

# Data Mining Project Examples

**Data Mining:**  
**Data Mining Project**  
with Dr. Qin Lv



**Master of Science in Data Science**  
UNIVERSITY OF COLORADO BOULDER



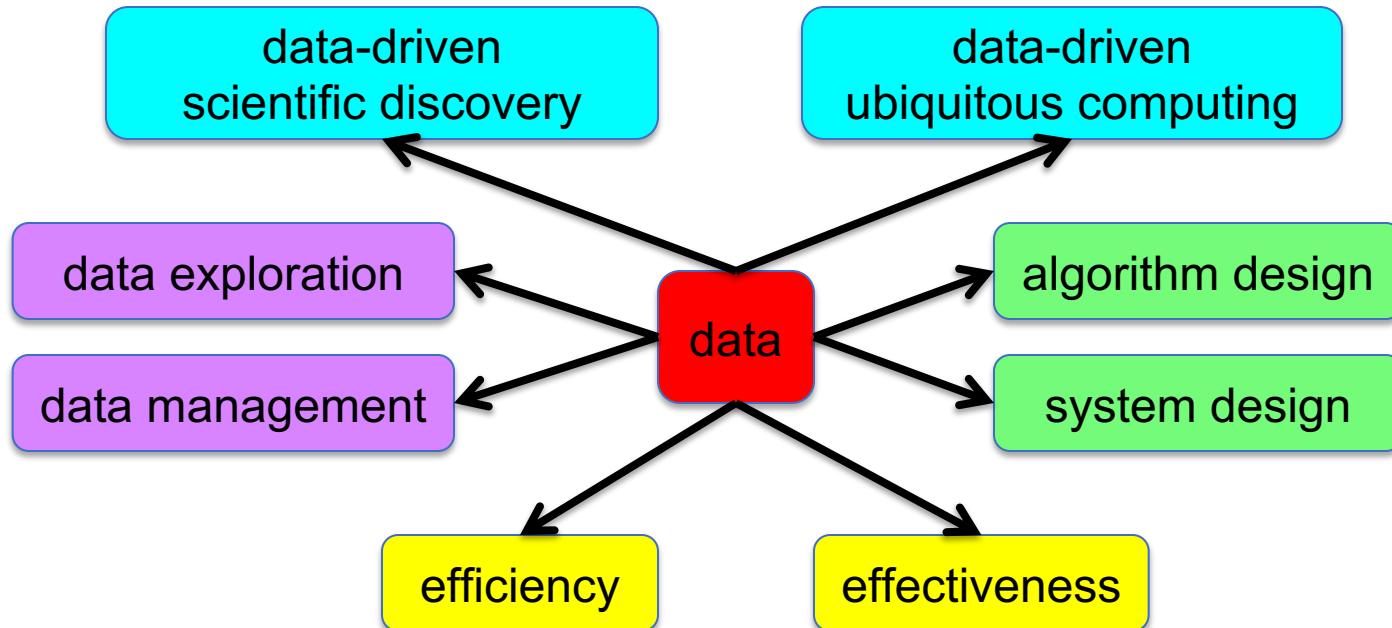
**Learning objective:** Identify the key components of real-world data mining projects and propose your own project.

# Example Projects in My Research

- Full-stack data analytics
- Integration of systems, algorithms, and applications
- Data-driven scientific discovery and ubiquitous computing

