OVERVIEW

- What is Stable Diffusion?
- Business Opportunity
- Research
- Coding Demonstration
- Ethical Concerns
- What's Next?

STABLE DIFFUSION 2.1

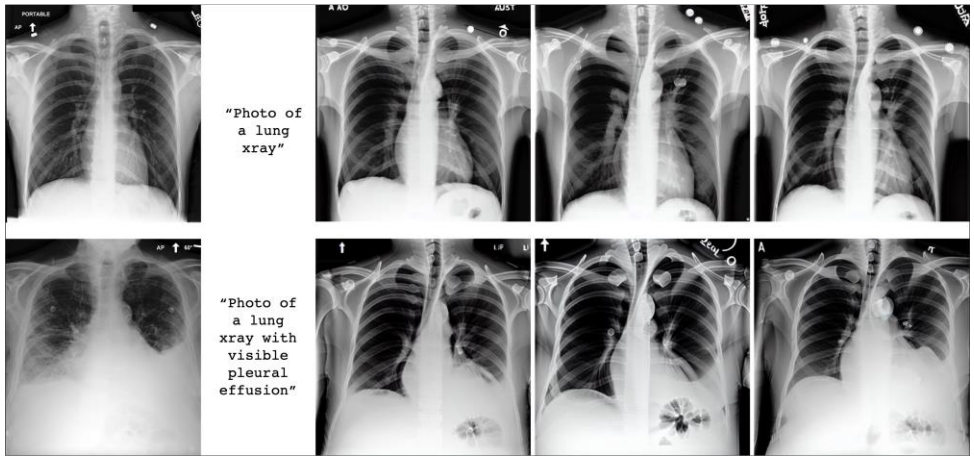
- Patrick Esser & Robin Rombach
- Released December 27, 2022
- Python
- General Disclaimer

WHAT IS STABLE DIFFUSION

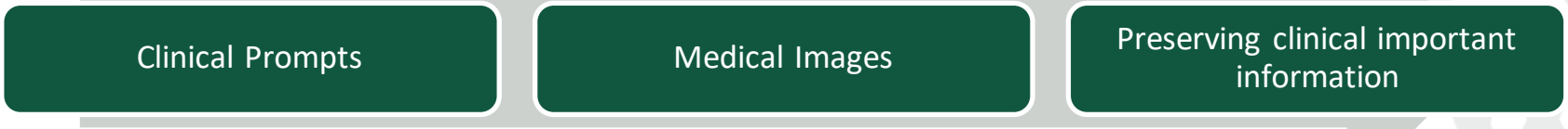
- High-resolution image synthesis
- Text to image
- Text to video
- Image to image
- Image to video

PROBLEM STATEMENT

- If Stable Diffusion models can accurately produce medically realistic images of observable abnormalities, rare diseases and clinically relevant features.



- First study to look at latent diffusion modeling for generating medical images.
- Chest X-Ray's (CXR's) most common imaging modality



- Researchers found the U-Net tuning to be the most effective.
- Overall, they found that medical diagnostic features were well preserved when generating realistic medical images.

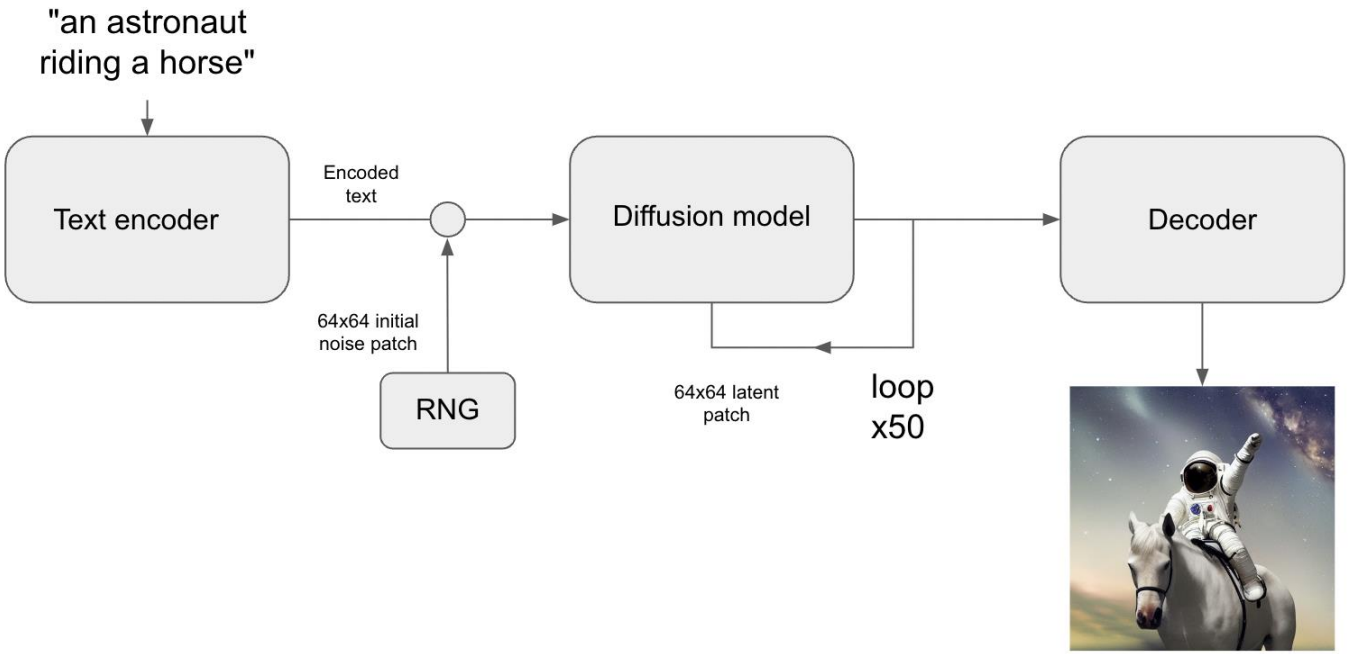
LIMITATIONS

- Questionable accuracy measures to assess clinical correctness
- Low diversity in images generated
- Text prompts do not fully correspond with words used in the clinical setting.

FUTURE DIRECTIONS

- Image generation can extend to a wide range of abnormalities.
- The ability to combine abnormalities (comorbidity).
- Models will be able to generate images for other body parts.

PROCESS


"an astronaut riding a horse"
Text encoder
Encoded text
Diffusion model
Decoder
64x64 initial noise patch
RNG
64x64 latent patch
loop x50

TECHNICAL DEMO

ETHICAL CONCERNS

Copyright / Ownership

Human job loss

Malicious use

WHAT'S NEXT?

Stated Goals

- Improved performance/quality
- Optimize for chipsets other than NVIDIA
- Reduce adverse outcomes

Current Limitations

- Perfect photorealism
- Legible text
- Compositionality
- People/Faces
- Trained in English

QUESTIONS?

VIDEO DEMONSTRATION

- https://twitter.com/i/status/1557517982095626241

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