튜토리얼 - Sequence Tagging

Named Entity Recognition

KOREA UNIVERSITY

Natural Language Processing & Artificial Intelligence

Background

Brief Introduction to
Named Entity Recognition and
Neural Networks

Named Entity Recognition

- NER Goal
  - It is to identify all Named Entities (NEs)

1. Finding NEs
2. Identify the type of NE found

- When performing text mining in a specific field, it is better to learn Tagger and Recognizer by using a corpus suitable for it

Jim bought 300 shares of Acme Corp. in 2006.

-> Jim bought 300 shares of Acme Corp. in 2006.

Person Organization Time

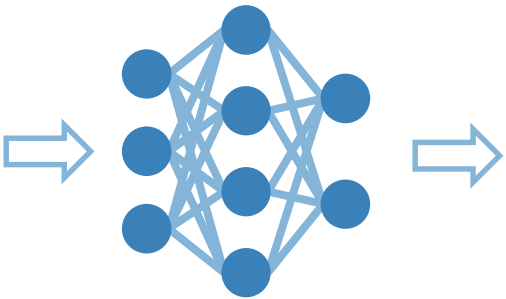
BIO Tagging Scheme

- Beginning-Inside-Outside (BIO)
- Used for correctly tag multi-word entities

…	Minister	Loyola	de	Palacio	had	earlier	…
…	O	B-PER	I-PER	I-PER	O	O	…

Neural Networks

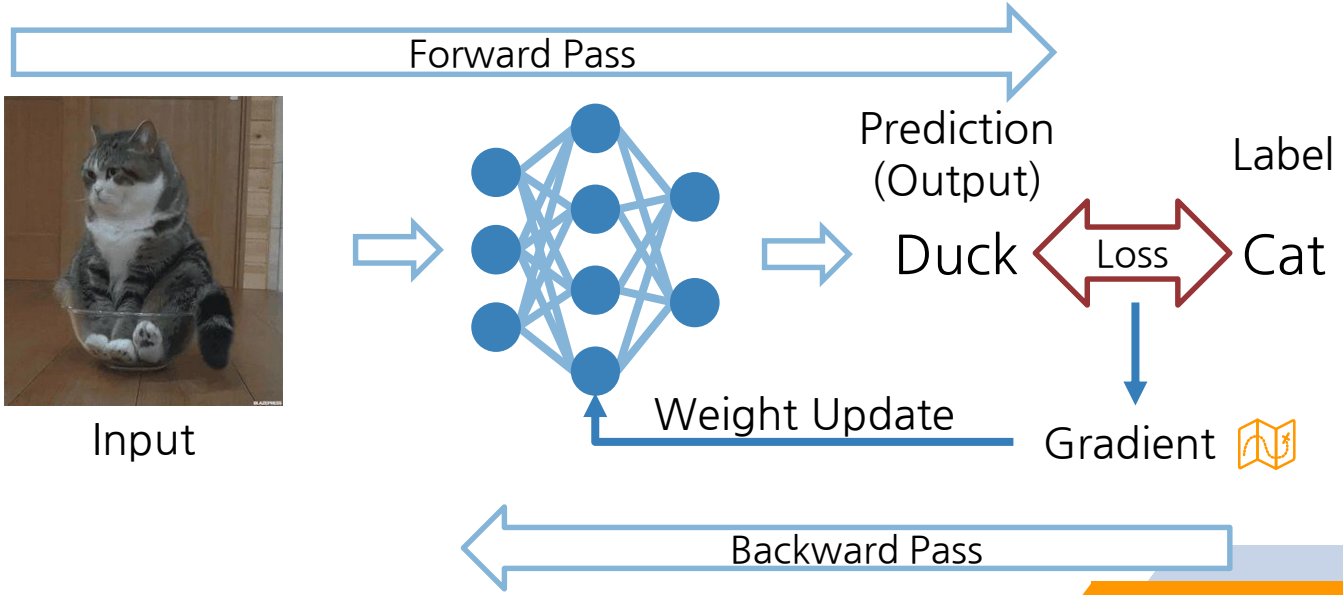
- Transforms input to output
- NN is a “set of weights(parameters)”
- Need to change the weights(train) to make it do what we want



