NATURAL LANGUAGE PROCESSING

LECTURE 4 : RNN tasks

goorm

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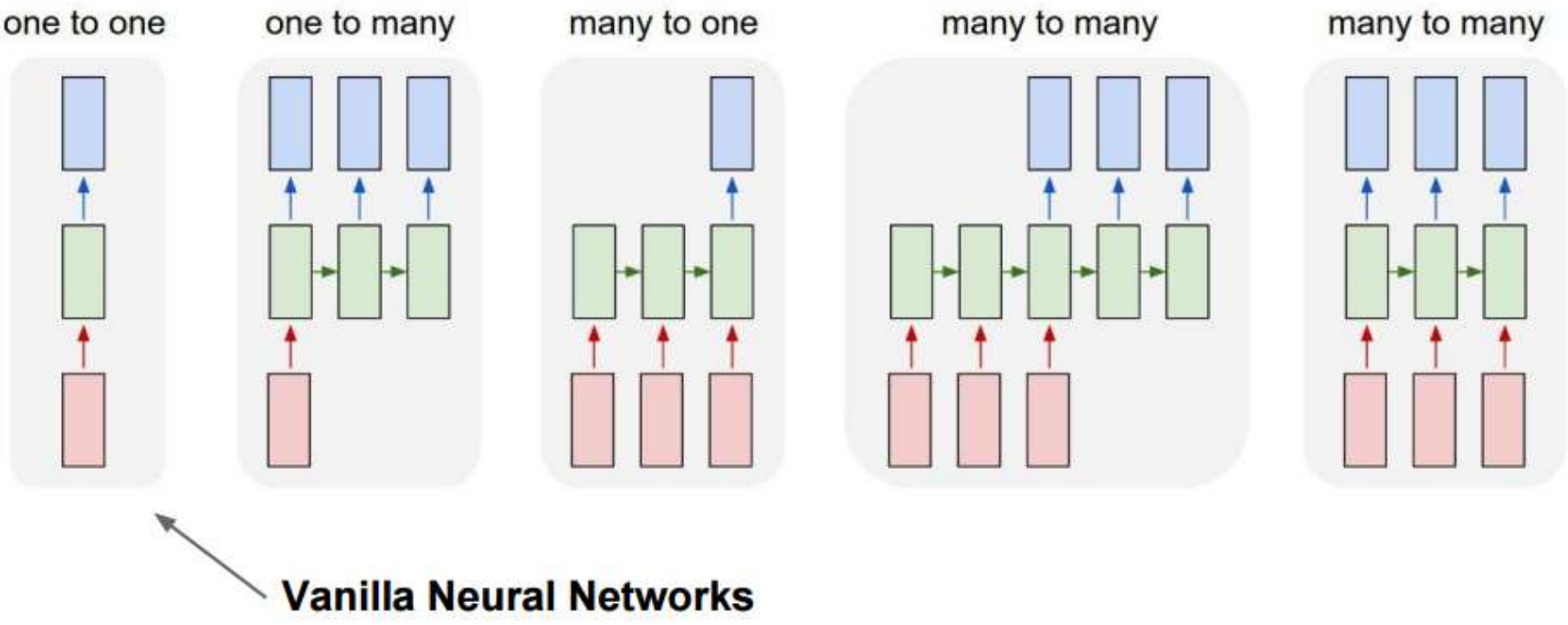
RNN의 여러가지 형태

기본 neural networks 구조



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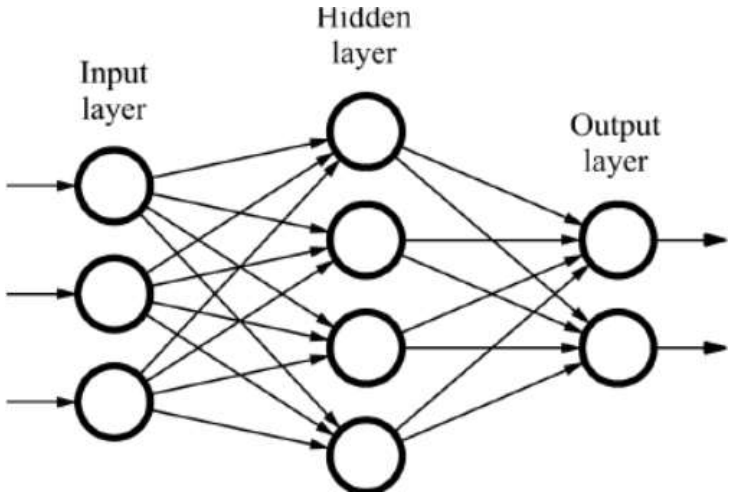
- Tasks according to types of RNN

