Machine Learning Motivation

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Machine Learning

- Feature Engineering
- Problem: huge datasets

ANNs

- Feed forward neural networks
- Auto-feature engineering
- Activation functions, Bias, weight

CNNs

- Convolutional concept

RNNs

- Sequence modelling

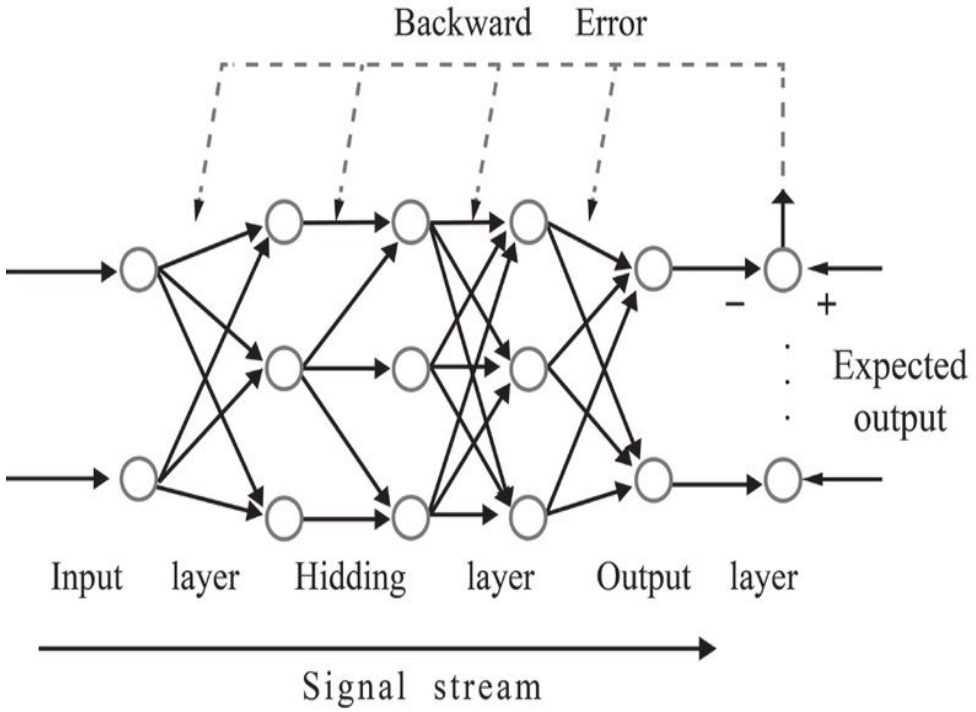
LSTM

ANNs

- **What are ANNs?**
  A collection of connected units or nodes called artificial neurons.

- **Why?**
  Modelling non-linear problems and to predict the output values for given input parameters from their training values.

