

Latent Traversal

Latent Traversal is the traversal around a latent space to observe the differences in the models output based off of the models hidden representation space. This will allow us to see patterns with the data in 3D space which we might have noted before

Latent Traversal is used in VAE's Autoencoders and Diffusion Models

Data is transformed into latent vectors

Technical Justifications

These are preliminary choices therefore we may not end up using these but from the current ideas that we have about this project we believe these suit our context the best

GMM

For our unsupervised learning algorithm we have chosen to use Gaussian Mixture Models. Seen in the points below GMM's allow for precise control over data which allows us to change data points and see differences with the outputs.

Latent Traversal - The soft assignments mean as you move through latent space, you get smooth blends of cluster memberships which allows for smooth visual transitions

Generative Capability - You can sample new points from learned Gaussians to create "synthetic but plausible" data for visualisation

Rich Visual Mapping - You can map the probability of clusters to opacities helping to create overlays of data

Autonomous K with BIC - Bayesian Information Criterion gives principled way to choose number of components

Variational Auto Encoders

If we are using GMM's the best neural network to use is a VAE this is because it creates a smooth latent space which makes it easy to visualise data. They work in tandem to create clear clusters of data which are simple to understand.