

A Graph Neural Network (GNN) based Interactive Application for Earthquake Early Warning

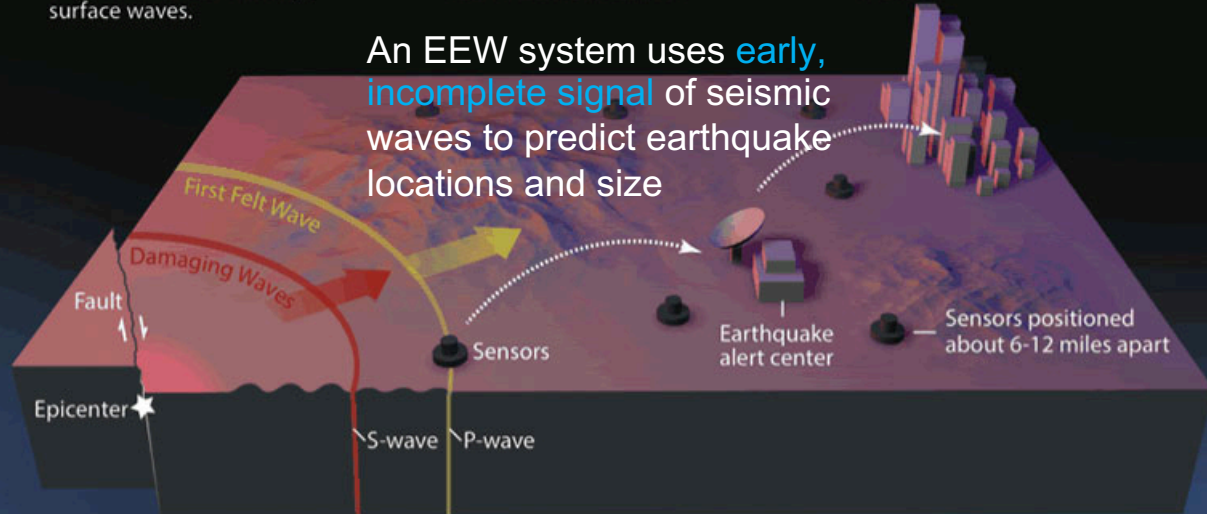
Lindsay Y. Chuang(EAS), Meghana Jain(COC),
George Jeno(COC), Hsin-Yi Lin(ISYE),
Preston T. Lee(COC), Paarth J. Parekh(BIOL)

Earthquake Early Warning (EEW) Systems

Earthquake Early Warning Basics

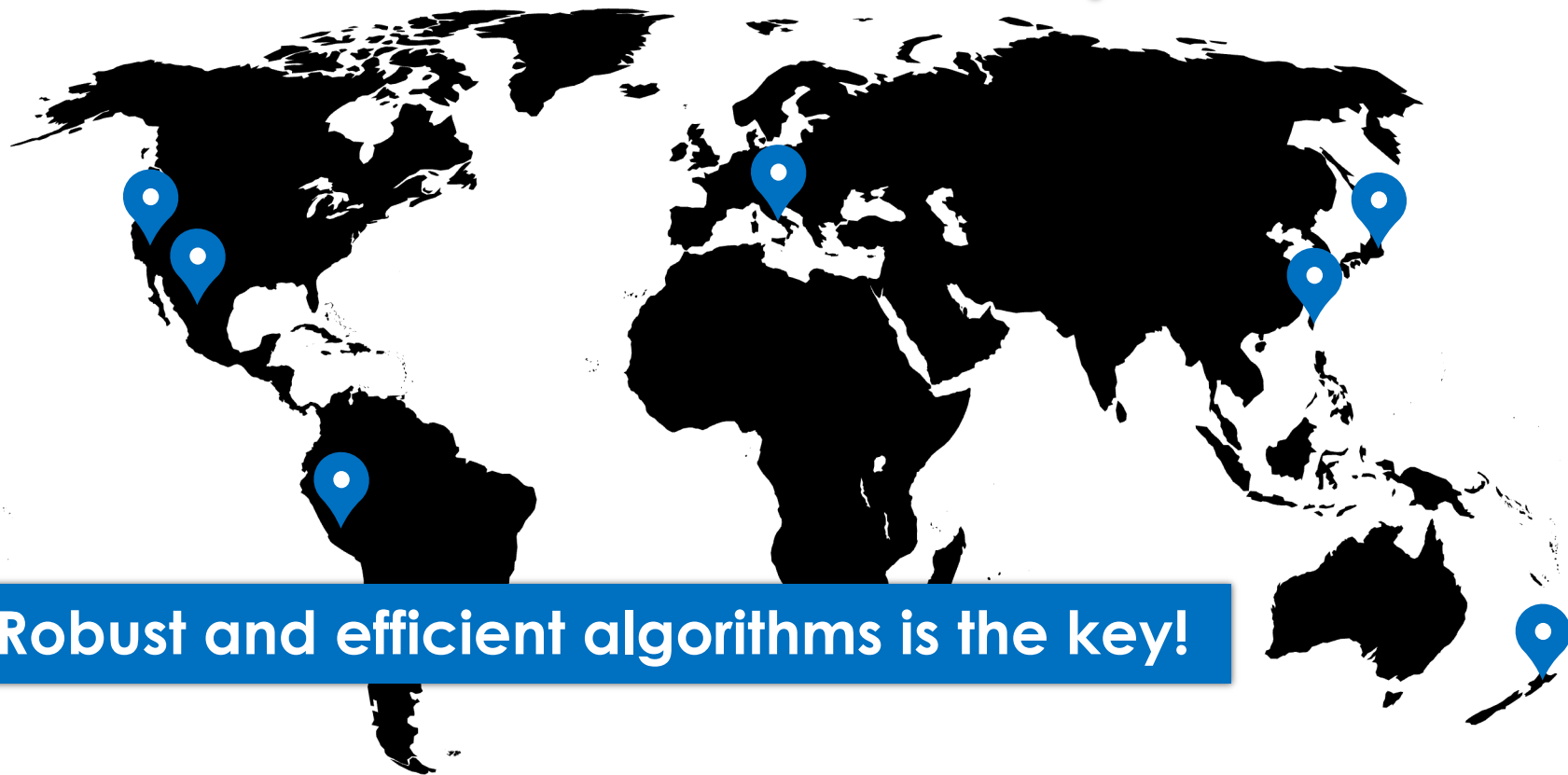
- 1 In an earthquake, a rupturing fault sends out different types of waves. The fast-moving P-wave is first to arrive, but damage is caused by the slower S-waves and later-arriving surface waves.
- 2 Sensors detect the P-wave and immediately transmit data to an earthquake alert center where the location and size of the quake are determined and updated as more data become available.
- 3 A message from the alert center is immediately transmitted to your computer or mobile phone, which calculates the expected intensity and arrival time of shaking at your location.