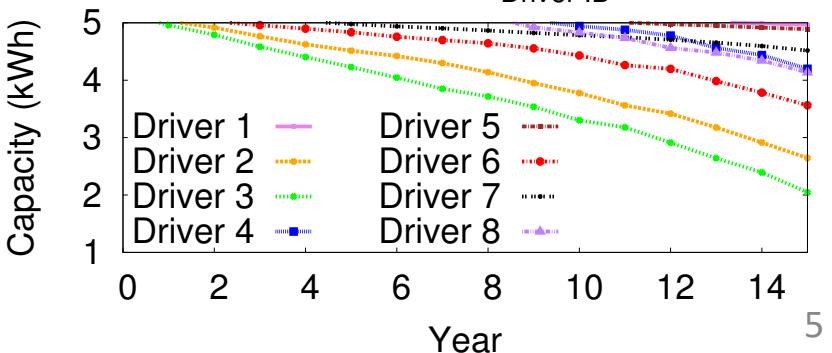
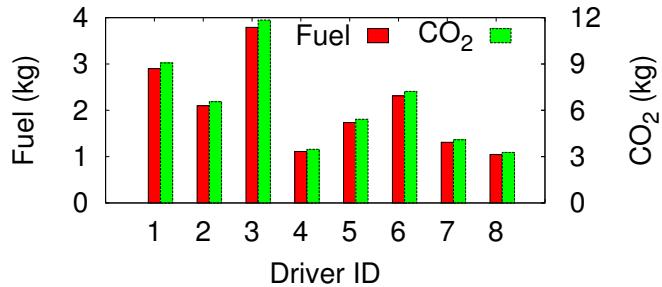
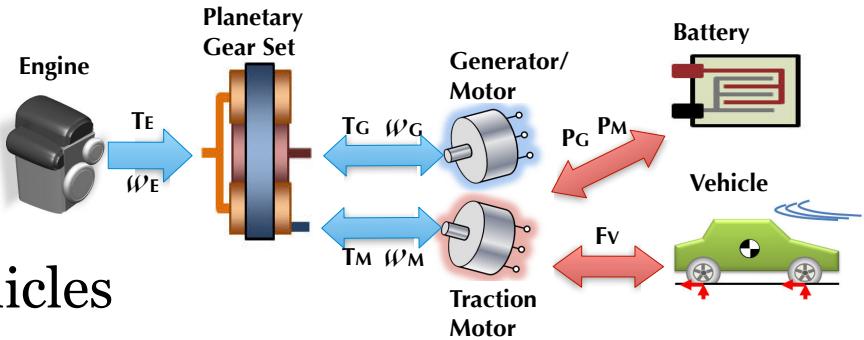
# Research Overview

interdisciplinary



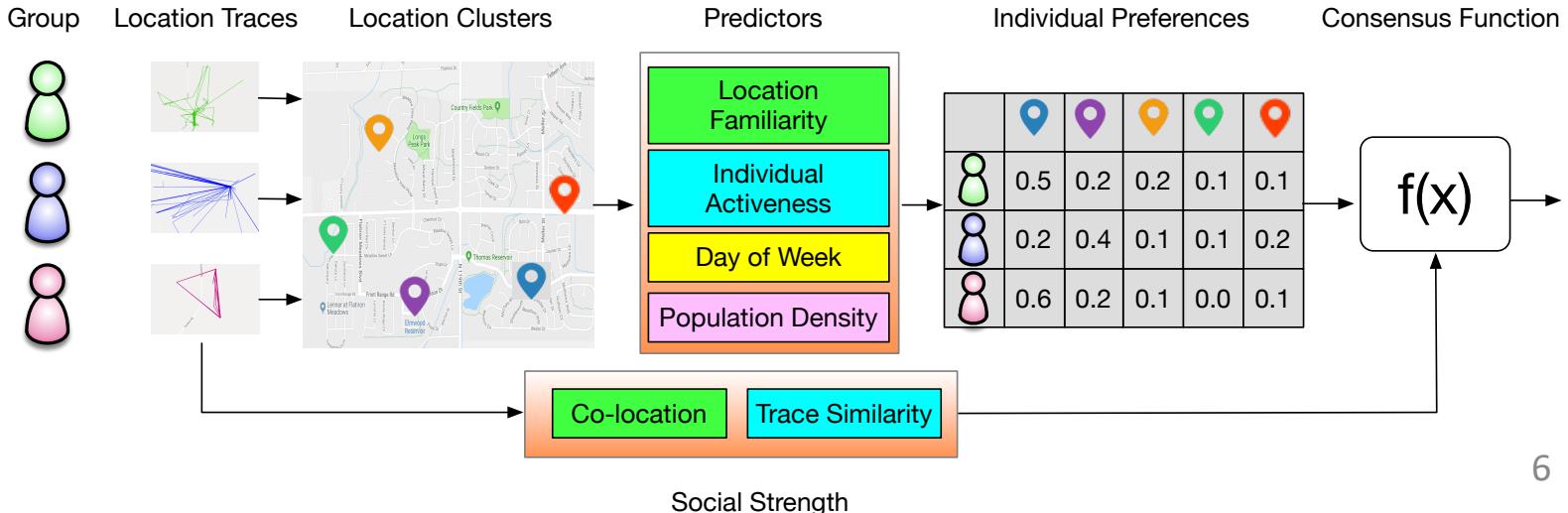
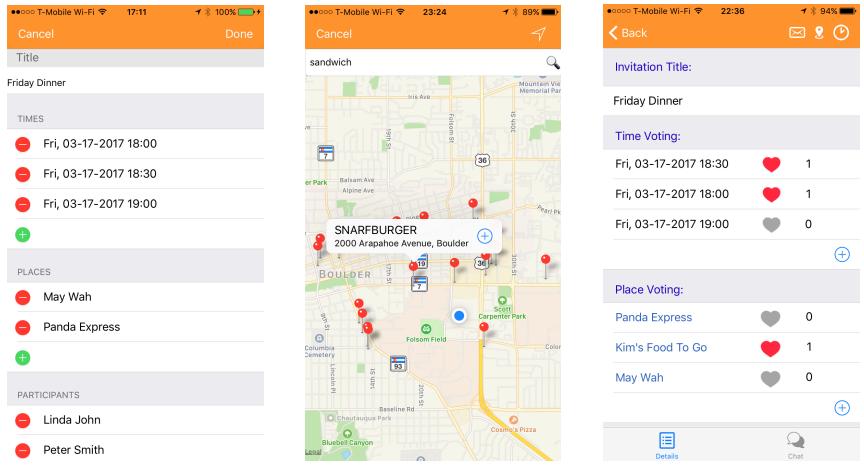
# Full-stack Data Analytics (1)

