COLLABORATIVE ML AEC LEARNING : GRAPH NEURAL NETWORK

Agenda

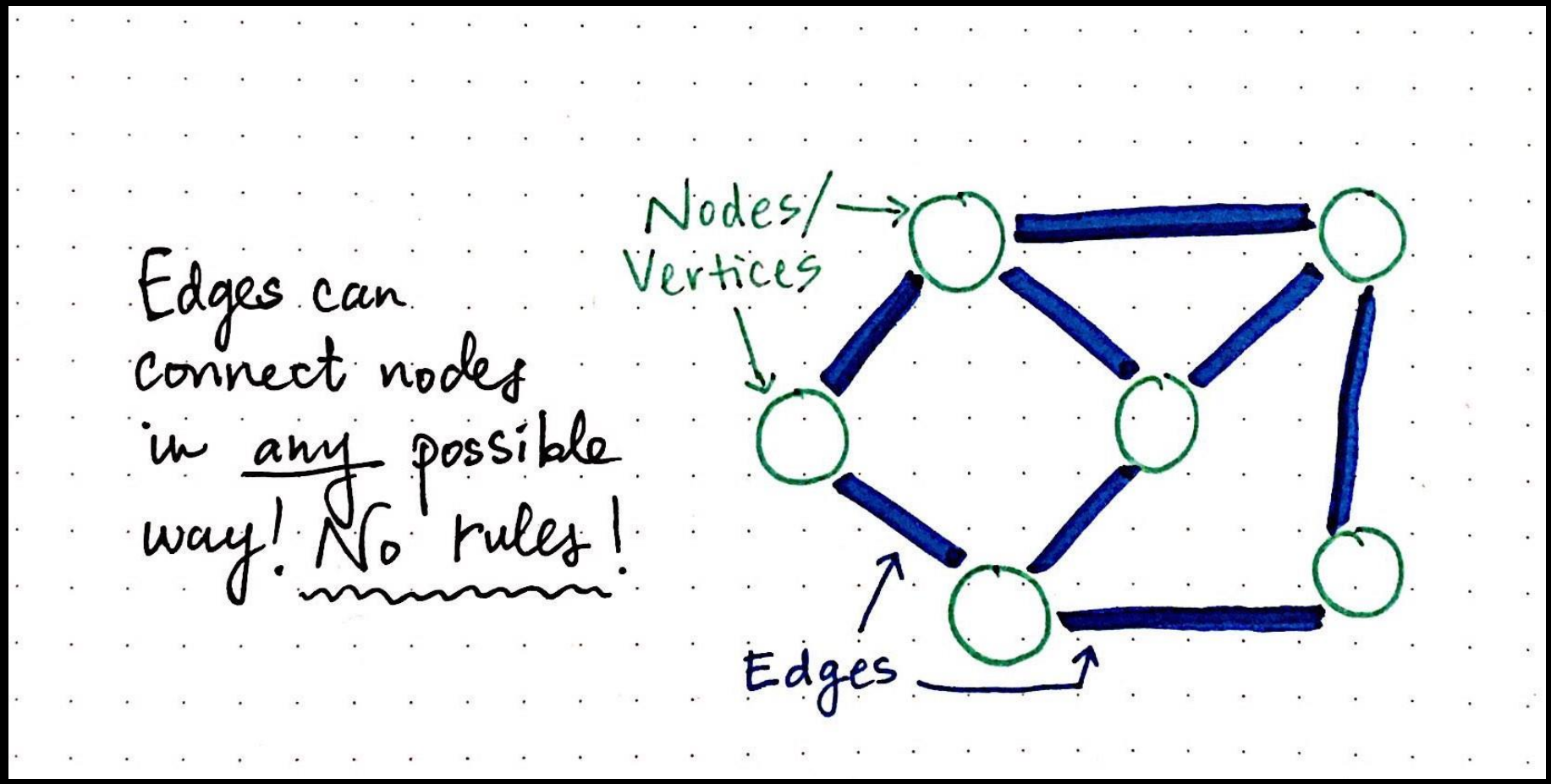
- Recap
- Graph Neural Network Theory
- Colab Implementation
- Paper
- Discussion

Recap

- Neural Network
- CNN
- RNN
- VAE
- GAN

- https://www.simplilearn.com/tutorials/deep-learning-tutorial/deep-learning-algorithm