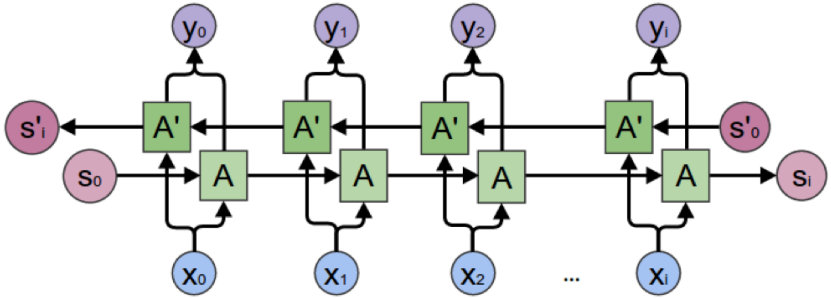
Cat

How to Train a NN

- With loss and gradient

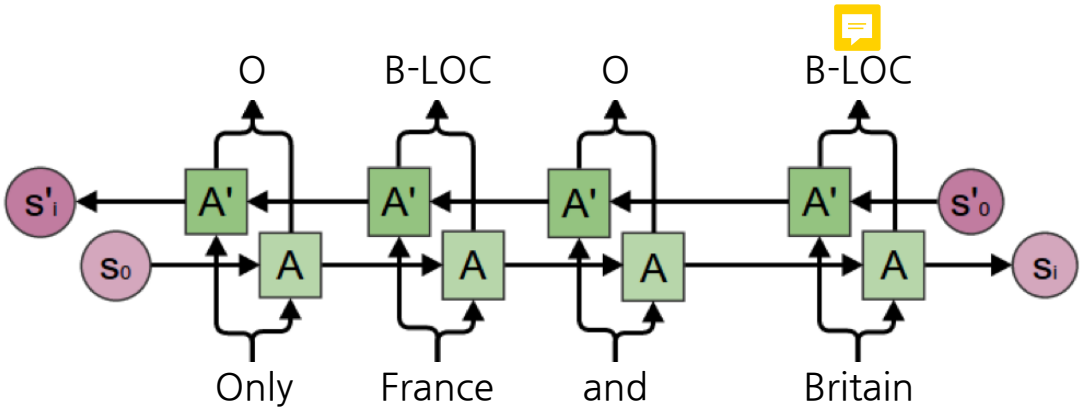


Model - Bidirectional RNN

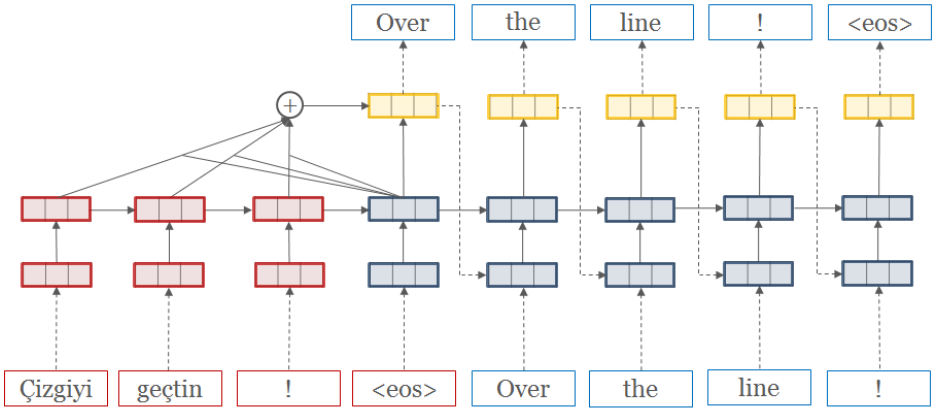


- RNNs that combine two RNNs in different directions to enable bidirectional dependence
- Output y_t has input $[x_0, x_1, \ldots, x_{t-1}]$ and $[x_{t+1}, x_{t+2}, \ldots, x_N]$ is reflected

Model - Bidirectional RNN



Neural Network and Language



Human
-> Characters

Neural Network
-> Numbers

One-hot Encoding

V = {cat, fat, mat, sat, the, on}

cat = [1, 0, 0, 0, 0, 0]

fat = [0, 1, 0, 0, 0, 0]

mat = [0, 0, 1, 0, 0, 0]

sat = [0, 0, 0, 1, 0, 0]

the = [0, 0, 0, 0, 1, 0]

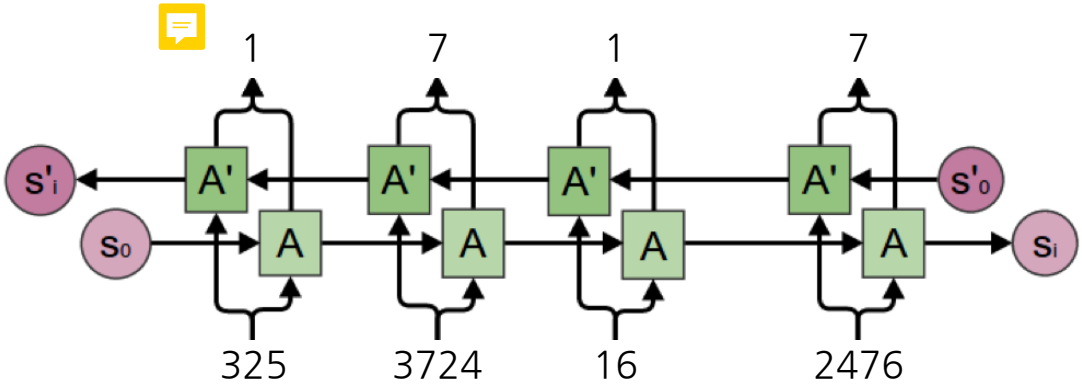
on = [0, 0, 0, 0, 0, 1]

Converting Characters to Numbers

“… … … … …. The fat cat sat on the mat. … … … … …“

“… … … … …. 32 832 561 …34 6132 32 565 … … … … …”

Model - Final



실습 - Sequence Tagger

Named Entity Recognition

Dataset - CoNLL-2003

- The SIGNLL Conference on Computational Natural Language Learning (CoNLL)
- Most frequently used open dataset for NER
- Four kind of entities - LOC(location), ORG(organization), PER(person), MISC(miscellaneous)
- With BIO scheme, nine possible tags - B-LOC, B-MISC, B-ORG, B-PER, I-LOC, I-MISC, I-ORG, I-PER, O

Files

- “CoNLL-2003” - Dataset
- “outdir” - Logger (debug, info)
- “saves” - Trained model
- “sequence_tagger_blank.ipynb” - 뼈대 코드
- “pieces.ipynb” - 코드 조각들

Links

- “sequence_tagger_blank.ipynb”
  https://bit.ly/ku_sequence_tagger_blank

- “pieces.ipynb”
  https://bit.ly/ku_sequence_tagger_pieces