

# Why is this Process Necessary?

Part 2/7: Forward Process



## Understanding the Fundamental Motivation



### Tractable Posterior

Known distribution  $q(x_{t-1}|x_t, x_0)$  enables efficient training



### Curriculum Learning

Start easy (small noise), gradually increase difficulty



### Stable Gradients

Small steps ensure smooth gradient flow during training



### Mode Coverage

Noise prevents collapse to single mode



### Theoretical Foundation

Enables variational bound derivation for optimization



### Flexible Design

Can adjust  $\beta_t$  schedule for different data types



### Reversibility

Ensures reverse generative process is well-defined



The forward process creates a tractable learning framework that makes the reverse process trainable