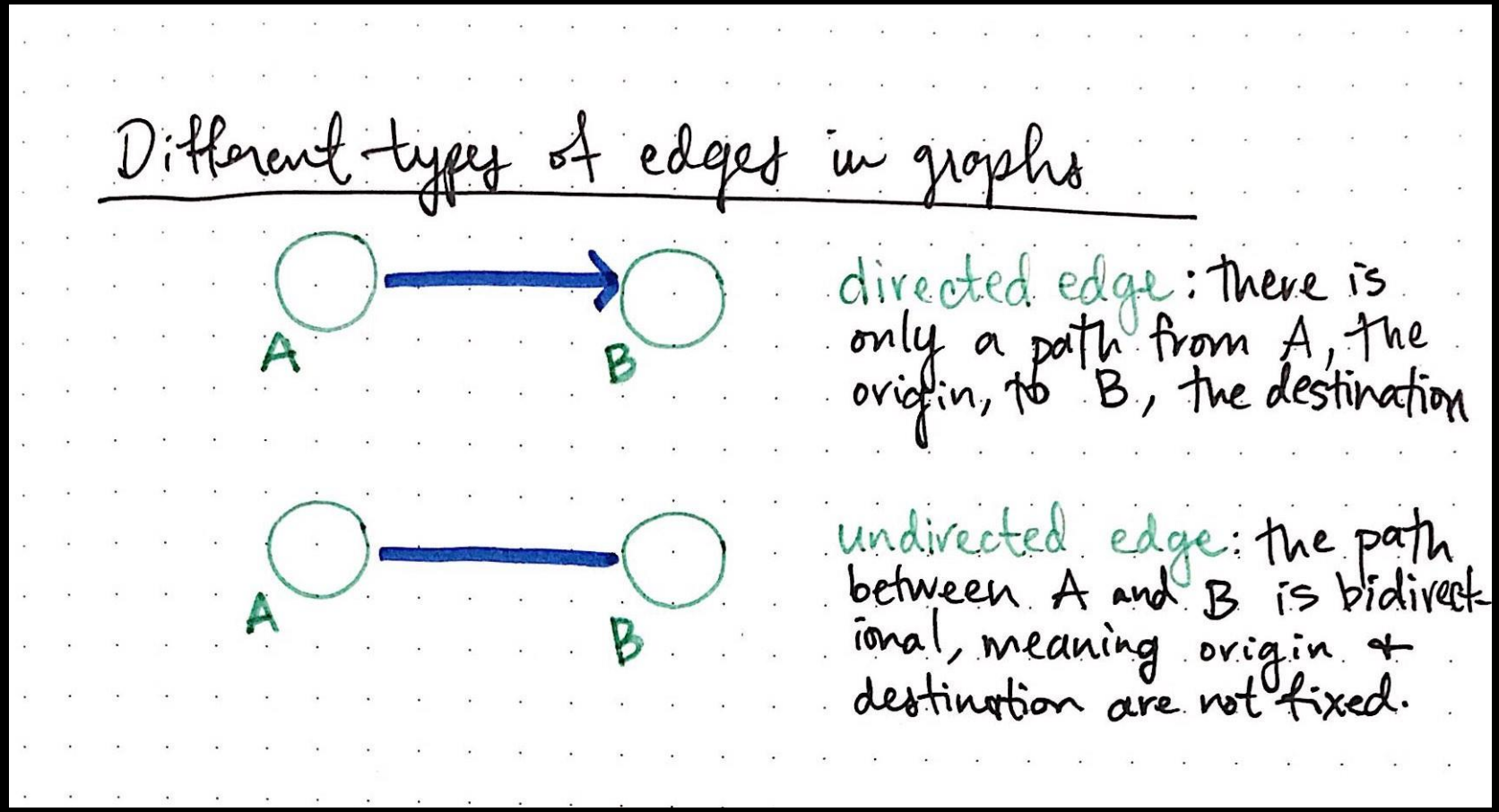
Graph Network Basics



In mathematics, graphs are a way to formally represent a network, which is basically just a collection of objects that are all interconnected.

