SUMMER OF CSI - 2025

Track: Tech-AI/ML Track

Data-Driven Environmental Monitoring and Risk Prediction

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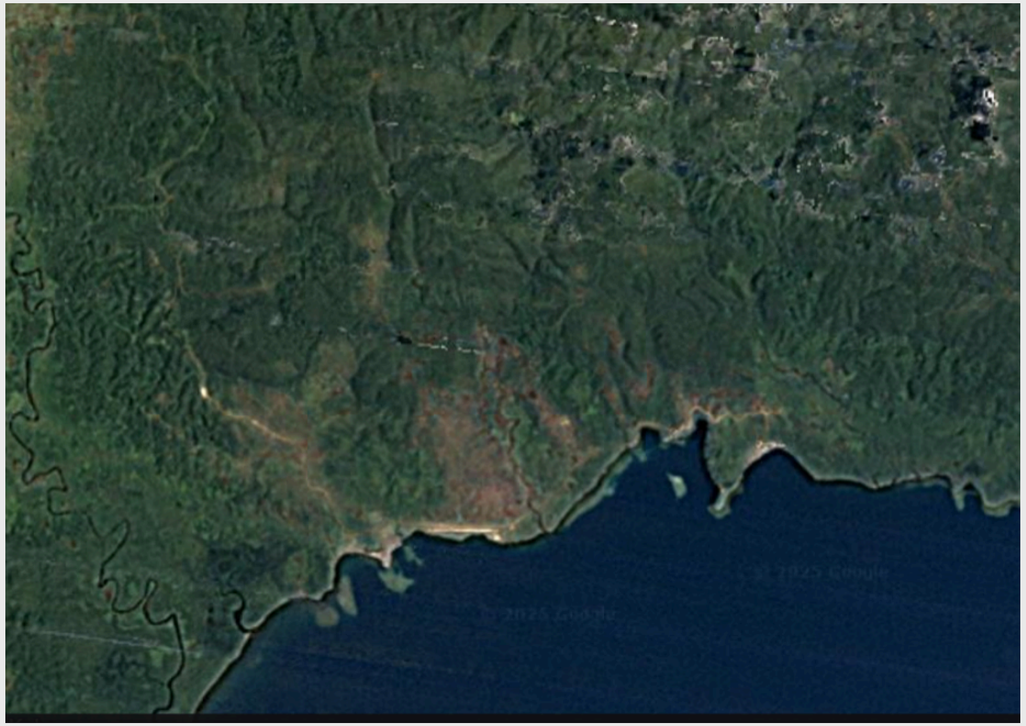
Why This Matters

- India’s push to scale nuclear power must not overlook social and ecological costs.
- Communities near mines face water contamination, health threats, and disrupted livelihoods.
- Lack of transparency amplifies grievances and fosters mistrust.
- Aligning operations with net-zero commitments & ESG principles is both moral and strategic.

Task 1: Satellite-Based Environmental Change Detection



Weda Bay Nickel Mine , Indonesia 2010 vs 2020

ENVIROMENTAL IMPACTS OF WEDA BAY NICKEL MINE

- Mining and smelter expansions cleared extensive forest land, with concessions overlapping ~40% of uncontacted Forest Tobelo territory.
- Satellite imagery confirms significant forest degradation around Weda Bay
- Pollution levels in fish and rivers exceed safety thresholds, eroding public trust and health.
- Loss of forest cover has increased flood frequency.
- Concessions encroach upon lands of the O’Hongana Manyawa (Forest Tobelo), an uncontacted tribe.

