WEATHER APP THAT'S DEALS DISASTER WITH CONFIDENCE

SANGAI WEATHER

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Hackathon Name: TechSprint Manipur 1.0

PROBLEM STATEMENT

- Designed an AI-driven platform that analyzes weather, satellite and historical disasters data to predict risks such as flooding, landslides, heatwaves and provide actionable alerts to communities and local adminstration
- Manipur is highly susceptible to landslides during monsoon season cutting off vital supply routes
- Directly addresses Governance and Social Impact by improving disaster preparedness.

PROPOSED SOLUTION

- An AI-driven platform that provides early warnings and actionable alerts for impending environmental risks.
- It predicts high-risk events like landslides and floods before they happen, allowing for preemptive action.
- Unlike generic weather apps, Sangai Weather is fine-tuned specifically for Manipur’s unique topography and infrastructure vulnerabilities

USE OF ARTIFICIAL INTELLIGENCE

- WHY AI? Traditional topological formulas cannot easily predict historical landslide data with real-time soil moisture saturation, That's why we use AI to predict
- Standard models often fail to account for the non-linear patterns of local weather
- Techniques used: XGBoost Regression, Random Forest, Logistic Regression
- Workflow:
  - Input: real-time weather feeds, and historical disaster data.
  - Output: Automated App Alerts

HOW OUR AI WORKS

Rain fall model -> XGBoost Regreesor

```
Rainfall MAE: 6.450153612372873
Rainfall R2: 0.8721555006199438
```

LandSlide model -> Random Forest Classifier

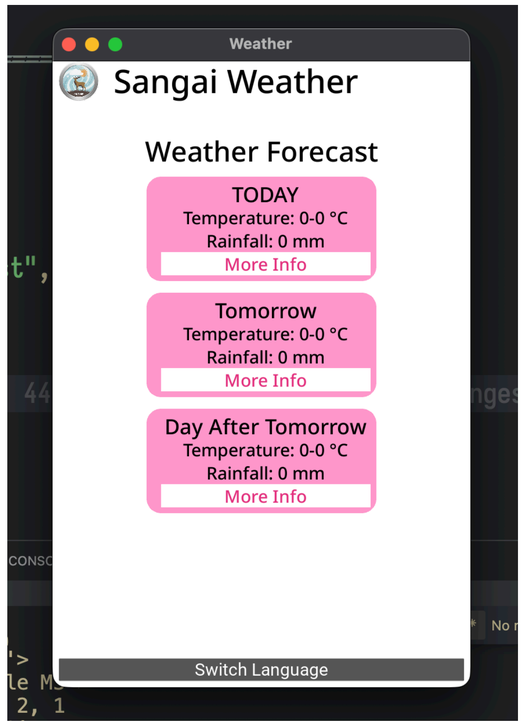
```
Landslide Model
              precision    recall  f1-score   support

           0       0.70      0.79      0.75       700
           1       0.31      0.21      0.25       300

    accuracy                           0.62      1000
   macro avg       0.50      0.50      0.50      1000
weighted avg       0.58      0.62      0.60      1000
```

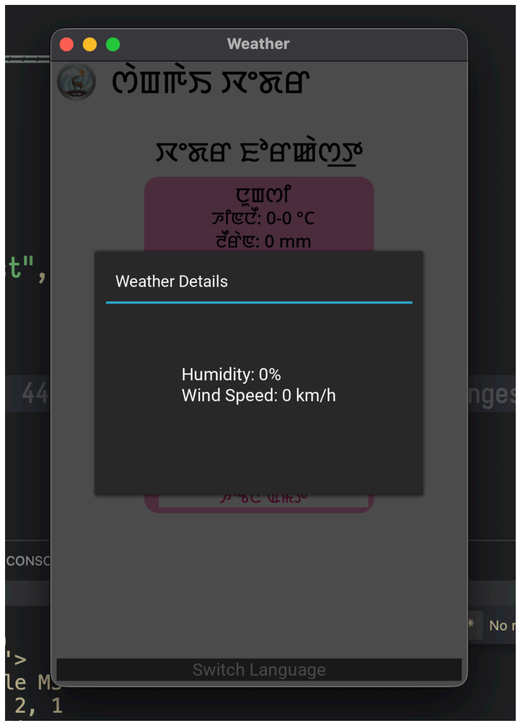
Flood model -> XGBoost Classifier

```
Flood Model
              precision    recall  f1-score   support

           0       0.71      0.43      0.53       709
           1       0.29      0.58      0.39       291

    accuracy                           0.47      1000
   macro avg       0.50      0.50      0.46      1000
weighted avg       0.59      0.47      0.49      1000
```