Source : https://medium.com/basecs/a-gentle-introduction-to-graph-theory-77969829ead8

Graph Network Basics



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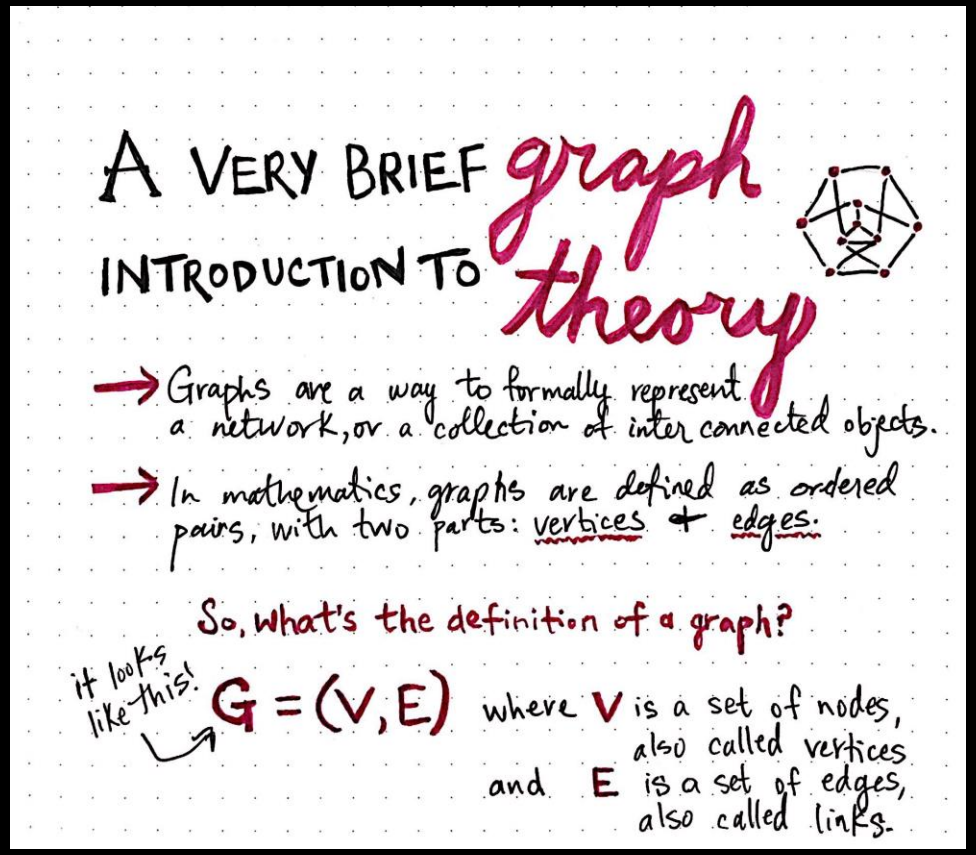