1) One-to-one $T_x = T_y = 1$
2) One-to-many $T_x = 1, T_y > 1$
3) Many-to-one $T_x > 1, T_y = 1$
4) Many-to-many $T_x = T_y$
5) Many-to-many $T_x \neq T_y$

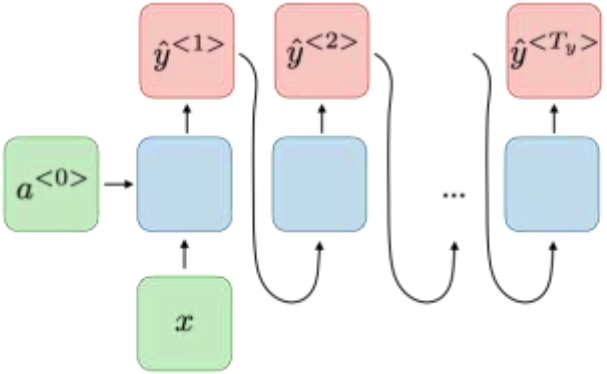
One-to-one $T_x = T_y = 1$

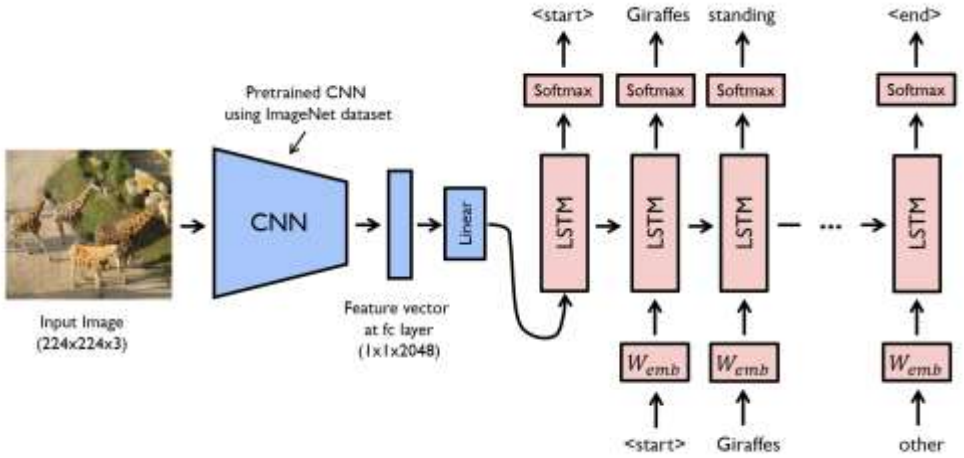
- Traditional neural network



One-to-many $T_x = 1, T_y > 1$

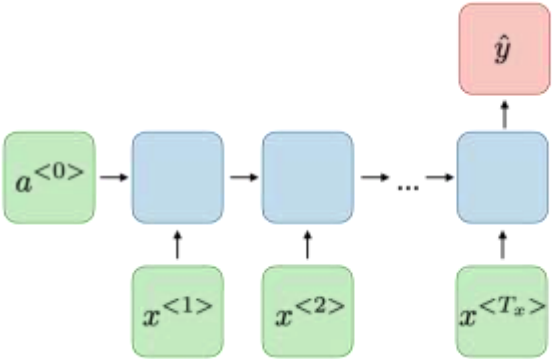
- Image captioning
  - Input: Image
  - Output: sentence that explains the input image
  - (1) Encode the information of the input image
  - (2) Decode the context via sequence of words