- E.g., Plug-in Hybrid Electric Vehicles



# Full-stack Data Analytics (2)

- E.g., group event scheduling
  - OutWithFriendz mobile app
  - GEVR event venue recommendation



## Scientific Discovery

Environmental Science

Seismology

Oceanography

Materials Science

Renewable and Sustainable Energy

Transportation Electrification

## Ubiquitous Computing

User Activities

Event Analysis

Group Behavior

CyberSafety

Context-aware Computing

Online Social Networks

## Data Management & Data Analysis

Multi-modal Data Fusion

Anomaly Detection

Recommendation

## Mobile/Wearable/IoT Sensing

Air Quality

Driving

Earthquake

Running

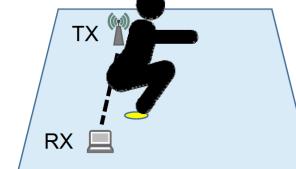
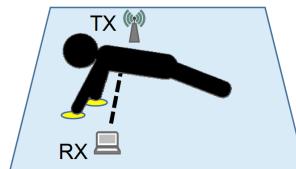
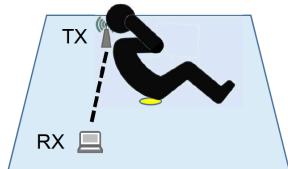
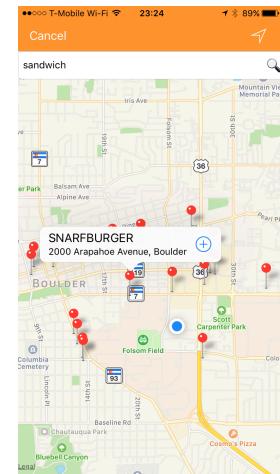
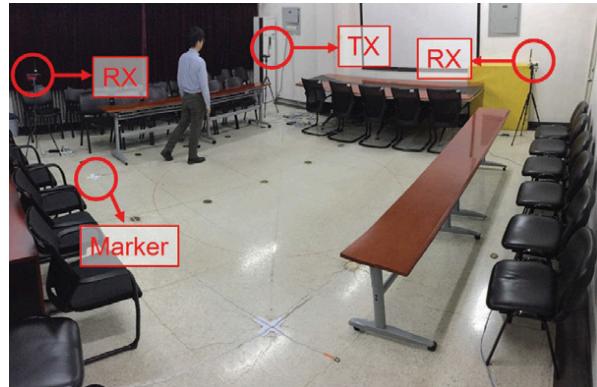
Exercise