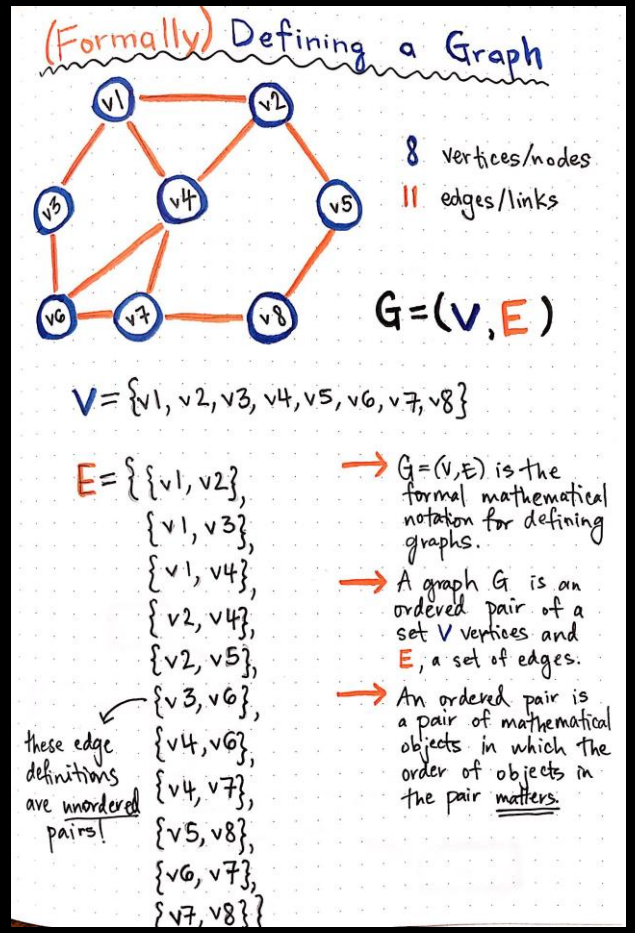

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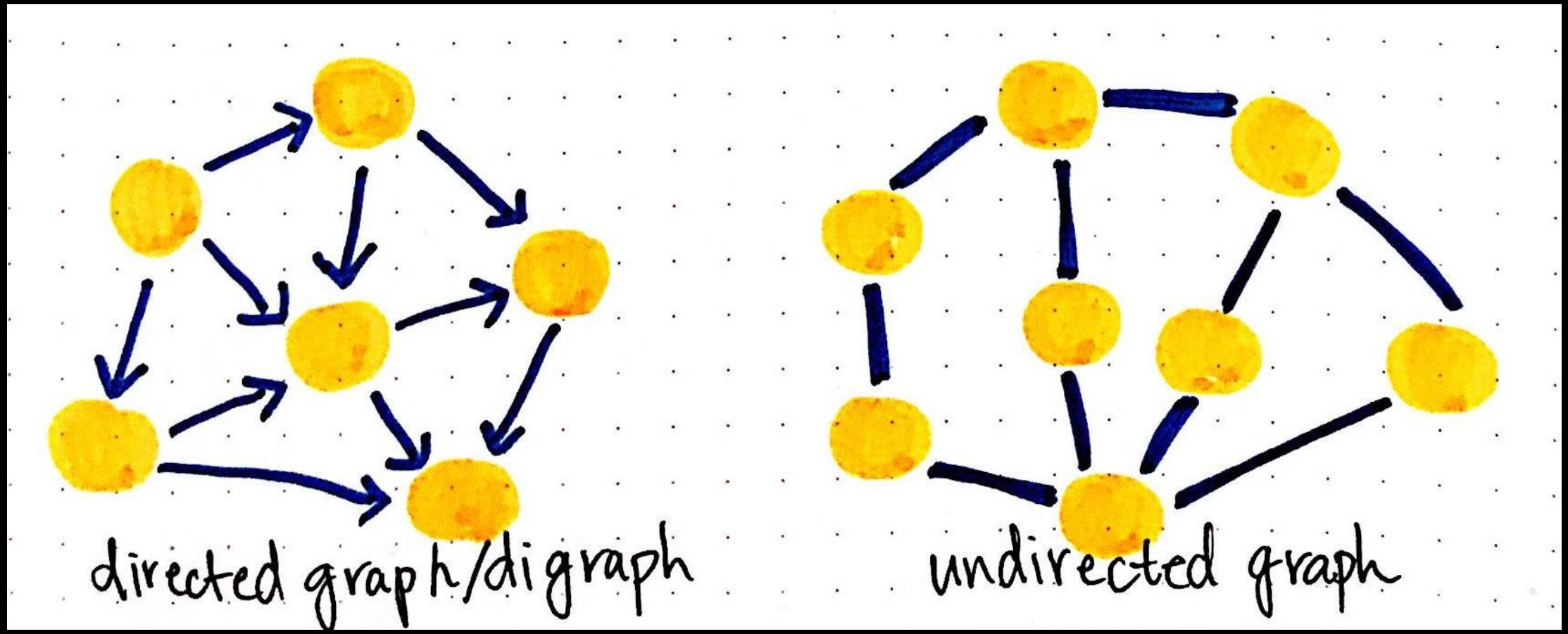

