



MACQUARIE UNIVERSITY

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ROLLING INITIATIVE FOR DECONVOLUTION WITH MACHINE LEARNING



Letter

Letter

Letter



Injection

Injection

Injection



DORITO

DORITO

DORITO



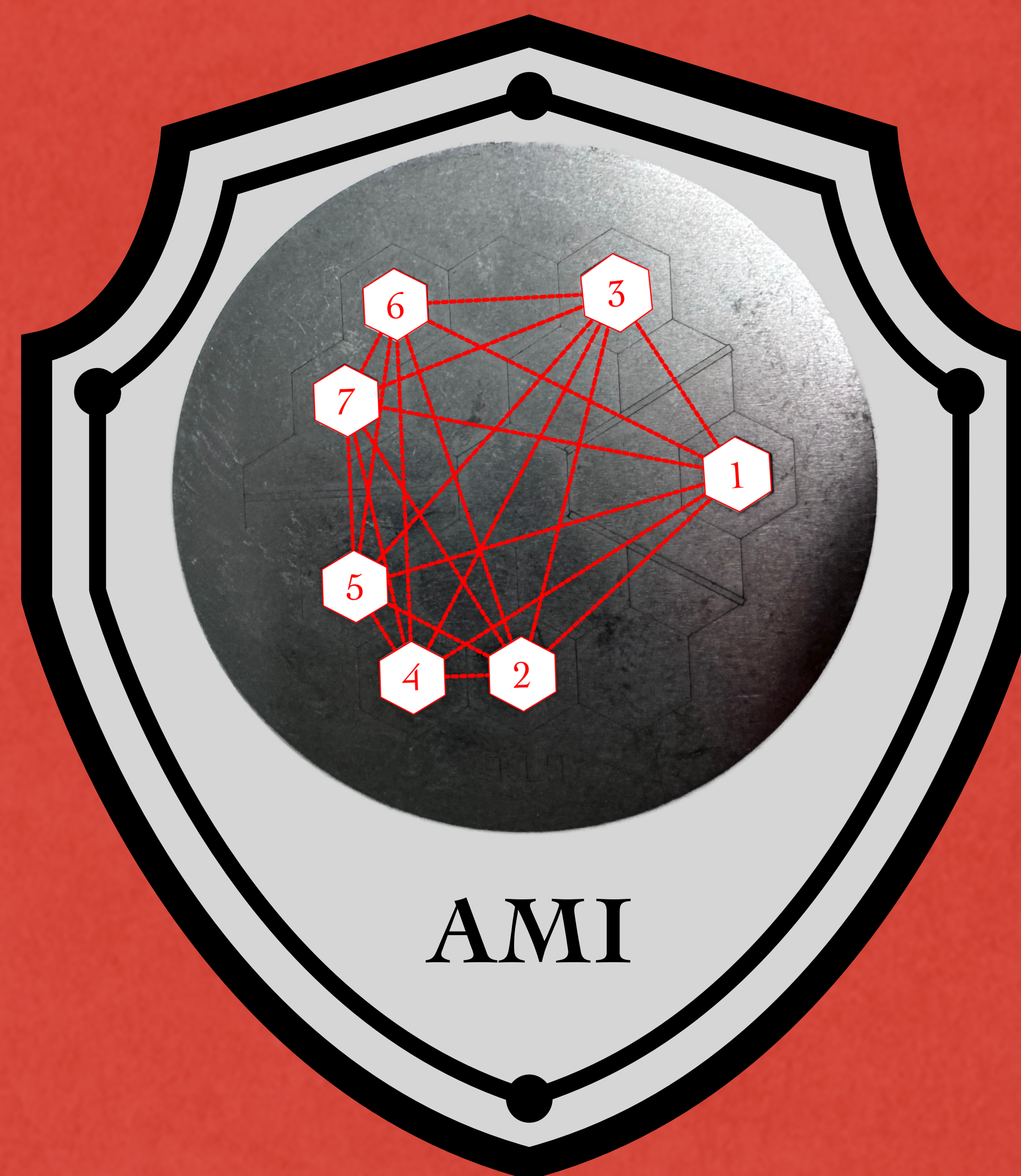
FRITO

FRITO

FRITO

DECONVOLUTION

When an image is blurred by an instrument's diffraction pattern and noise, deconvolution is the inverse problem of reconstructing the image. In this project, the images are deconvolved in a representation of the pixel space. This is all done to achieve high angular resolution images despite the diffraction pattern.