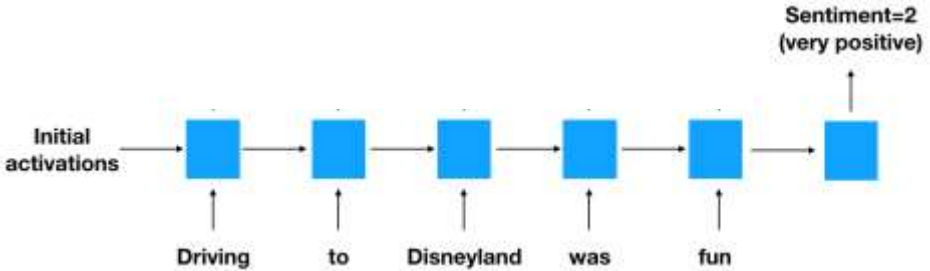




Many-to-one $T_x > 1, T_y = 1$

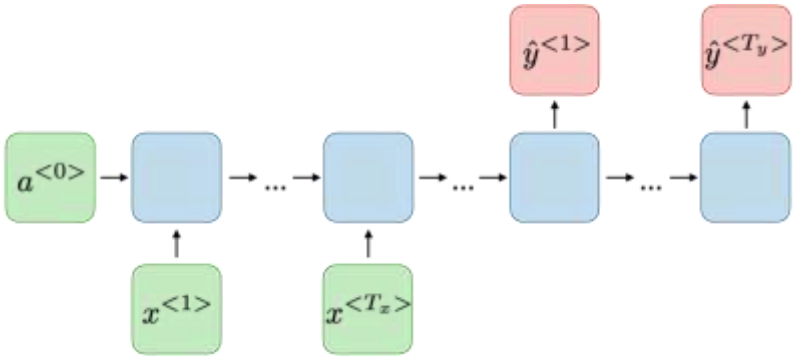
- Sentiment classification
  - Consider x_t , h_{t-1} at each time
  - Predict a sentiment class after processing the overall input sequence

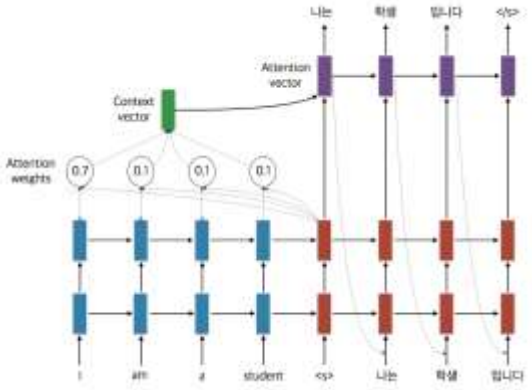




Many-to-many $T_x \neq T_y$

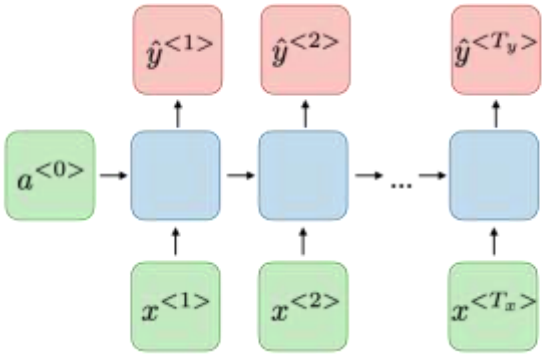
- Machine translation
  - Translate input sentence from source language to target language
  - NMT = Encoder + Decoder
    - Encoder: encodes the contextual information of input sentence, which is written in source language
    - Decoder: based on the context of input, generate a new sentence of target language

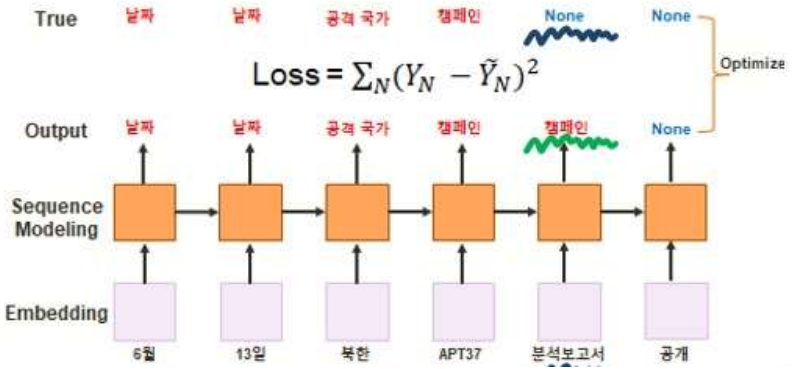




Many-to-many $T_x = T_y$

- Named entity recognition
  - Named-entity recognition (NER) *(also known as (named) entity identification, entity chunking, and entity extraction)* is a subtask of information extraction that seeks to **locate and classify named entities mentioned in unstructured text into pre-defined categories** such as person names, organizations, locations, medical codes, time expressions, quantities, monetary values, percentages, etc.





Reference

- https://stanford.edu/~shervine/teaching/cs-230/cheatsheet-recurrent-neural-networks#architecture