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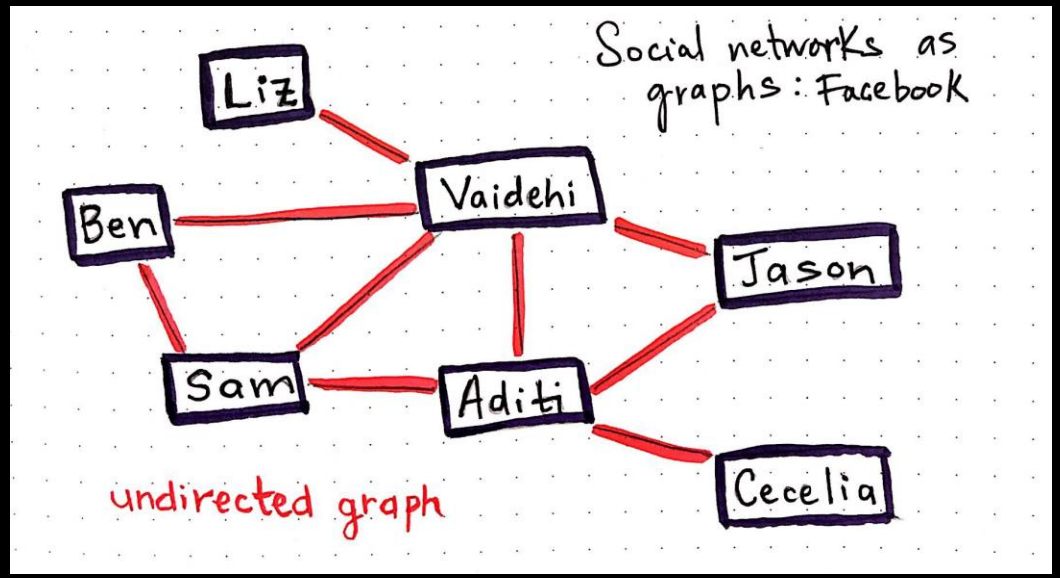