Gesture

Group Events

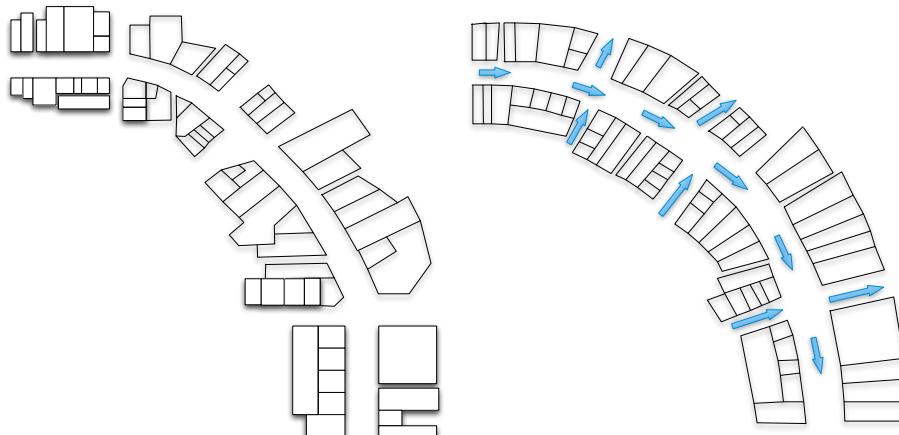
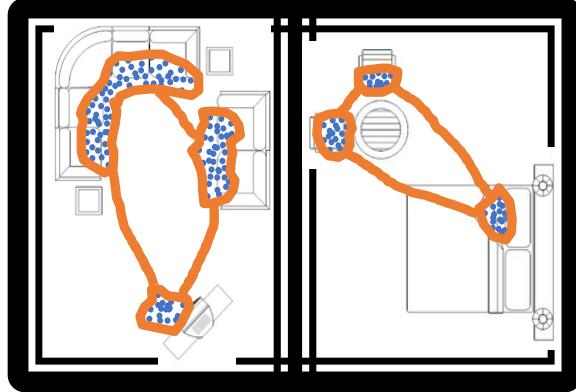
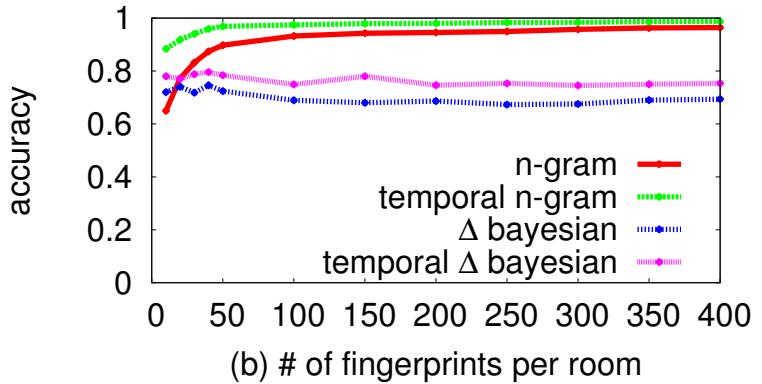
# Mobile/Wearable/IoT Computing

- Air quality
- Driving
- Earthquake
- Running
- Exercise
- Gesture
- Group events