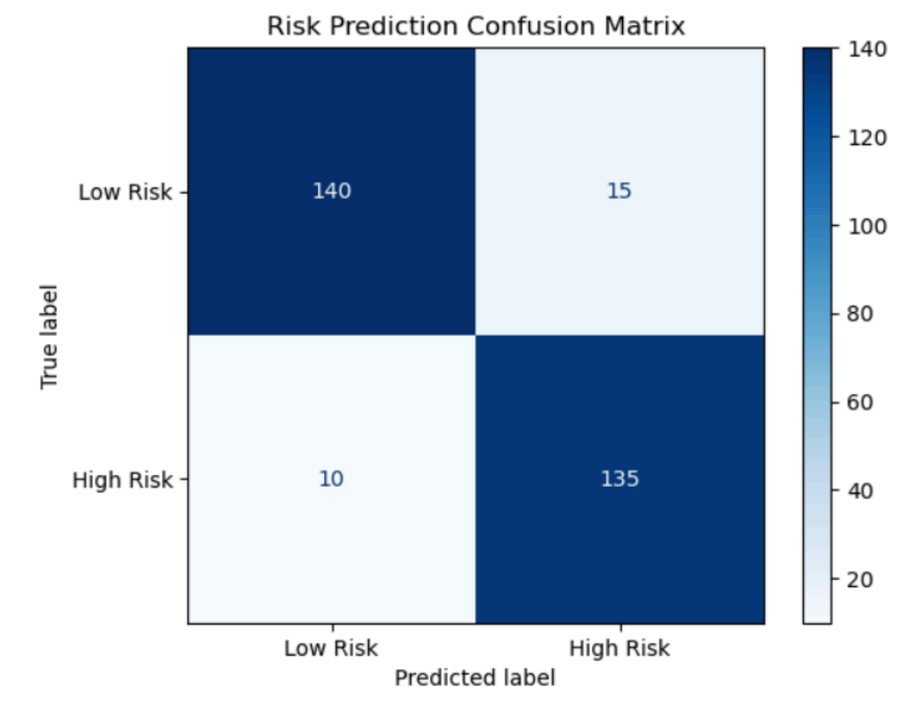
Task 2 : Develop a Risk Prediction Model

Dataset Used : https://github.com/RudranilJadhav/CSI_Project/blob/main/Dataset.csv

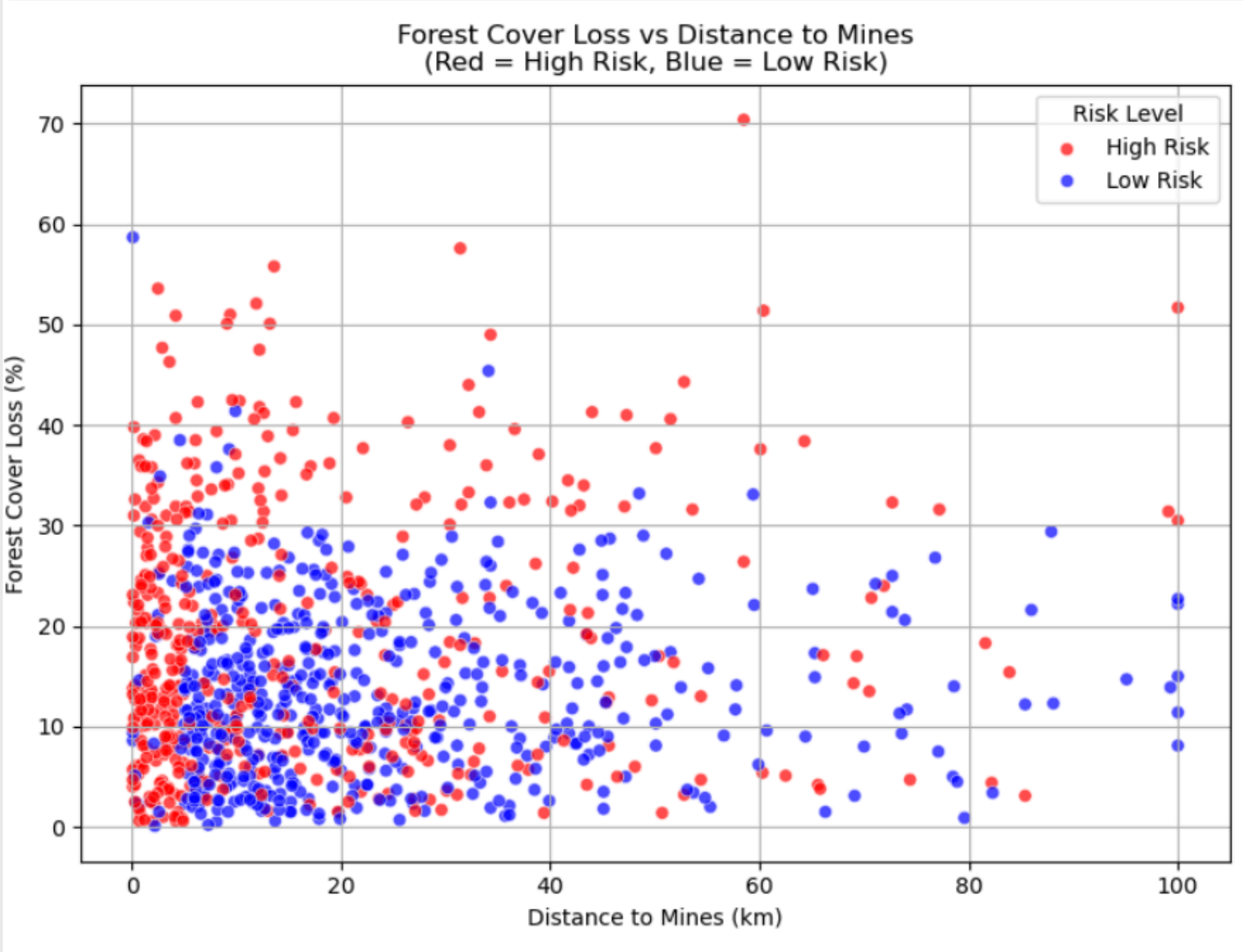
- Proxy datasets Features : Distance to mine , forest cover loss and illness reported
- Machine Learning algorithm used : Random Forest Classifier