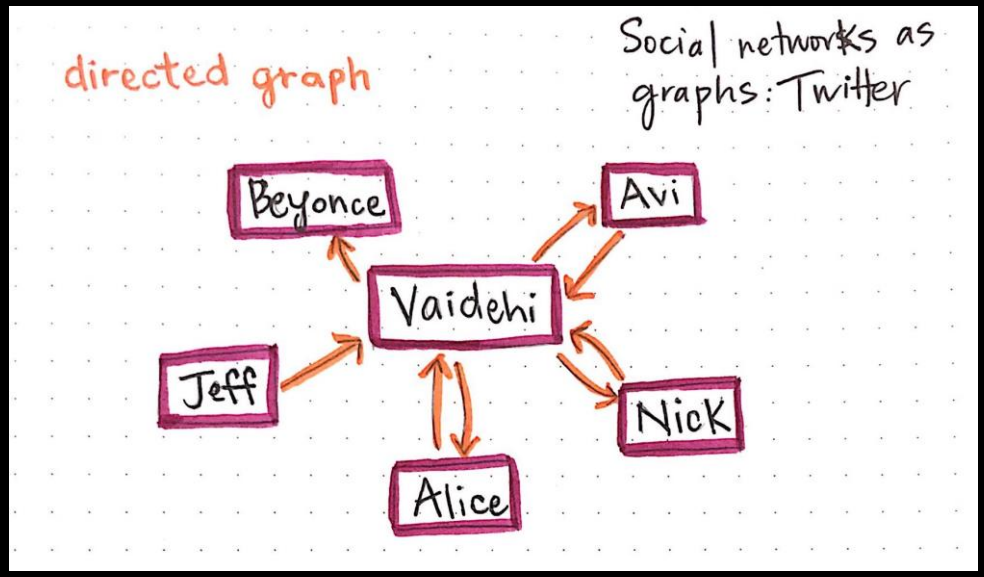

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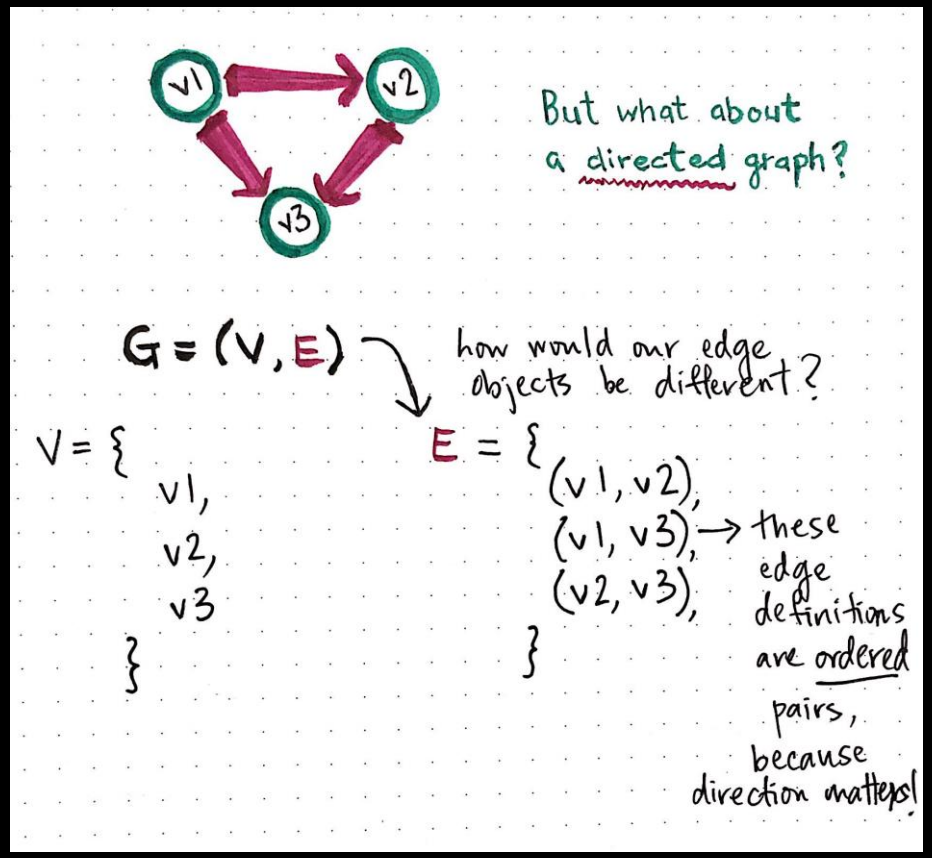

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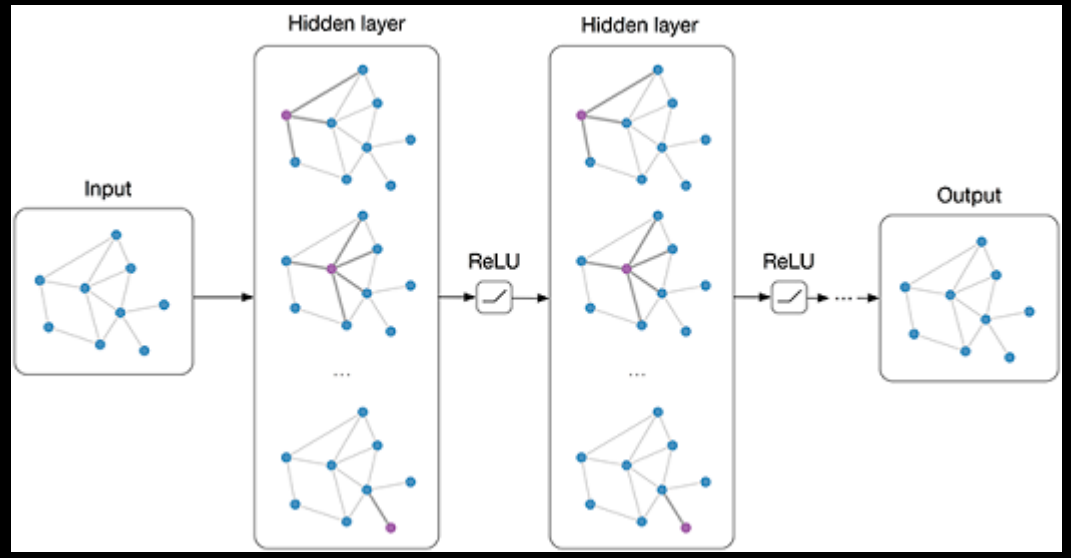
Graph Neural Network

- Graph neural networks (GNNs) are connectionist models that capture the dependence of graphs via message passing between the nodes of graphs. They are extensions of the neural network model to capture the information represented as graphs. However, unlike the standard neural nets, GNNs maintain state information to capture the neighbouurhood properties of the nodes



Source : https://towardsdatascience.com/https-medium-com-aishwaryajadhav-applications-of-graph-neural-networks-1420576be574