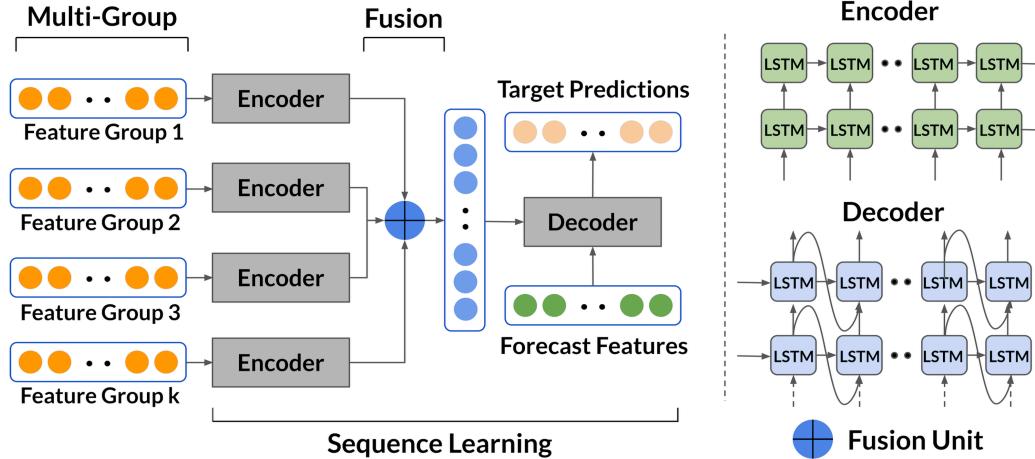
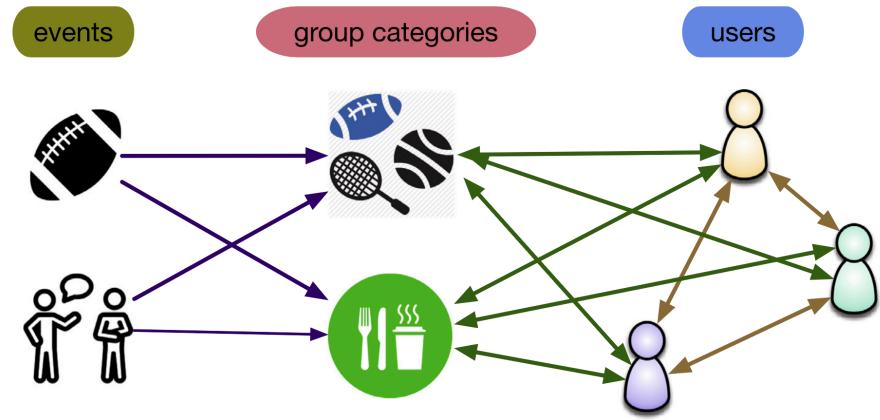
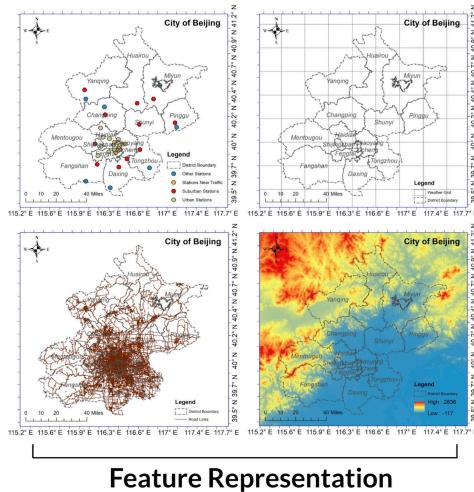
# Wi-Fi based Air Quality Sensing

- Indoor room localization
- Personalized air pollution risk analysis
- Supervised model
- Unsupervised model
- Automated floorplan construction