- **Problem?**
  - Image and speech recognition
  - Huge computational cost

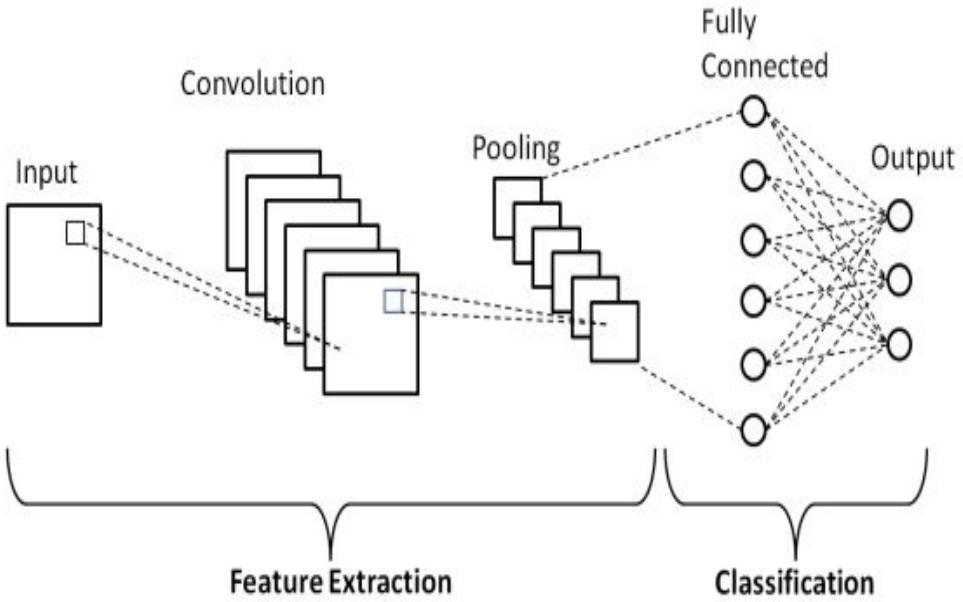


CNNs

- **What is CNN?**
  Type of ANN used in image recognition and processing.

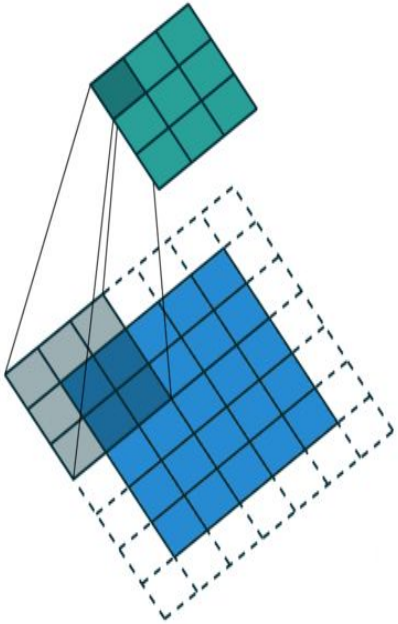
- **Why?**
  Work with visual imagery, process pixel data.

- **Problem?**
  No connection between previous input and output to the current input and output.

