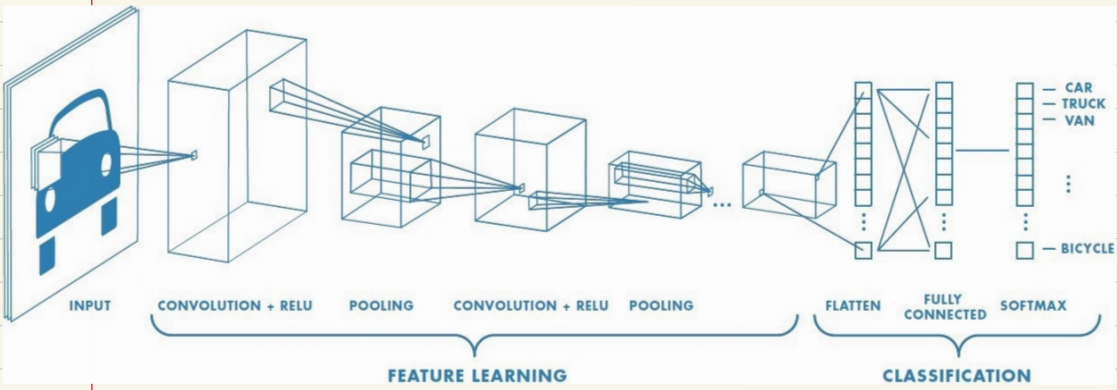
Lecture 22

- Photo-z With Neural Networks
  - ↳ learn galaxy redshifts from their colors.
    - * FULLY CONNECTED NETWORK i.e all neurons connected between layers.
    - * 4 HIDDEN LAYER → RELU activation
    - * STOCHASTIC GRADIENT DESCENT
    - * PASS DATA IN BATCHES

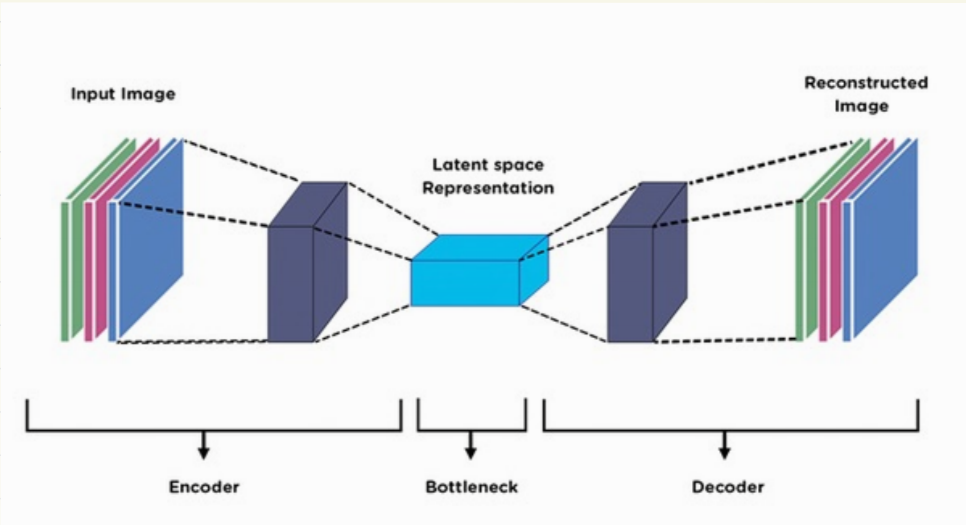
- Convolutional Neural Networks (CNNs)
  - ↳ used for image classification

⇛ Your eye does not look at everything at once... only things within FOV.



Autoencoders

↳ data compression and dimensionality reduction



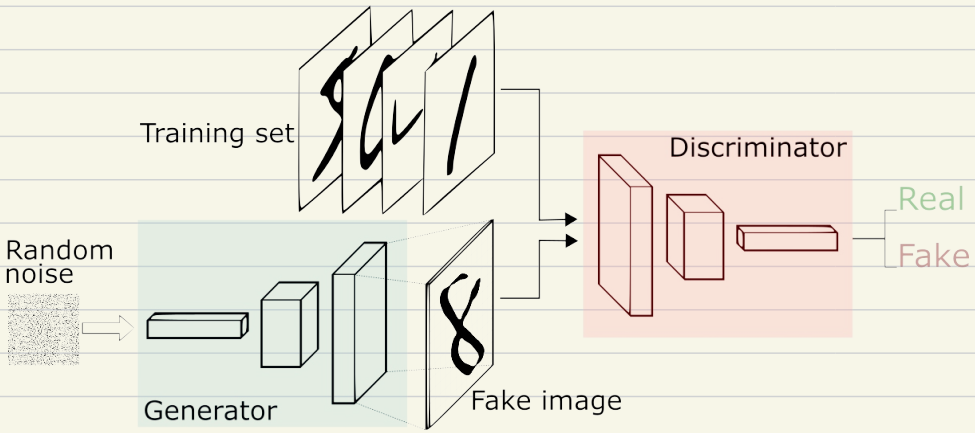
compression | coded (compressed) data | decompressing

* Sort of like PCA with a NN.
* Can filter out noise and interference.

⇒ Variational Autoencoders allow for a degree of randomness and probability in the coded representation.

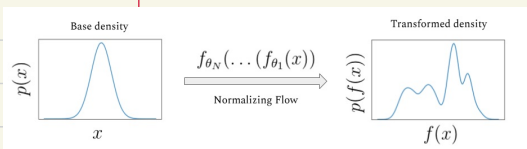
↳ helps if we have only limited training data.

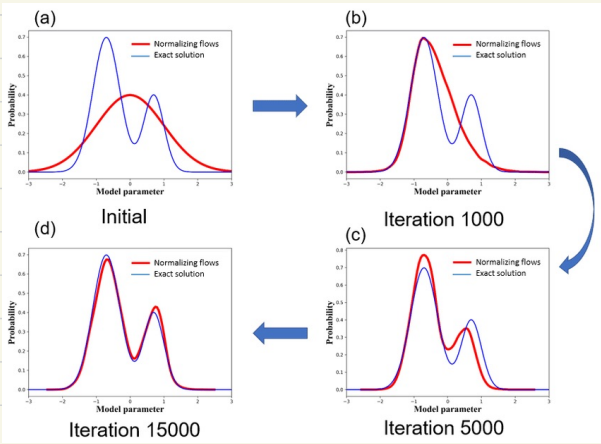
- **Generative Adversarial Networks (GANs)**
  - ↳ make NNs compete against each other to fake new data samples.



  - * "This X Does Not Exist"

- **Normalizing Flows (NFs)**
  - ↳ learn a mapping between a simple distribution and a complicated one through a chain of invertible transformations.





Use in forward or backward directions i.e. score or sample.