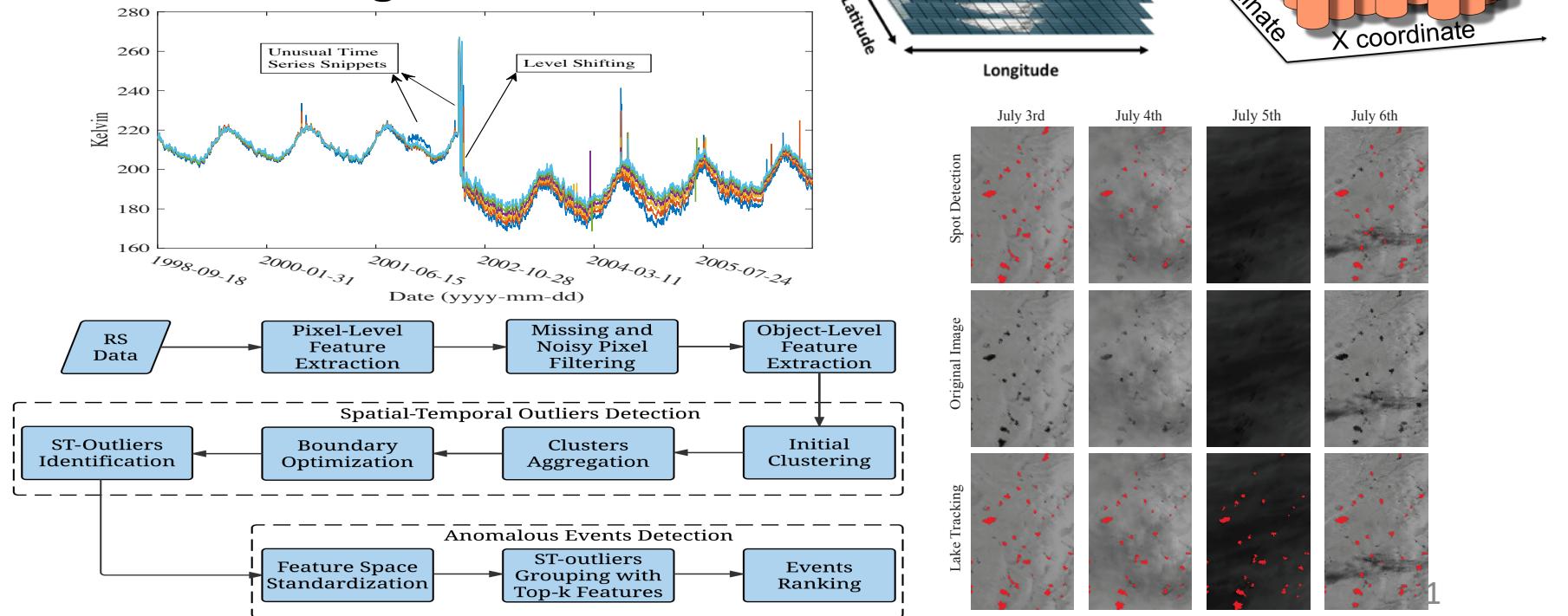
# Multi-modal Data Fusion

- Mobile, social, content, network
- Space, time, sensors, land use, ...



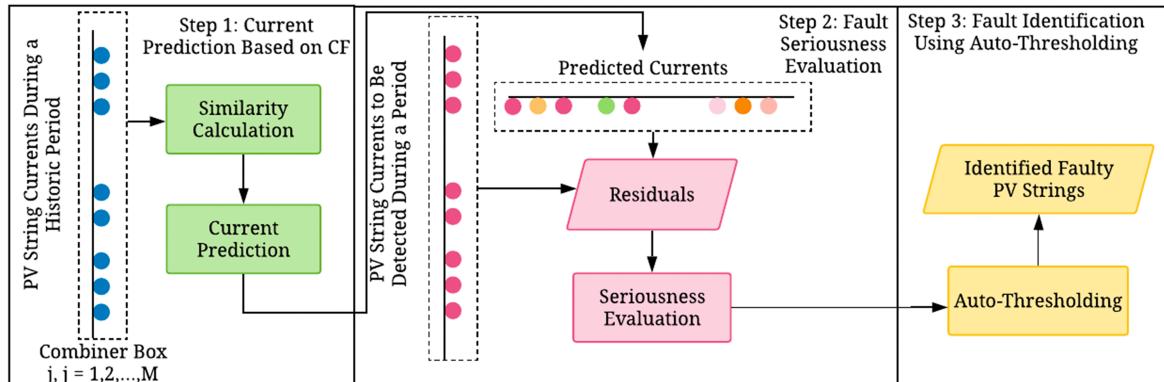
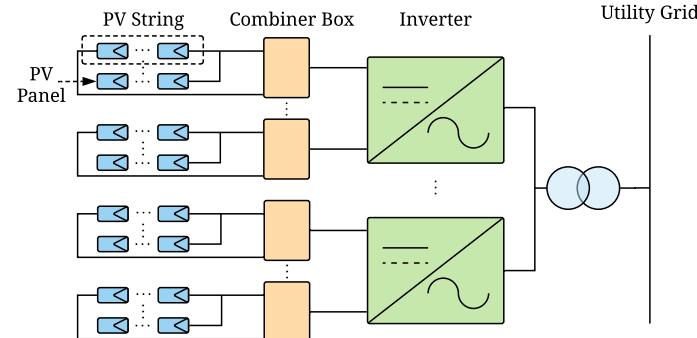
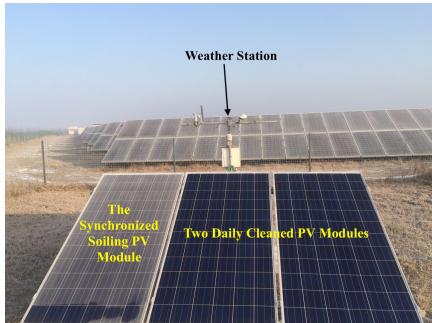
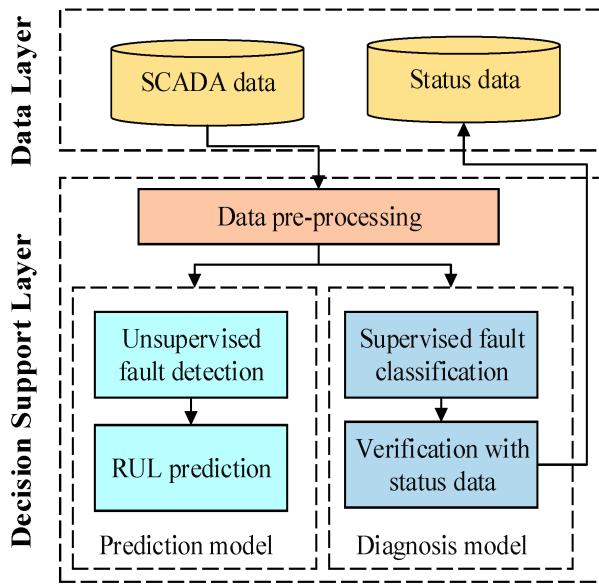
# Anomaly Detection