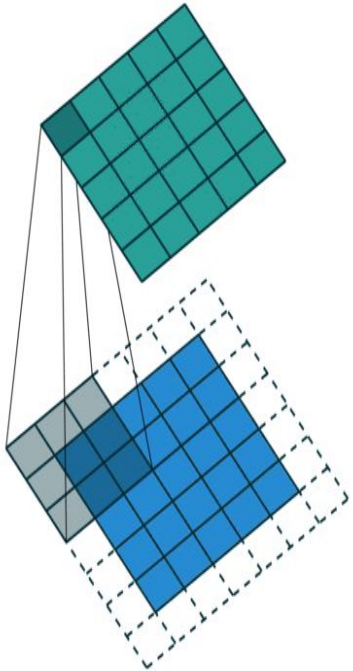


CNNs Layers

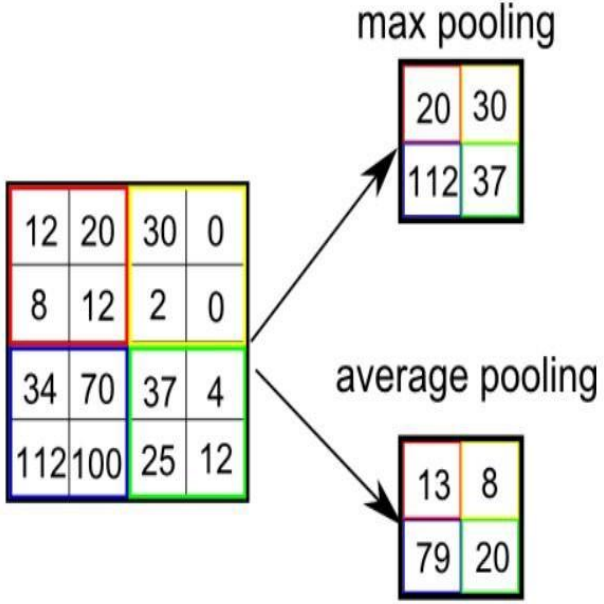
Convolution



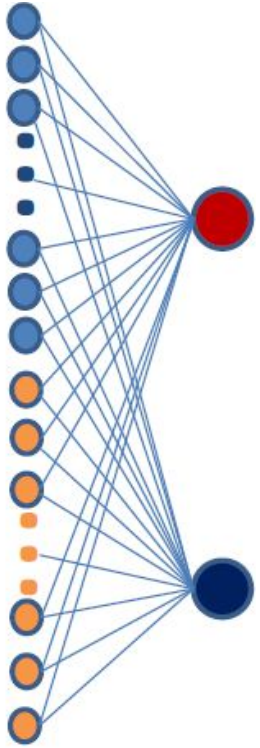
Padding



Pooling



Fully connected



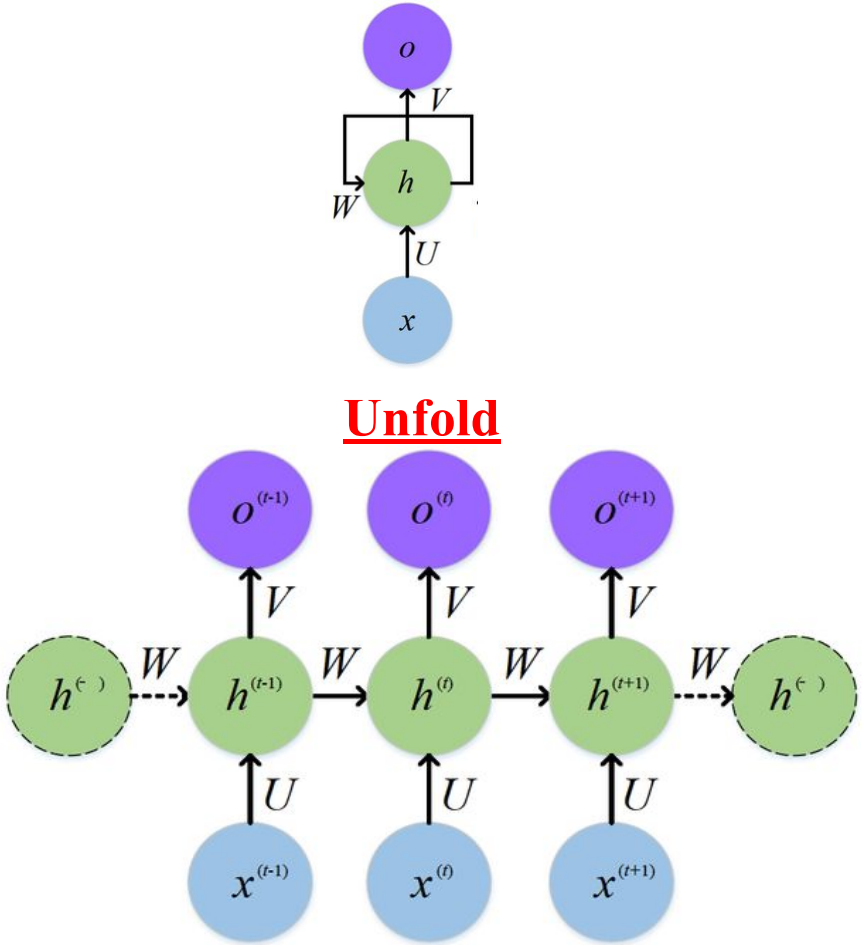
Why can’t use regular ANNs?

- Size of input is different every time (**sentences**).
- Competition is huge (**one hot encoding**)
- Output is different (**parameters are not shared, translation length is different**).

RNNs

- **What is RNN?**
  Type of ANN where where connections between nodes form a directed graph along a temporal sequence.

- **Why?**
  Sequence modelling.
- **Problem?**



Sequence Modelling

- Auto completion (Gmail)
  I hope this email >>> finds you well

- Translation (Google translate)
  Good morning >>> صباح الخير

- Named Entity Recognition (NER)

- Sentiment Analysis