GRAPH + AI SUMMIT

organized by TigerGraph

Graph Data Science with TigerGraph Graph Algorithms

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https://github.com/jiportilla/gsdl-101

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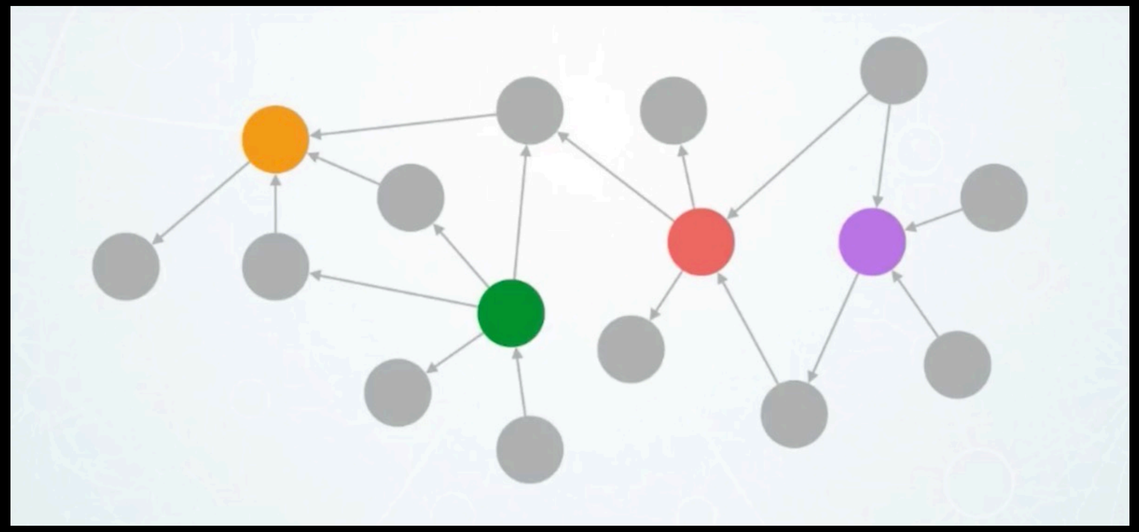

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Let me tell you a story...

https://www.youtube.com/watch?v=ifgf6bZhxiE

https://medium.com/@sweetmantech/hilton-ibm-watson-7c5f5f1a611

Today’s presentation

Graph Databases
Graph Data Science
Demonstration

Graph Data Science Featured Services

https://www.tigergraph.com

https://docs.tigergraph.com/gsql-ref/current/intro/intro

TigerGraph Graph Data Science Library

Insights at Scale with Graph Algorithms for Machine Learning.

Enterprise graph analytics and graph-native machine learning at scale.

Graph algorithms are used to compute metrics for graphs, nodes, or relationships.

Out-of-the-box Graph Data Science and Graph Machine Learning.

Watson Studio

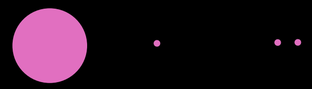
Build, run and manage AI models.

Prepare data and build models anywhere using open-source code or visual modeling.

Watson NLU

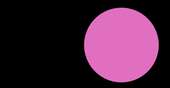
Powerful advanced text analytics for your data

https://www.ibm.com/cloud/watson-studio



Graph Databases

Graph Data Science



Demonstration

What is a graph?

A graph is ...

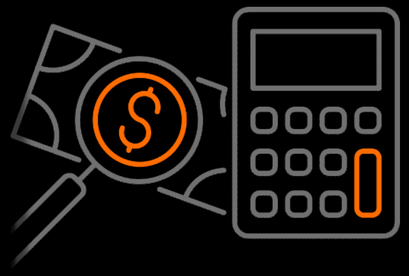
... a network of real-world entities (objects, items, or concepts) and the relationship between them.