- Remote sensing data



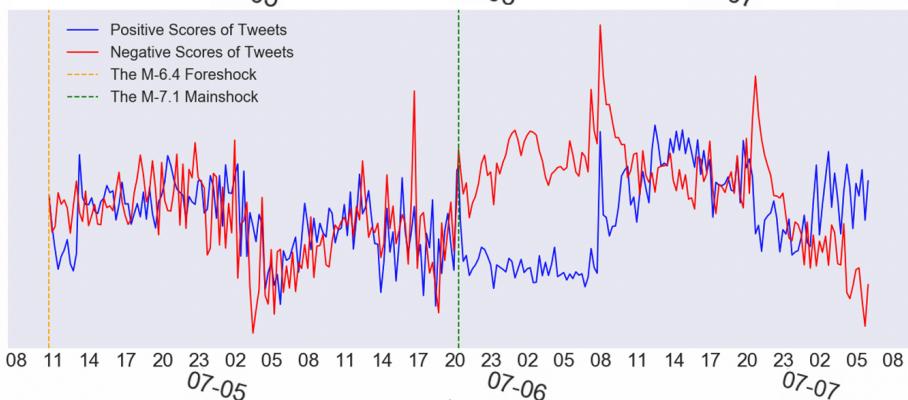
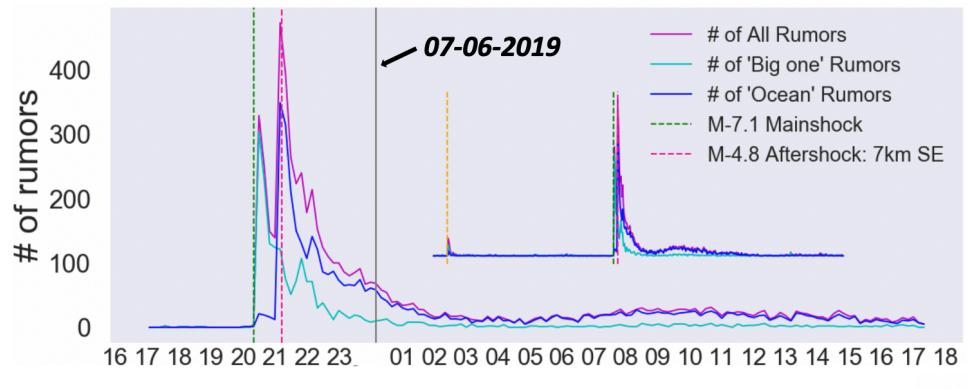
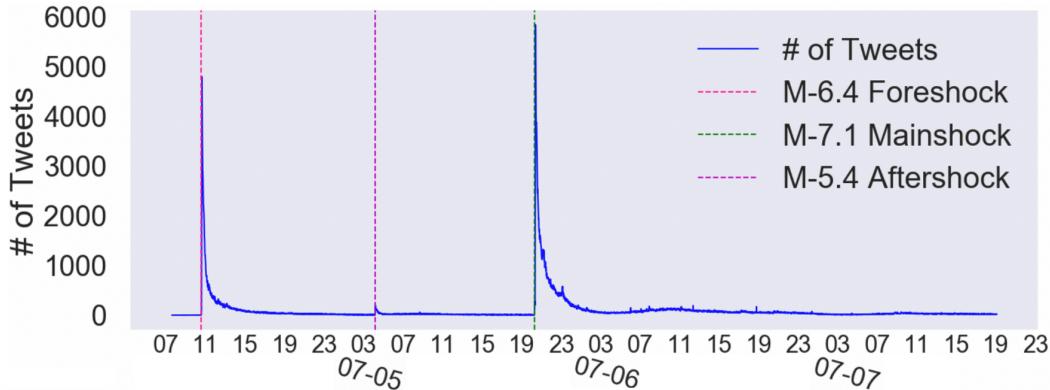
# Anomaly Detection

