Learning*
- **11.20 AM to 12.00 PM** - Hands on Demo

Day 3: Advanced Topics and Applications

- **9.00 AM to 10.00 AM** - Deep Probabilistic Circuits
 - *Merging probabilistic circuits with deep generative models*
 - *Other extensions and enhancements*
- **10.00 AM to 10.30 AM** - Hands on Demo
- **10.30 AM to 10.50 AM** - Break + Q/A
- **10.50 AM to 12.00 PM** - Applications of Deep Tractable Probabilistic Models
 - *Constrained Generation in Language and Vision*
 - *Semantic Probabilistic Layers for NeuroSymbolic Learning*
 - *Credibility Aware Multimodal fusion*