캡스톤설계프로젝트

Kingo Manager

Team AIU

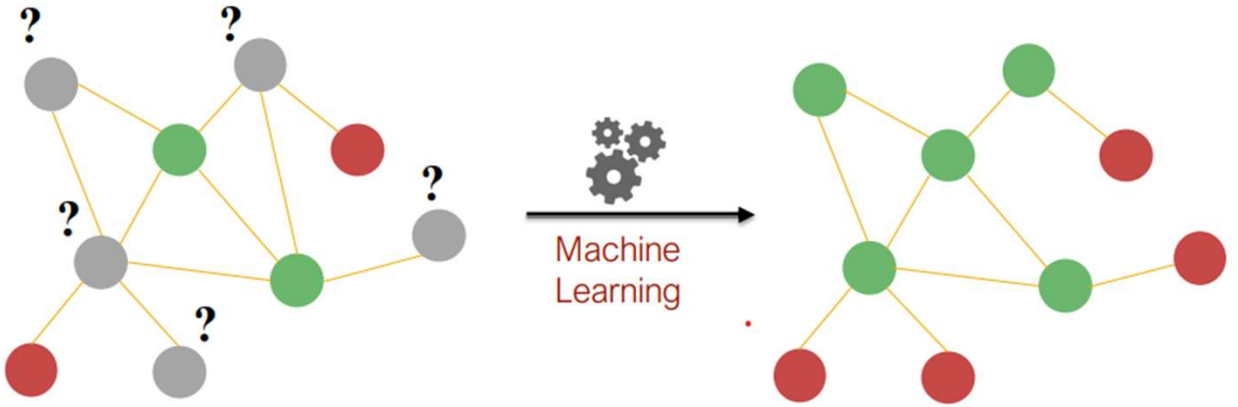
All images are from Stanford CS224W

Content

Graph
GNN
Plan

What is graph?

$$G = (V, E)$$

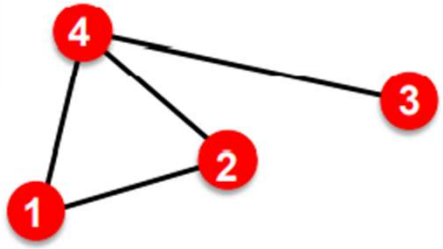


Node classification

ML needs features.

Task using GNN

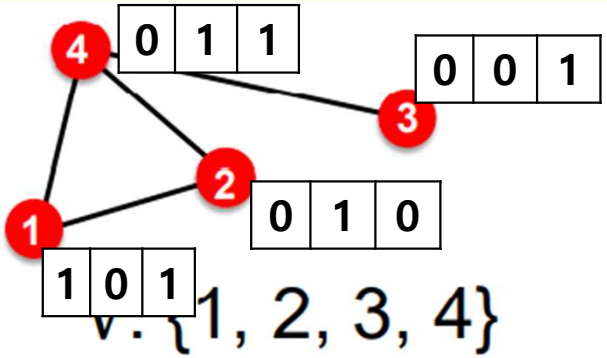
Node classification
Link prediction
Feature prediction



V: {1, 2, 3, 4}

$$A = \begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{pmatrix}$$

Process



$$A = \begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{pmatrix}$$

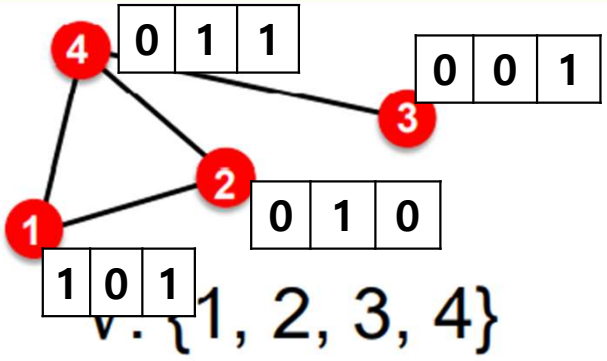
0	**1**	**0**	**1**
1	0	0	1
0	0	0	1
1	1	1	0

Adjacency Matrix (A)

1	**0**	**1**
0	1	0
0	0	1
0	1	1

Feature matrix (X)

Process



$$A = \begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{pmatrix}$$

0	1	0	1
1	0	0	1
0	0	0	1
1	1	1	0

Adjacency Matrix (A)

