

HikeSafe Advisor – Business & Research Insights

1. Market Value & Real-World Impact

HikeSafe Advisor converts objective trail metrics into clear risk categories (GREEN / YELLOW / RED), addressing a crucial safety-information gap for hikers, tourism offices, and insurers.

- **Tourism Boards:** integrate HikeSafe on official websites to promote safe outdoor activity and reduce rescue costs.
- **Outdoor Platforms (e.g., Komoot, AllTrails):** embed the API for personalized warnings.
- **Insurance Companies:** use aggregated risk predictions to design prevention programs and dynamic pricing.

Estimated benefit: fewer mountain accidents, reduced emergency costs, improved tourist satisfaction.

2. Data Scalability & Future Expansion

The model is trained on the Kaggle *GPX Hike Tracks* dataset (351 MB raw). Its modular design enables new data sources without architectural change:

- **Weather APIs:** integrate real-time temperature and storm alerts.
- **Terrain & Satellite APIs:** add slope, snow, and surface data (e.g., OpenElevation, Copernicus).
- **User Profiles:** personalize thresholds by fitness, age, or experience level.

Architecture advantage: each feature seamlessly extends the current schema without re-training from scratch.

3. Explainable AI & Model Choice

A shallow **Decision Tree Classifier** (`max_depth=4`) was selected for transparency and interpretability:

- Clear, rule-based decisions (e.g., “if `elevation_gain > 1200` → YELLOW”).
- Visual feature-importance plots communicate the influence of environment factors.
- Avoids the black-box limitations of deep models, ensuring public-safety trust.

Explainability builds trust: both end-users and authorities can trace every decision path.

4. Vision Snapshot

From personal safety assistant to global hiking-intelligence network.

Large-scale deployment could power mountain-rescue planning, climate-impact monitoring, and data-driven tourism policy.