CNN, RNN, LSTM & GRU

* **CNN vs. RNN**

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| CNN | RNN |
| It is suitable for spatial data such as images. | RNN is suitable for temporal data, also called sequential data. |
| CNN is considered to be more powerful than RNN. | RNN includes less feature compatibility when compared to CNN. |
| This network takes fixed size inputs and generates fixed size outputs. | RNN can handle arbitrary input/output lengths. |
| CNN is a type of feed-forward artificial neural network with variations of multilayer perceptron designed to use minimal amounts of pre-processing. | RNN unlike feed forward neural networks - can use their internal memory to process arbitrary sequences of inputs. |
| CNNs use connectivity pattern between the neurons. This is inspired by the organization of the animal visual cortex, whose individual neurons are arranged in such a way that they respond to overlapping regions tiling the visual field. | Recurrent neural networks use time-series information - what a user spoke last will impact what he/she will speak next. |
| CNNs are ideal for images and video processing. | RNNs are ideal for text and speech analysis. |

* **Data normalization methods**

MaxAbsScaler

MinMaxScaler

RobustScaler

Classification performance scores - precision, accuracy, recall etc.

Python library - sklearn.preprocessing.StandardScaler, normalize( ) from sklearn

* **References**

**#** Webpages

<https://www.geeksforgeeks.org/introduction-to-recurrent-neural-network/?ref=lbp>

# YouTube

What is RNN? - <https://www.youtube.com/watch?v=Y2wfIKQyd1I>

Simple explanation of LSTM - <https://www.youtube.com/watch?v=LfnrRPFhkuY>

Simple explanation of GRU - <https://www.youtube.com/watch?v=tOuXgORsXJ4>

Illustrated guide of LSTM & GRU - <https://www.youtube.com/watch?v=8HyCNIVRbSU>

ANN vs. CNN vs. RNN - <https://www.youtube.com/watch?v=u7obuspdQu4>

Simple explanation of CNN - <https://www.youtube.com/watch?v=zfiSAzpy9NM>