AMI

Onboard JWST is the Aperture Masking Interferometer (AMI). Using a non-redundant mask, AMI creates an interference pattern that enables the precise calibration of the Point Spread Function (PSF), which in deconvolution to recover structure at smaller angular scales.

NEXT STEPS

Switch to simulated protoplanetary disks and apply this to JWST observations of HD 135344 B and HD 100546



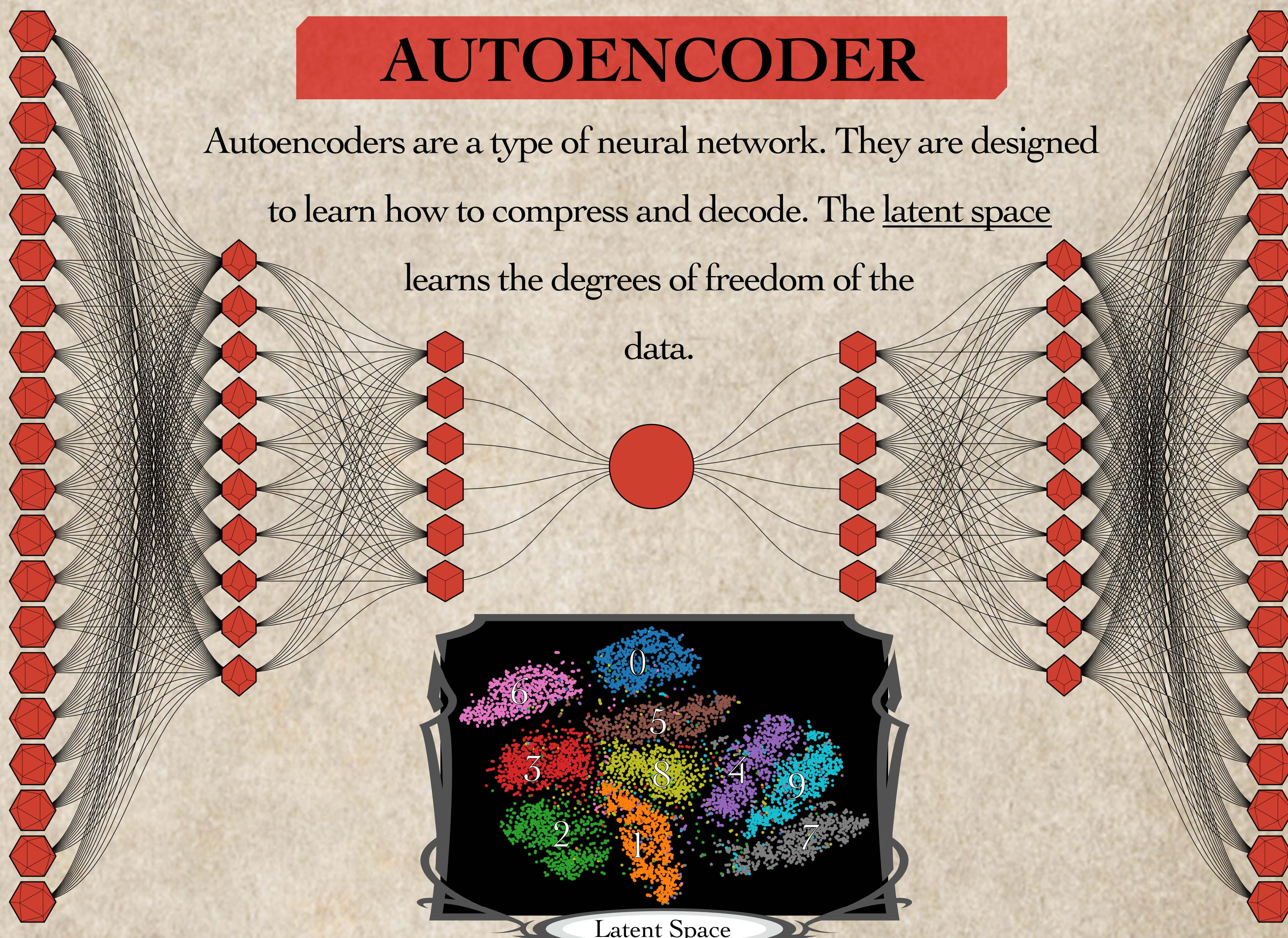
Disk

FUTURE

Explore score-based diffusion as learned priors for deconvolution

AUTOENCODER

Autoencoders are a type of neural network. They are designed to learn how to compress and decode. The latent space learns the degrees of freedom of the data.



Latent Space