Results

- F1 Score : 0.92
- Precision : 0.93
- Recall : 0.90



TASK 3: VISUALIZE THE FINDINGS



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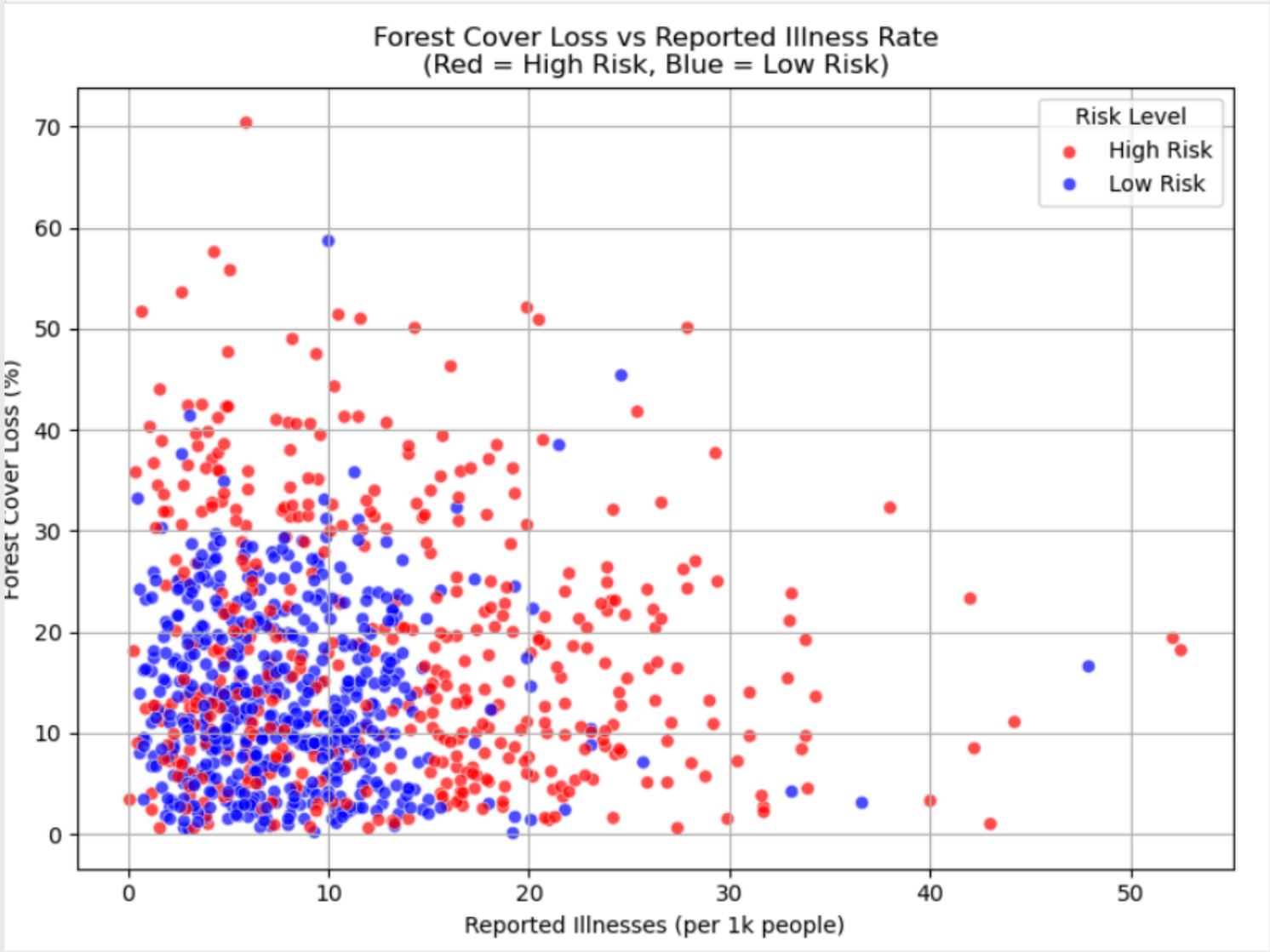

