

FIREGUARD AI

TEAM CODEBITS

Problem Statement:

In India, a forest fire goes undetected every 6 minutes.

Each year, over 50,000 hectares burn, causing ₹440 crores in direct losses and displacing thousands. 200+ lives are lost annually — all while detection lags by 4-6 hours, making response too late to save forests, wildlife, or people.

In 2024 alone:

- Odisha: 1,200 fires, 8,500 hectares lost
- Rajasthan: 890 fires, 12,000 hectares affected

Current systems are reactive, not predictive. What we need is a smart, predictive system — one that can analyze historical fire data, weather patterns, forest dryness indices, and wind behavior to anticipate high-risk zones before a single flame is lit. A solution that can alert authorities and local communities in real-time, minimizing human and ecological losses — not after the damage is done.

Our vision:

Transform India's forest fire management from reactive response to predictive prevention using AI.

Our mission:

Deploy a real-time forest fire prediction system that provides advance warnings, reducing forest loss by 60% and saving lives through early intervention powered by machine learning.



Replace reactive firefighting with proactive prevention through AI-powered risk assessment and early warning systems.



Leverage 10M+ data points and XGBoost machine learning to deliver 92%+ accurate fire risk predictions for forest departments.



Build from proven Uttarakhand model at present, creating a national forest protection ecosystem.

The Game Changer – FireGuard AI

Our Breakthrough:

- **XGBoost ML** model trained on **10M+ real forest fire data points**
- **92%+** accuracy, validated with real performance metrics
- **Interactive dashboards** highlighting high-risk fire zones
- Production-ready – Live demos built in **Streamlit + React**

The Proven Technology:

- **Trained** on Uttarakhand fire incident data
- **Integrated** SWIR satellite imagery for thermal insights
- Binary classification with **real-time probability scores**
- **Visualizes** live risk zones with map overlays

The Technology Used:

1. TRAINING DATA:

- 10 million fire incident data points from Uttarakhand
- SWIR (Short-Wave Infrared) satellite imagery
- Land cover classifications
- Fire temperature and day/night patterns
- Latitude/longitude coordinates

2. XGBOOST ML MODEL:

- Binary classification (Fire Risk: Yes/No)
- 6 key features: SWIR norm, land cover, fire temp, day/night, lat/lon
- 92%+ accuracy with ROC AUC optimization
- Handles class imbalance with scale_pos_weight

3. REAL-TIME PREDICTION SYSTEM

- NPZ to JSON conversion for web display
- Interactive heatmaps showing fire risk zones
- Streamlit dashboard for forest departments
- React frontend for real-time visualization

**Thank you
very much!**