- Wind & solar farms

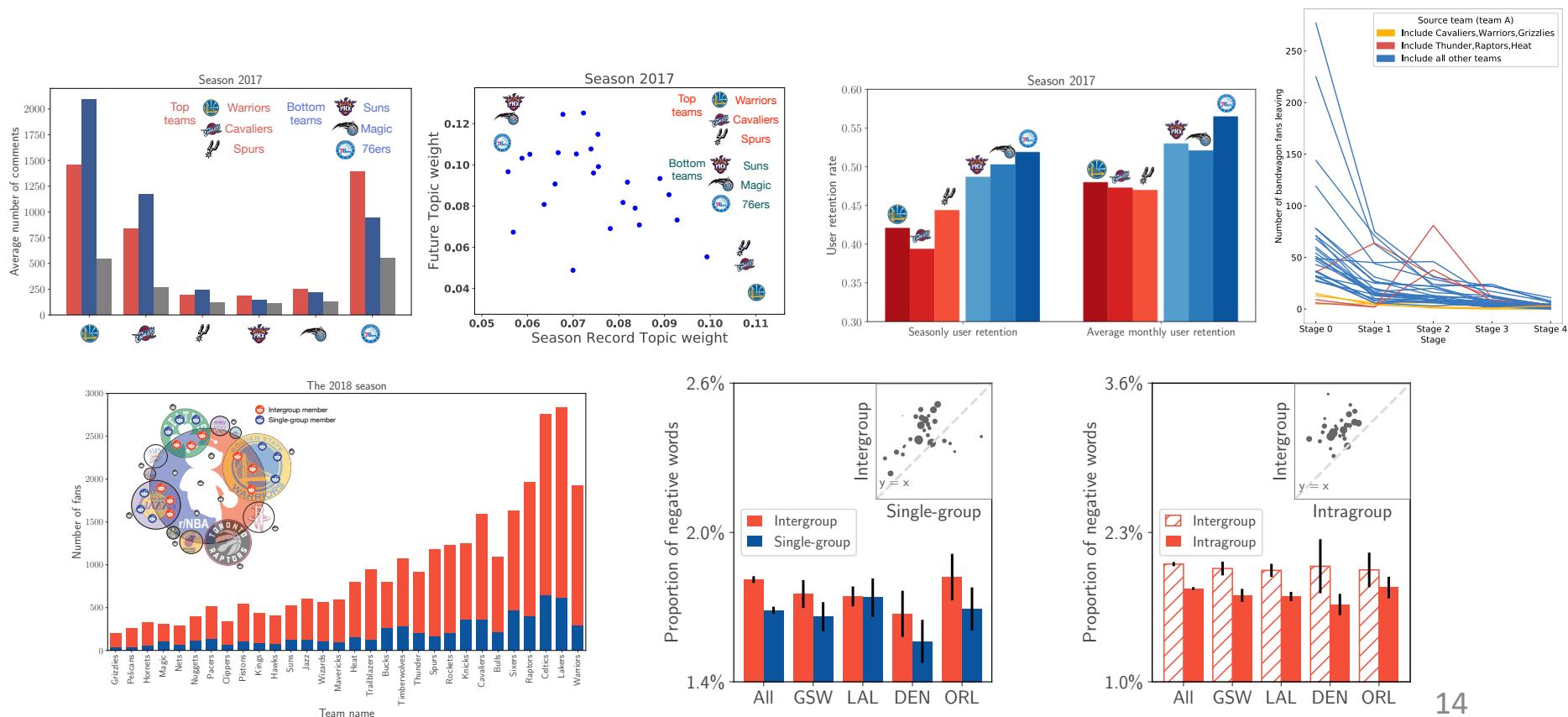


# Earthquake Public Response

- 2019 Ridgecrest Earthquakes
- Key Twitter accounts
- Emotions, topics, rumors



# Reddit NBA Fan Communities Analysis



# Project Brainstorming

- Pick some **initial ideas**
- Check **feasibility**: data, evaluation, ...
- **Discuss** with family, friends, colleagues, ...
- **Iterate**: add/modify/remove ideas