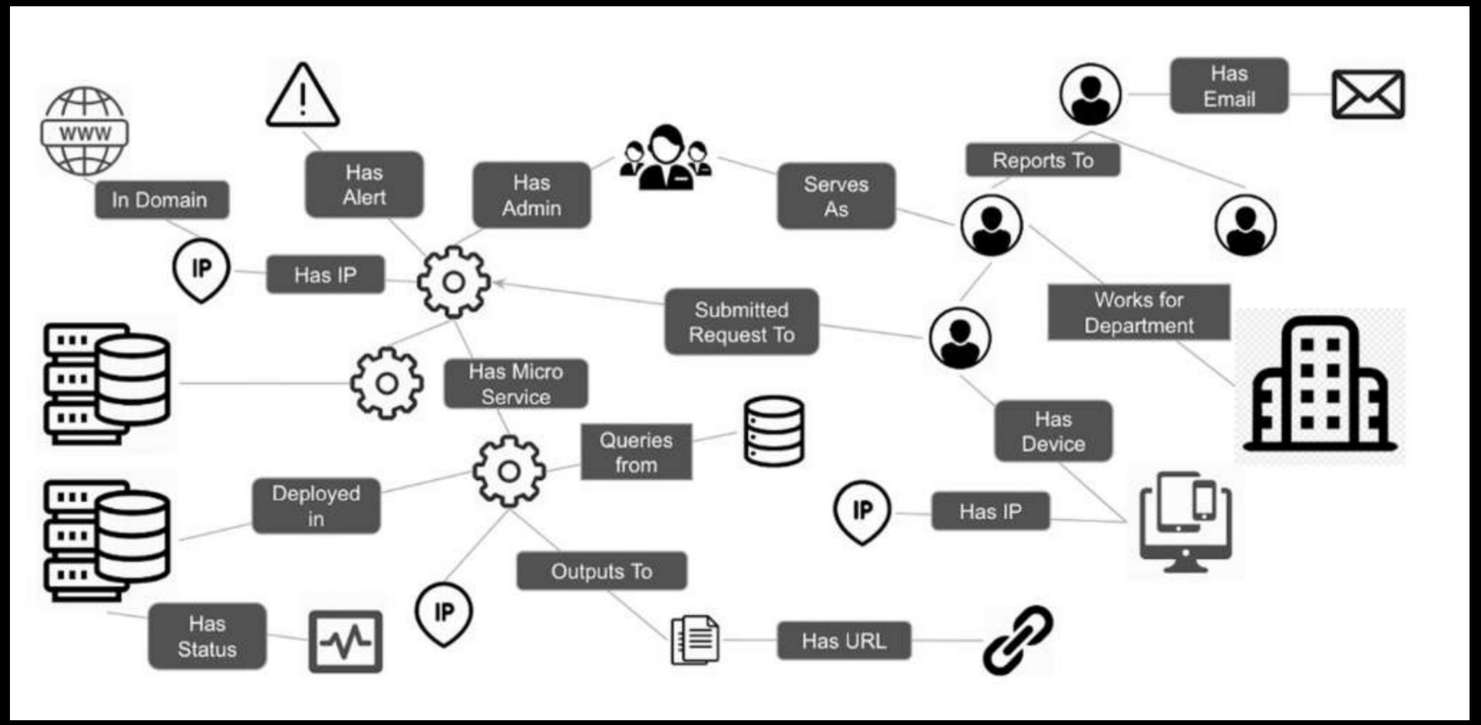
A graph database stores data with its relationships

https://www.tigergraph.com/blog/what-is-a-graph-database-and-why-should-you-care/

Why do we want graphs?

Business face the threat of Cybersecurity attacks...