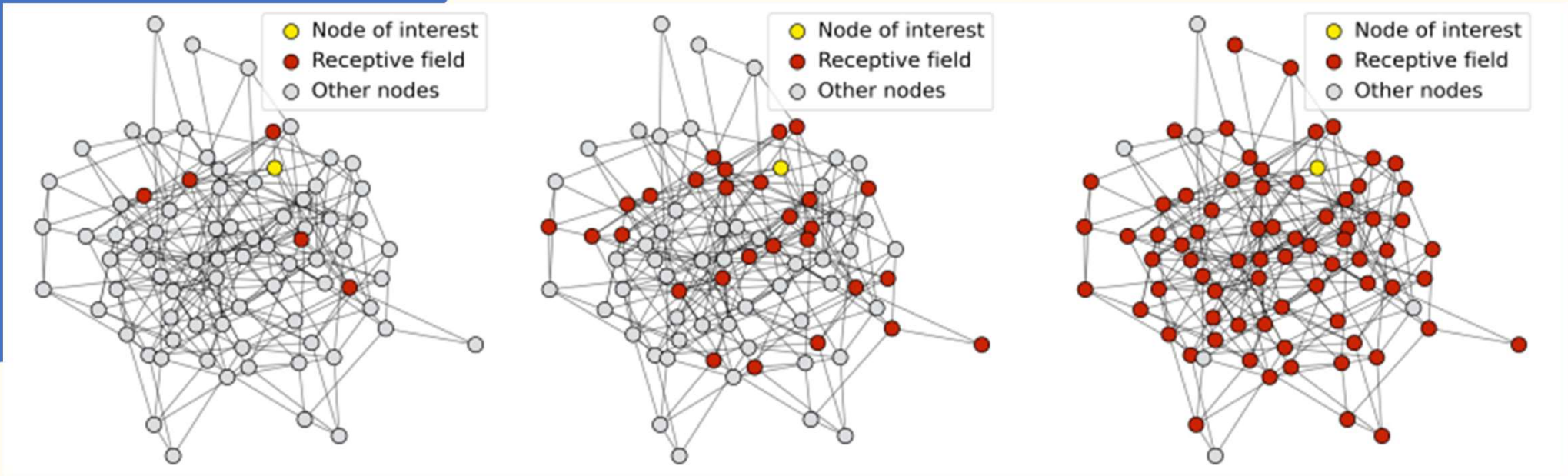
1	0	1
0	1	0
0	0	1
0	1	1

Feature matrix (X)

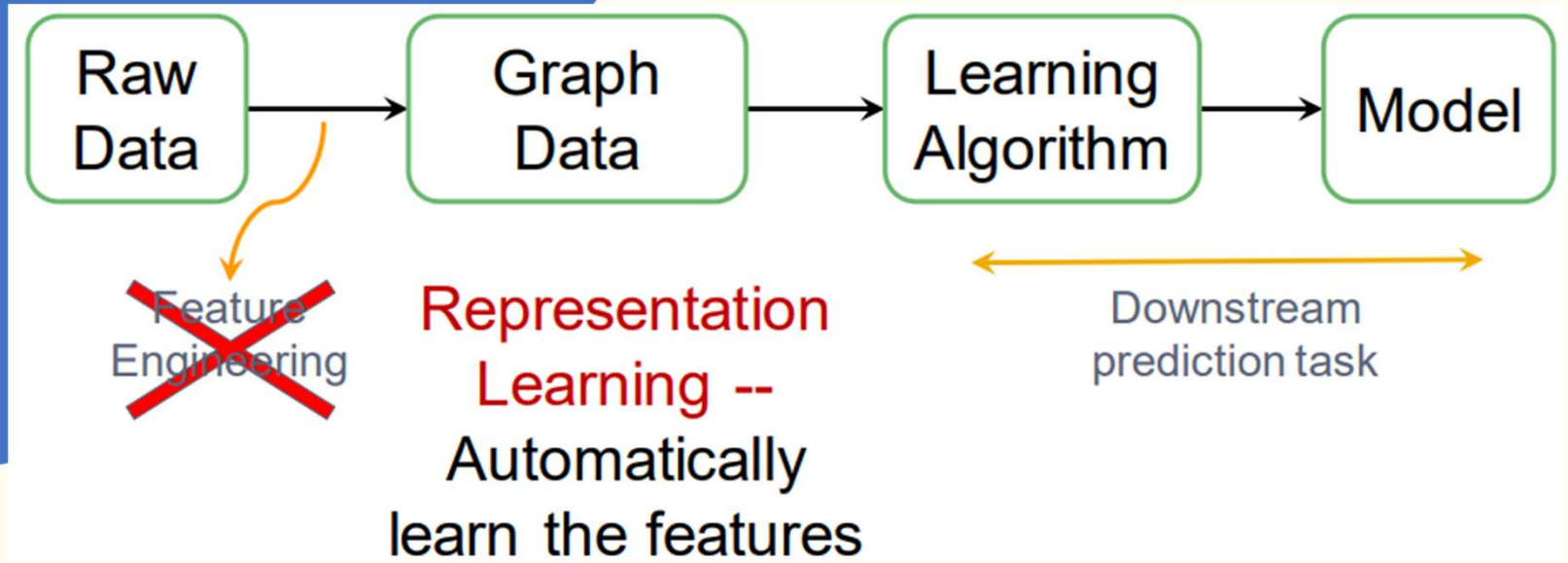
Ex.) $H^{(l+1)} = \sigma\left(AH^{(l)}W^{(l)} + b^{(l)}\right)$

$$H = A * X$$

Example image



Form of data


Raw Data
Graph Data
Learning Algorithm
Model
Feature Engineering
Representation Learning -- Automatically learn the features
Downstream prediction task

GNN vs. Transformer & CNN

CNN and Transformer can be seen as special GNN:

- CNN can be seen as GNN with fixed neighbor size and ordering
- Transformer can be seen as GNN with fully-connected graph.

Example of GNN

There are many examples of GNN:
* GCN(PinSAGE), GraphSAGE, GAT, ...

Plan

- 데이터는 1차적으로 교내 정보로 제한해서 정보를 가져올 예정
- GNN 알고리즘을 통해 각 학생들의 정보에 따라 필요 정보에 가중치를 주는 방식으로 가중치가 가장 높은 정보를 1순위로 추천을 해줘서 알림을 주는 방식을 생각하고 있음

Thank you!