

ML2 vs ML++ - Use Cases

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1 Use Case: Stress Watch

A tech company developed a smart watch that gauges the stress level of a person during physical activity.

- **Dataset:**

- Humidity - Double
- Temperature - Double
- Step count - Integer
- Stress Level - Categorical: normal, medium, high

- **Devices:**

- **Stress Watch:** Measures humidity, temperature and step count of the user.
- **Server:** Makes predictions and warns Stress Watch.

- **Data Flow:**

- The watch will send its measures to the server.
- The server will consolidate this data and produce a prediction of how stressed the user is.
- The server will send the prediction back to the watch, notifying the user.

- **Machine Learning:**

- Task: Classification
- Features: humidity, temperature, step count, stress level
- Target Features: stress level
- Recommended Model: Logistic Regression
- Plots/Metrics: At least use 2 model evaluation metrics, and 1 pre-processing plot

2 Use Case: Moist Meter

A large-scale agricultural farm aims to optimize water usage through smart irrigation. To do this, the farm deploys a soil moisture prediction system powered by IoT sensors and machine learning.

- **Dataset:**

- **Data:**

- * Humidity - Double
 - * Atmospheric Temperature - Double
 - * Soil Temperature - Double
 - * Dew Point - Double
 - * Soil Moisture - Double
 - Atmospheric data: humidity, atmospheric temperature
 - Soil Data: soil temperature, dew point

- **IoT Devices:**

- **Atmospheric Sensor:** Measures atmospheric, this will measure the humidity and atmospheric temperature.
 - **Soil Sensor:** Measures soil-related data, this will measure the soil temperature and dew point.
 - **Server:** Makes predictions and notifies how much moisture is currently in the ground

- **Data Flow:**

- Both devices transmit their readings to a central server.
 - The server will consolidate this data and produce a prediction of how moist the soil will be.

- **Machine Learning:**

- Task: regression
 - Features: humidity, atmospheric temperature, soil temperature, moist meter
 - Target Features: moist meter
 - Recommended Model: Linear Regression
 - Plots/Metrics: At least use 2 model evaluation metrics, and 1 pre-processing plot

3 Use Case: Server Crash Prediction

A shipping company tracks telemetric data from multiple servers, with this data they can predict whether or not a server will crash.

- **Dataset:**

- cpu-user - Double
- cpu-system - Double
- cpu-wait - Double
- disk-read - Double
- disk-write - Double
- mem-used - Double
- swap-used - Double
- net-eth0-rx - Double
- net-eth0-tx - Double
- net-eth1-rx - Double
- net-eth1-tx - Double
- sch-threads - Double
- build-status - Categorical: RUNNING / NOTRUNNING

- **IoT Devices:**

- **CMS:** requests telemetric data from server, requests prediction
- **Server:** sends telemetric data.
- **OutagePrediction:** receives telemetric data and predicts outage.

- **Data Flow:**

- The CMS requests parameters from the server
- The Server sends the data to CMS
- CMS sends the data to OutagePredictor
- OutagePredictor predicts whether or not the server will have an outage or not

- **Machine Learning:**

- Task: Classification
- Features: cpu-user,cpu-system,cpu-wait,disk-read,disk-write,mem-used,swap-used,net-eth0-rx,net-eth0-tx,net-eth1-rx,net-eth1-tx,sch-threads,build-status
- Target Features: build-status
- Recommended Model: Logistic Regression
- Plots/Metrics: At least use 2 model evaluation metrics, and 1 pre-processing plot