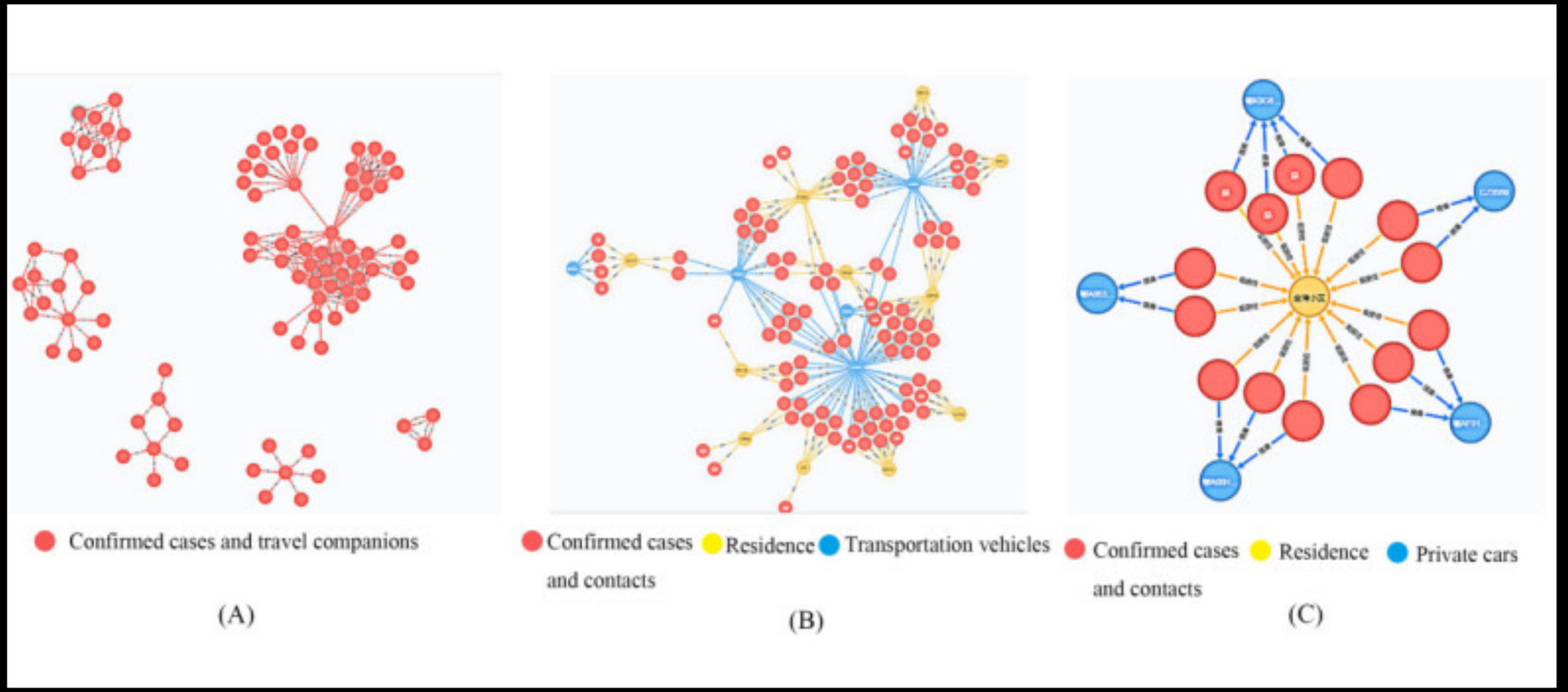




https://www.tigergraph.com/solutions/cybersecurity-threat-detection/

Why do we want graphs?

Covid-19 contact tracing...