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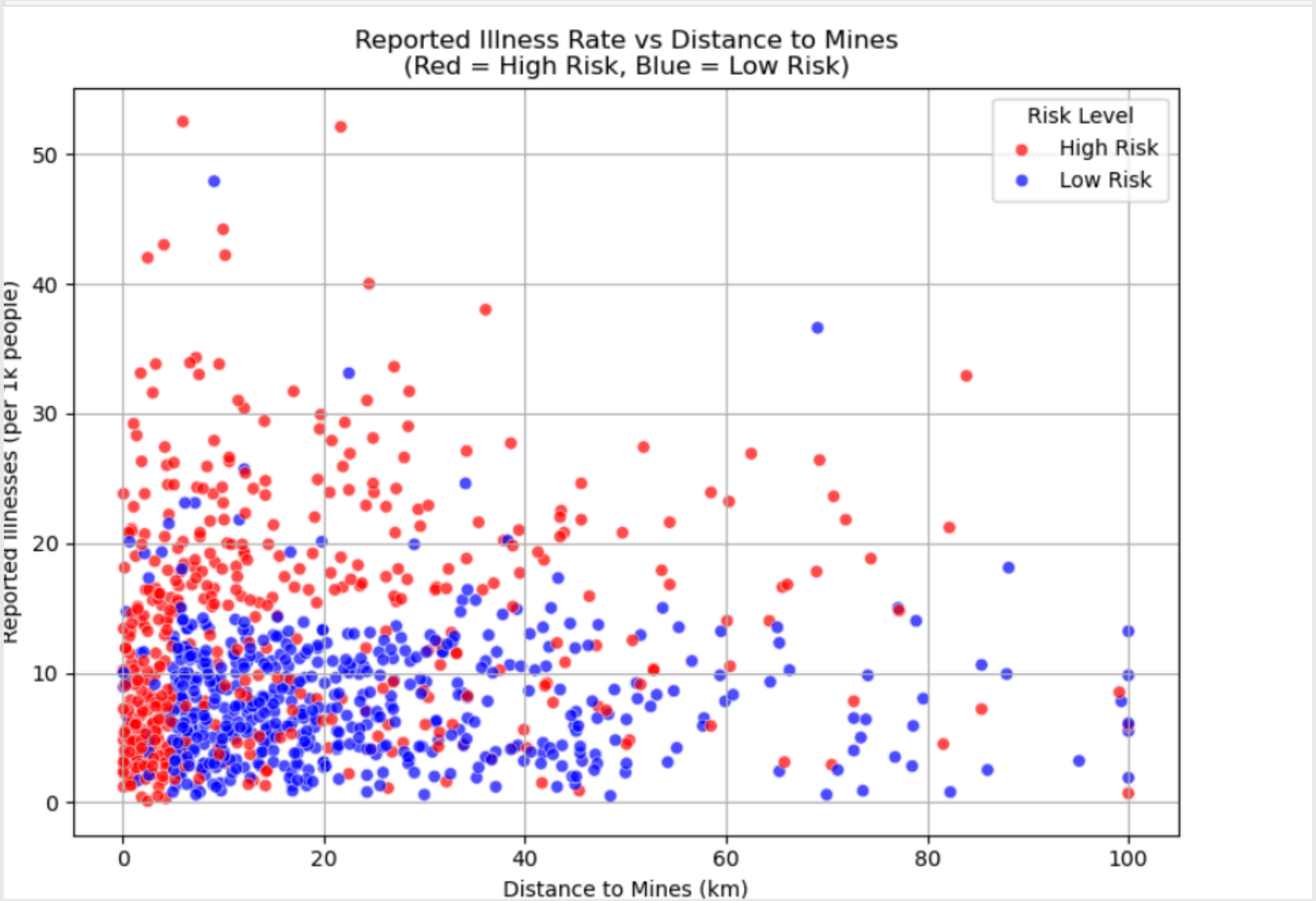

THANK YOU