- We have used rule based approach for predicting Cold Wave, Heat Wave, Hailstorm

UI/UX



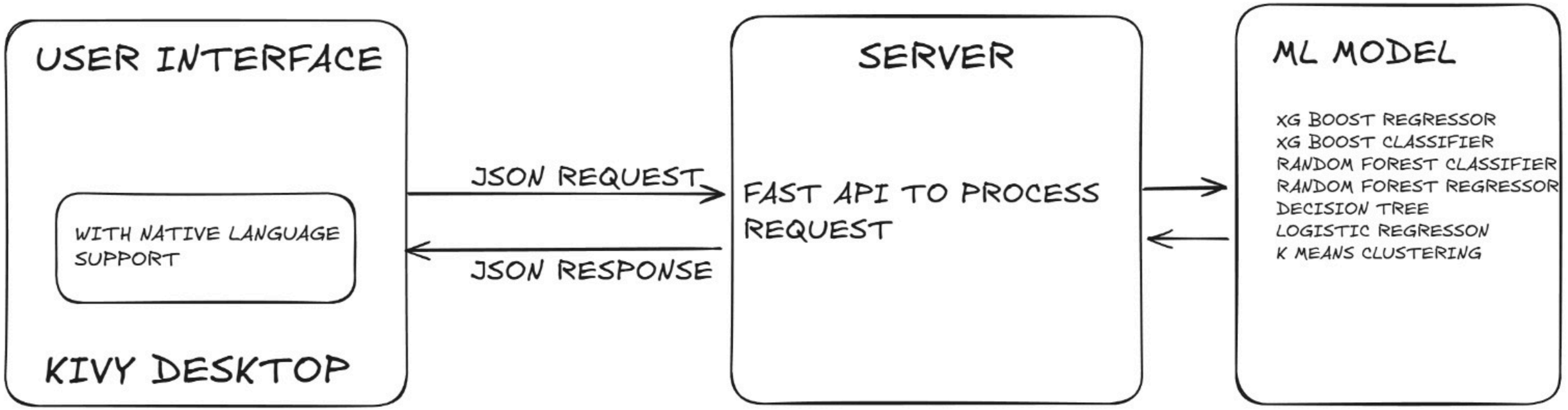


- UI/UX App with Diaster Warning, Local Native Language Support(Meetei Mayek)

TECHNOLOGY STACK

- Python(Backend),Kivy(Frontend)
- Frameworks: Requests, Scikit Learn, FastAPI

SYSTEM ARCHITECTURE



OUR INNOVATION

- Topography-Aware: we have designed the model considering the varied topological factors in Manipur
- Using one model has blindspots, so we are using multiple models (XGBoost, Logistic Regression, Random Forest, Decision Tree) that cover each other-ensemble learning.
- Native language support: we have integrated our UI to support Meetei Mayek Script, so that locals can use the app without any inconvenience.

IMPACT/VALUE PROPOSITION

- Aiming for a 20-30% reduction in response time and minimized agricultural loss through early heatwave/flood alerts.
- Increased security to local communities

FEASIBILITY & SCALABILITY

- The model can be trained on data from other Himalayan states or regions across India
- Integration with IoT ground/AQI sensors (soil moisture/ river levels/air quality levels) for even higher accuracy in Phase 2.