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7837510

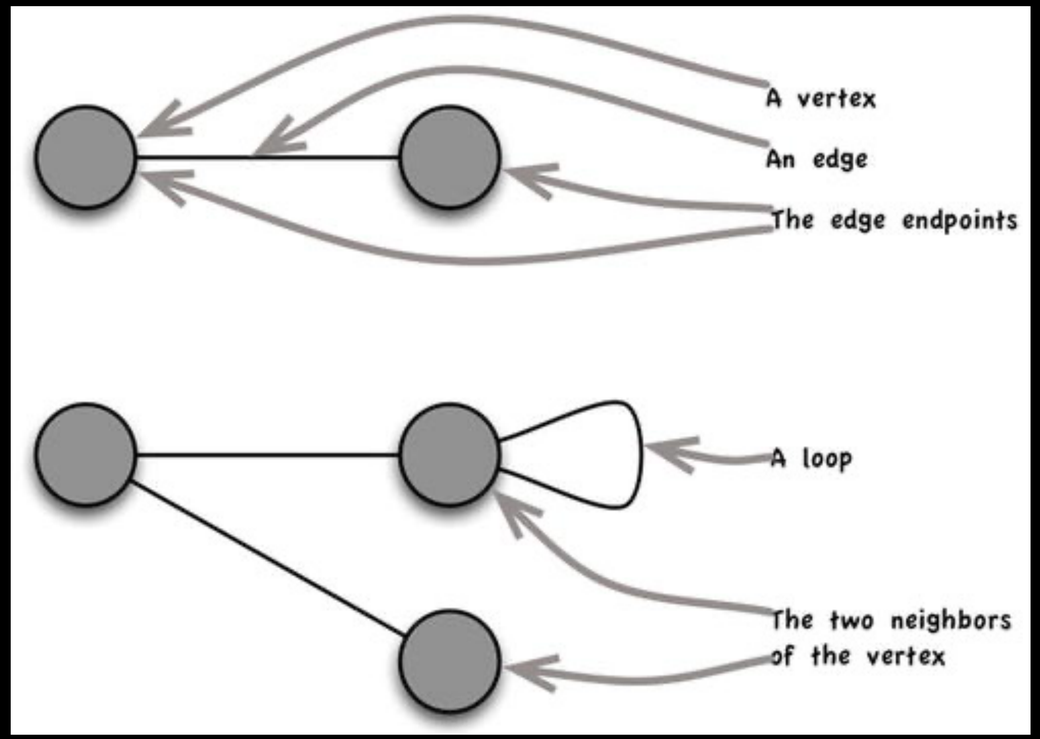
Graph Components

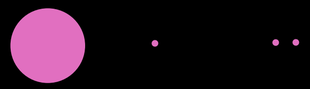
Node (Vertex)

- The main data element from which graphs are constructed

Relationship (Edge)

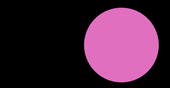
- A link between two nodes. Has:
  - Direction
  - Type
- *A node without relationships is permitted.*
- *A relationship without nodes is not*





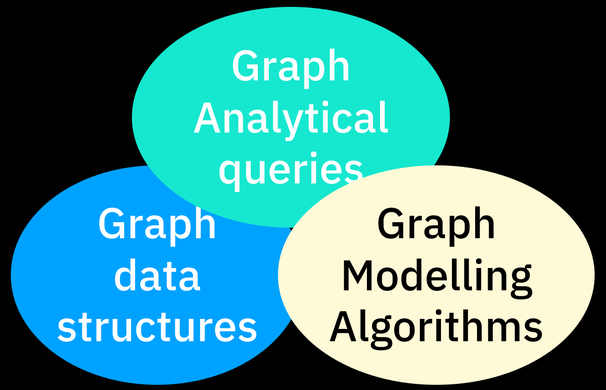
Graph Databases

Graph Data Science



Demonstration

What is *Graph* data science?



A branch of data science which employs graph data structures, graph analytical techniques and data modeling