An EEW system uses **early, incomplete signal** of seismic waves to predict earthquake locations and size



EEW systems widely used in **high-risk** areas

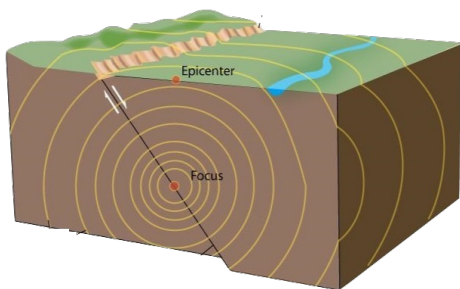
And they save lives!



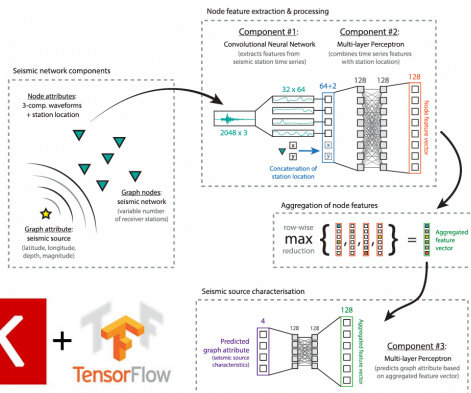
Robust and efficient algorithms is the key!

Our approach toward an **interactive GNN EEW** system

(1) Data scraping

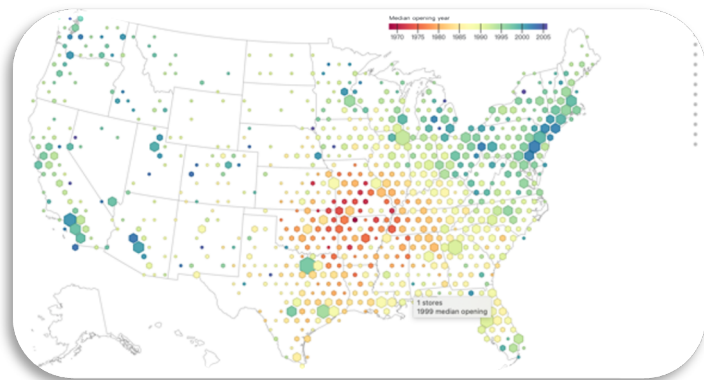


(2) GNN model



(van den Ende and Ampuero, 2020)

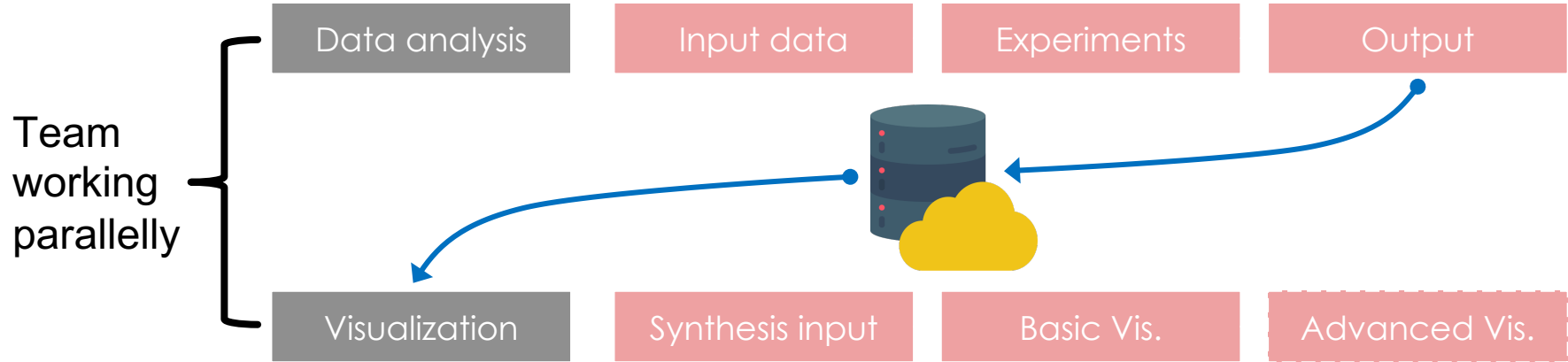
(4) Interactive Map



(3) Data Storage



How long will it take? 4-5 weeks, practically no costs



check for
success



1. Successfully building the application as planned
2. Prove GNN useful for Earthquake early warning system
3. The interactive visualization easy to use and showcase the insights of data