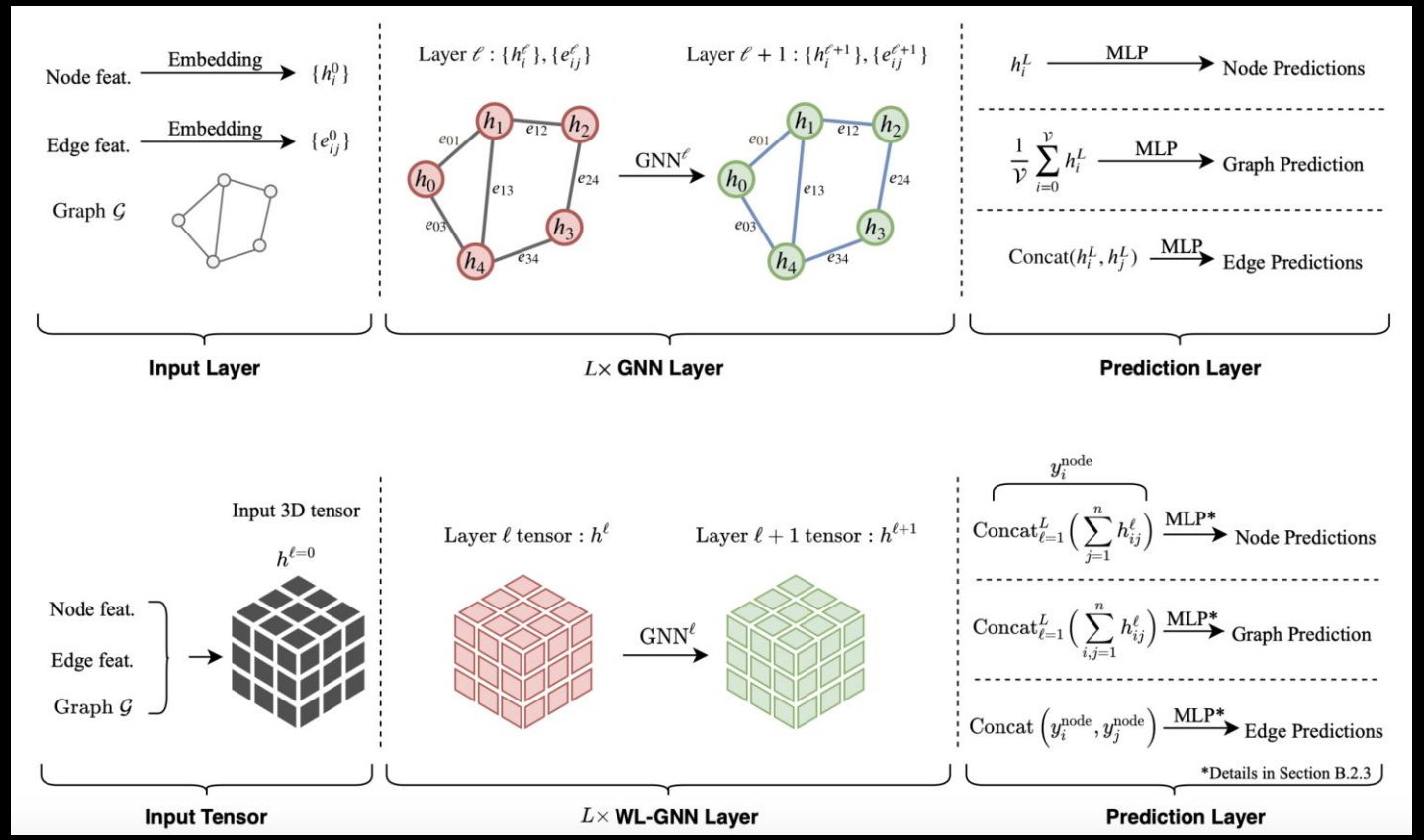
Message Parsing

- https://youtu.be/ABCGCf8cJOE?t=48

GNN Application

- https://towardsdatascience.com/https-medium-com-aishwaryajadhav-applications-of-graph-neural-networks-1420576be574

GNN Prediction



Source : https://towardsdatascience.com/benchmarking-graph-neural-networks-d644e0bf54d5

Colab Implementation

- https://colab.research.google.com/drive/1ydRYa2_CsSMZabj8OxlM3IR4jfVHdlCU?usp=sharing

What are the ways it can be applied in AEC

- Takeaways from Autodesk paper
- Structural Engineering : https://arxiv.org/pdf/2003.09103.pdf
- Architecture : https://arxiv.org/pdf/2003.09103.pdf

General Discussion

- Q n A Topic
- Upcoming Topics for Next Livestream
  - ❑Reinforcement Learning
  - ❑Computer Vision (Object Detection)
  - ❑ML Model Deployment (Tensorflow.js)

Seven Categories: