

Generative AI Models

ECE 598 LV – Lecture 11

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Midterm Examination

- Released at about 8:30am on Wednesday, March 9 via emailed link to Box document
 - Due at 3:00pm on Thursday, March 10 via Gradescope upload
 - No lecture on March 10
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- Open notes and resources; students should however work independently
 - 5-6 questions, which may have multiple parts
 - Largely focused on mathematical derivations and so on, with some conceptual pieces as well

Individual Project

- One-paragraph proposal due at 5:00pm on Monday, March 7 via Gradescope upload
- Can be any reasonable mix of theory, experiment, design
- If it is related to your doctoral research or other research projects, proposal should briefly clarify what is being done specifically for the class project

Can one learn a language model for a (probabilistic) context-free grammar source and do information-theoretic probing of what rules are learned?

Can one generate novel and high-quality artifacts in a domain like computer architecture or nanoscale circuit design?

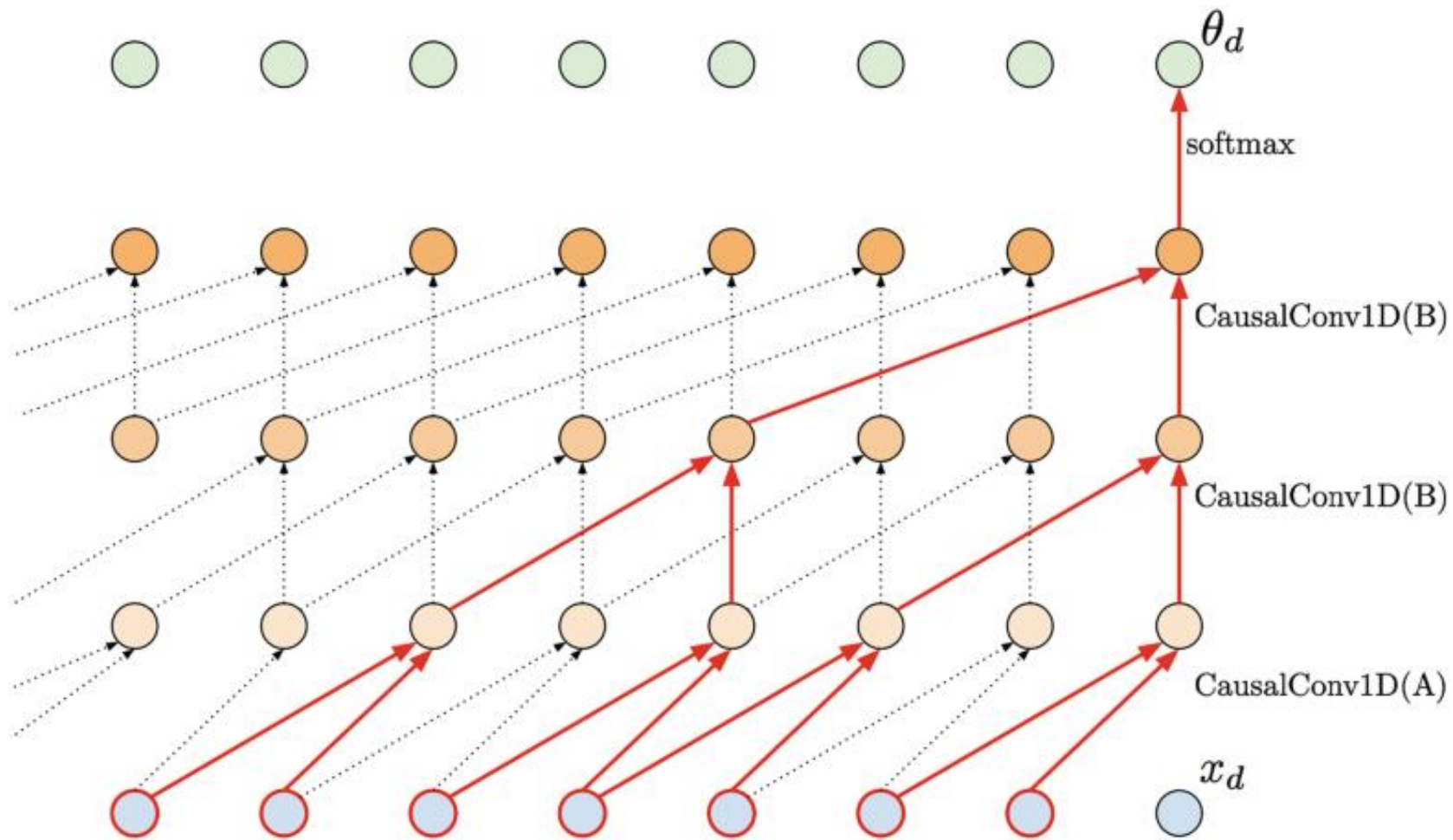
What are the fundamental mathematical limits of GAN fingerprinting?

What is an appropriate way to assess the performance of a generative model in the domain of industrial design, and can we design AI models that optimize for such an assessment metric?

What is an appropriate way to assess the performance of a generative model in the domain of medical imaging dataset creation, and can we design AI models that optimize for such an assessment metric?

Is there a way to prompt/decode large-scale language models so that they perform well on tasks of moral reasoning in response to moral vignettes?

How can we make normalizing flows human-interpretable / human-explainable?



An example of applying causal convolutions. The kernel size is 2, but by applying dilation in higher layers, a much larger input could be processed (red edges), thus, a larger memory is utilized. Notice that the first layers must be option A to ensure proper processing