NeuGraph:
Parallel Deep Neural Network Computation on Large Graphs

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NeuGraph: Parallel Deep Neural Network Computation on Large Graphs

**Neural Networks**
- Self-Driving
- Personal Assistant
- Recommendation
- Question Answering

**Input Feature Vector**

**Graph Neural Networks**
- Image Object Detection
- Speech Recognition
- User-Item Graph
- Knowledge Graph

*Figures from Internet*
Graph Neural Networks (GNN)

- Information propagation via *Graph*
- Information transformation via *Neural Networks*
Challenges in Processing GNNs

- Scalability Problem
- Efficiency Problem

* Figures from Internet
NeuGraph

- Bridge graph and dataflow models to support efficient and scalable GNN processing

**SAGA-NN Abstraction**

**Dataflow Generation**

**Streaming Optimization**

**Kernel Optimization**

**Programming GNN apps**

**Handle Scalability**

**Handle Efficiency**

**Compatibility**

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**TensorFlow**

Existing Dataflow System
NeuGraph

- Bridge graph and dataflow models to support efficient and scalable GNN processing

- Performance
  - Outperform state-of-the-art frameworks (e.g., TensorFlow and DGL) on small graphs
  - Scale to large real-world graphs with GPUs

Existng Dataflow System

TensorFlow

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Dataflow Generation
Streaming Optimization
Kernel Optimization

Programming GNN apps
Handle Scalability
Handle Efficiency
Compatibility
NeuGraph

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