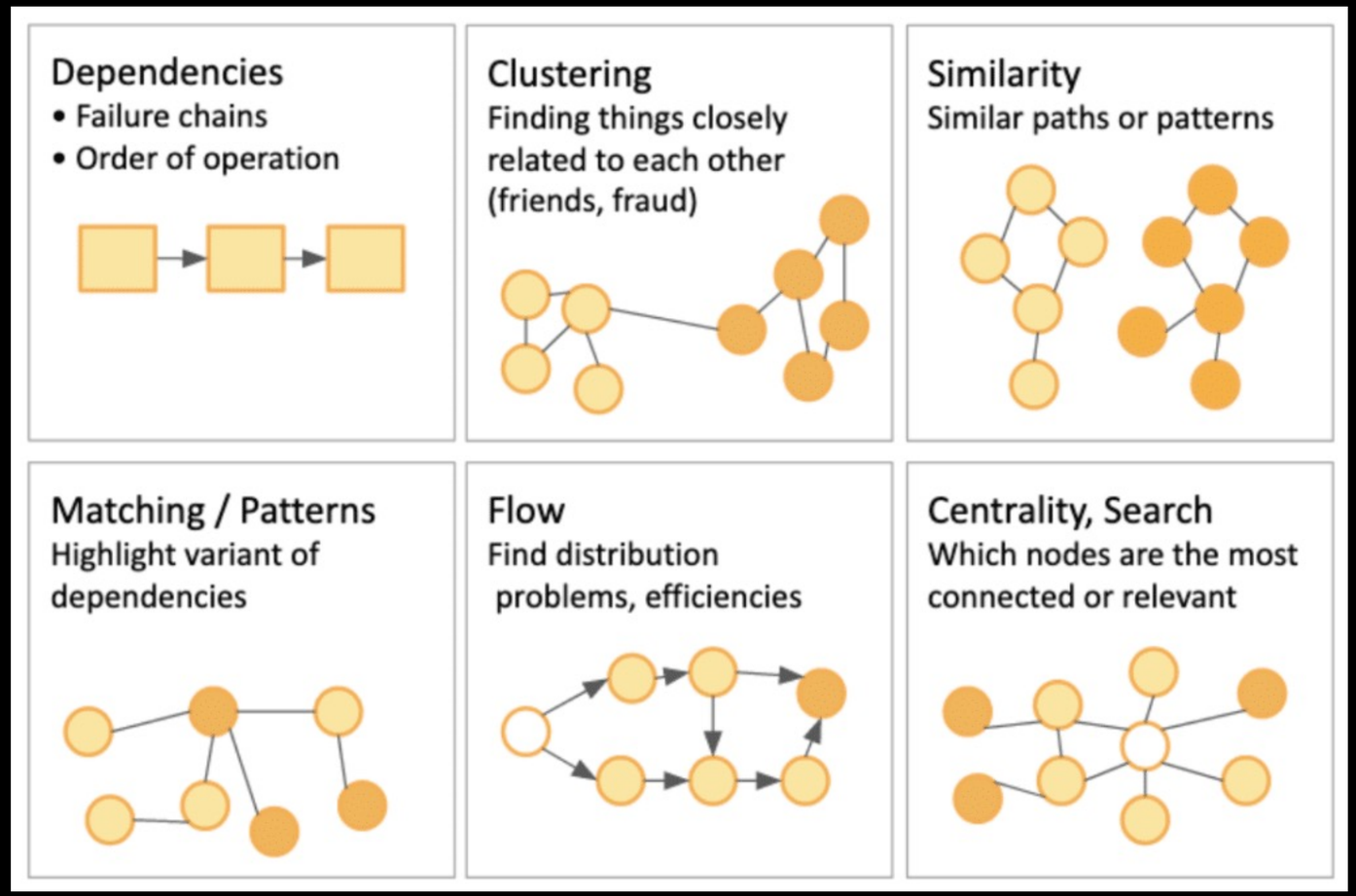
Includes several analytical methods: simple statistics-gathering queries, algorithms and machine learning methods which form predictive models.

Data scientists using relationships to answer business questions.

https://www.tigergraph.com/blog/graph-data-science-library/

TigerGraph Graph Data Science

50+ algorithms: Dependencies, Clustering, Similarity, Matching / Patterns, Flow, Centrality, and Search



https://www.tigergraph.com/graph-data-science-library/

https://github.com/tigergraph/gsql-graph-algorithms

GDSL Algorithms & Use Cases

Centrality (Search) - Determines the importance of distinct nodes in the network

Community (Cluster)- Evaluates how a group is clustered or partitioned

Classification -assigns a label to a node based on established conditions

Node Embeddings - Vector representations of properties of vertices in a graph for ML

Path - Find the optimal path or evaluates route availability and quality

Similarity - Evaluates how alike individual nodes are

Influencers in an organization → Centrality

Fraud detection, Cybersecurity → Community (Louvain)

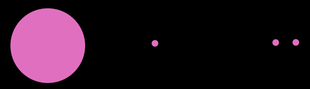
Root cause analysis → Centrality (Pagerank)

Minimum delay in telecom network → Path finding

Most Influential Health Care Provider → Community + Centrality

Important routers in a telecom network → Centrality

Customer classification based on purchases → Node Similarity



Graph Databases

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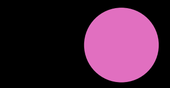
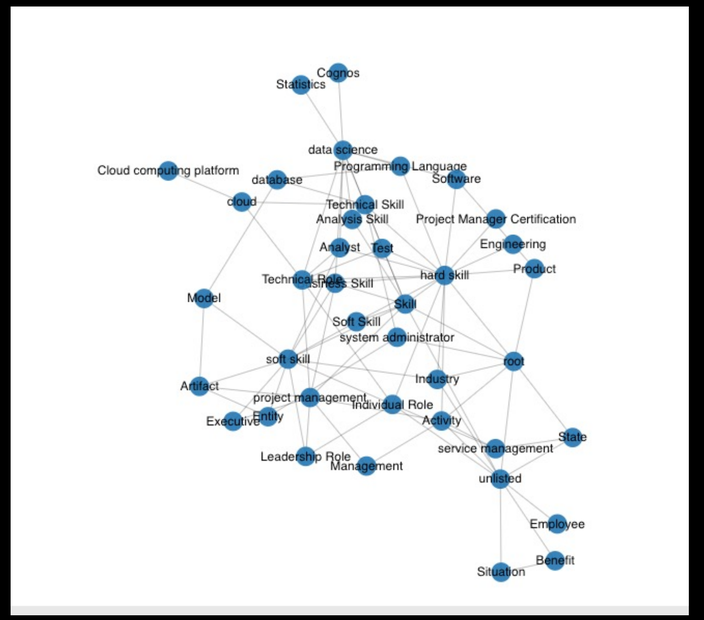


Demonstration

Demo

Demonstration

Step 1. Create the ontology data
Step 2. Run Jupyter Notebook, create TigerGraph database
Step 3. Visualize the results



Demonstration

Knowledge Graphs: Ontology
Centrality: Pagerank
Community: Louvain

Get started

1. Access TigerGraph
(or cloud sandbox, docker container, Enterprise edition)
https://www.tigergraph.com/get-tigergraph/

2. Install GDSL library
https://github.com/tigergraph/gsql-graph-algorithms

3. Watch the tutorials
https://info.tigergraph.com/graph-ai-summit-fall-session-graph-data-science-library

Q&A

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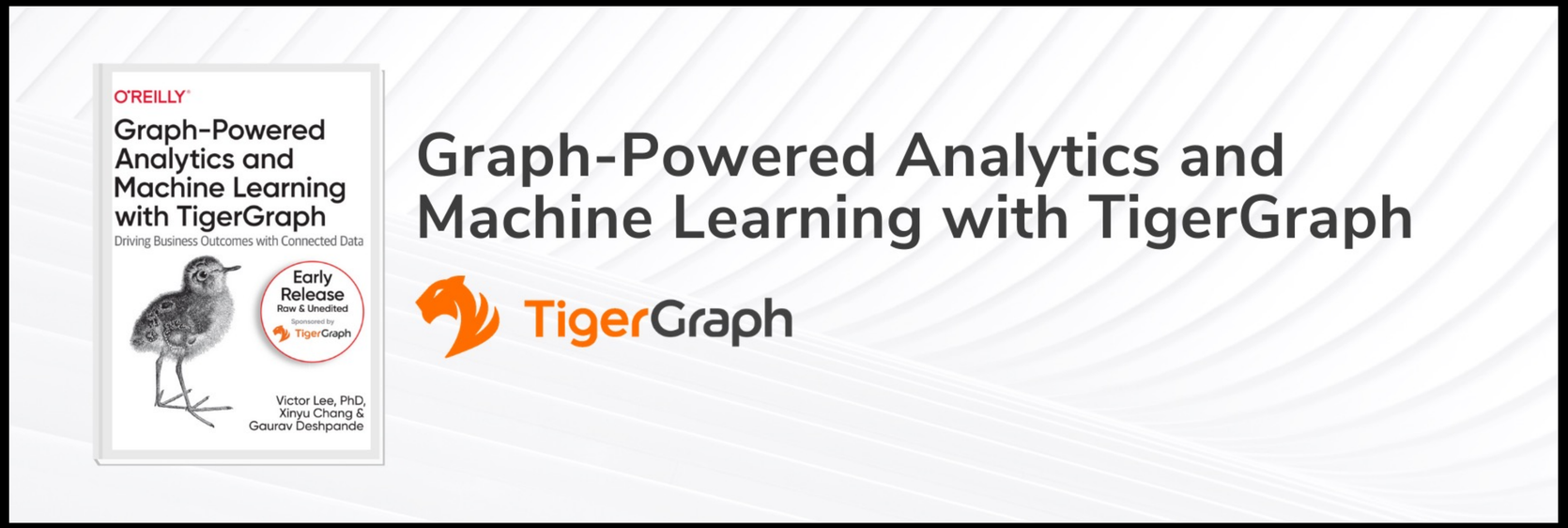
@iportilla



https://info.tigergraph.com/oreilly-book