**GROUP 4 PROJECT PROPOSAL**

**GROUP 4 MEMBERS**

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**1. Project Title**

**SafeBristol – AI-Powered Crime Prediction & Safety Advisory App**

**2. Project Overview**

Bristol is a vibrant and diverse city, but crime rates differ significantly across its neighborhoods. Many students, professionals, and newcomers face challenges making informed decisions about their safety, especially when commuting or relocating to new areas.

**SafeBristol** is an AI-powered Android mobile application designed using Android Studio, Kotlin, and XML. The app predicts crime trends, provides real-time safety insights, and recommends safe travel routes. Machine learning models are trained on historical crime data, user reports, and environmental variables. The application leverages the UK Police API via Retrofit and integrates Google Maps SDK to visualize crime heatmaps, offer anonymous incident reporting, and suggest safe routes powered by AI.

**3. Problem Statement**

* Lack of predictive, real-time crime data for informed public safety decisions.
* Uneven crime distribution across Bristol neighborhoods, with low awareness among new residents.
* Public safety concerns affecting housing, transport, and nightlife choices.
* Policymakers and safety authorities lack robust data-driven tools for resource allocation.

**4. Objectives**

* Develop machine learning models to forecast crime hotspots.
* Provide real-time, location-based safety alerts.
* Implement a safe route planner using graph-based algorithms.
* Visualize crime data with an interactive heatmap.
* Enable crowdsourced safety reporting and community engagement.
* Generate analytics dashboards for policymakers and city planners.

**5. Key Features**

**Crime Prediction Model**

* Uses Random Forest, LSTM, or XGBoost for prediction.
* Inputs: crime history, time, weather, social context.
* Outputs: neighborhood-specific risk scores.

**Safe Route Planner**

* Graph-based algorithms (Dijkstra’s or A\*).
* Integrates Google Maps and public transport data.
* Recommends least-risk walking and commuting routes.

**Interactive Crime Heatmap**

* Real-time, color-coded map.
* Filters by crime type, location, and time.
* Updates via UK Police API using Retrofit.

**Real-Time Safety Alerts**

* Push notifications when entering high-risk zones.
* Customizable based on user preferences.

**Crowdsourced Safety Reporting**

* Users can report suspicious activities anonymously.
* NLP filters assess urgency and flag misuse.

**Data Analytics Dashboard**

* Visualizes crime trends and risk zones.
* Aids in public safety planning and policy decisions.

**6. Data Sources**

* UK Police API (via Retrofit)
* Bristol City Council Community Safety Reports
* UK Met Office API (weather data)
* Transport for London (TfL) API (for transport safety patterns)
* User-submitted safety reports

**7. Technology Stack**

**Frontend**: Android Studio, Kotlin, XML, Google Maps SDK, Figma

**Backend**: Python (Flask/Django), Firebase (authentication & database), PostgreSQL (optional), ML libraries (Scikit-learn, TensorFlow, PyTorch)

**Libraries & APIs**: Retrofit, Firebase Auth, Google Maps API, UK Police API

**Cloud & Deployment**: Google Cloud/Firebase, Docker

**Tools**: GitHub, Trello, UWE Blackboard

**8. Project Schedule (Agile-inspired)**

| **Phase** | **Tasks** | **Duration** |
| --- | --- | --- |
| Phase 1 | Research & Data Collection | 2 Weeks |
| Phase 2 | Model Development & Training | 4 Weeks |
| Phase 3 | Frontend & Backend Integration | 4 Weeks |
| Phase 4 | Testing & Refinement | 3 Weeks |
| Phase 5 | Deployment & Evaluation | 2 Weeks |

**9. Expected Outcomes**

* Fully functional SafeBristol prototype.
* Real-time safety alerts and travel suggestions.
* Crime prediction model and heatmap visualization.
* Data dashboard for decision-makers.
* Increased community participation in safety reporting.

**10. Risk & Mitigation**

| **Risks** | **Mitigation Strategies** |
| --- | --- |
| Data Privacy | Ensure GDPR compliance and data anonymization |
| Model Accuracy | Use ensemble methods and model validation |
| User Adoption | Partner with UWE and Bristol City Council for outreach |
| Data Limitations | Leverage multiple data sources + crowd input |
| Technical Complexity | Use low-code tools for rapid MVP development |

**11. Ethical Considerations**

1. **Data Privacy**: Full anonymization of user data, GDPR-compliant design.
2. **Informed Consent**: Clear opt-in/opt-out settings.
3. **Bias Prevention**: Balanced ML models to reduce geographic/demographic bias.
4. **Transparency**: Users informed on AI predictions and limitations.
5. **Responsible Reporting**: NLP moderation of user-generated content.
6. **Accessibility**: Inclusive app design for all users.
7. **Ethical Data Use**: Avoids fear-mongering and stereotyping.

**12. Related Works & Innovation**

| **Project/Tool** | **Description** | **SafeBristol's Improvement** |
| --- | --- | --- |
| **StreetSafe UK** | Allows users to report areas they feel unsafe. | Adds AI predictions, route planning, and heatmaps. |
| **UK Police API Tools** | Provides crime stats by location. | Adds ML modeling and real-time routing. |
| **TfL Open Data** | Offers transport data but lacks safety features. | Integrates safety data for transit planning. |
| **Bristol Council Safety Reports** | Periodic static reports. | Offers real-time, user-friendly mobile platform. |

**Additional Similar Research & Projects:**

* **ShotSpotter (USA)**: Uses sensors to detect gunshots and predict danger zones in cities like Chicago and New York. *SafeBristol offers a more generalized, crowd-driven alternative without expensive infrastructure.*
* **PredPol (USA)**: Predictive policing tool for law enforcement. *SafeBristol focuses on community empowerment and transparency.*
* **WalkSafe App (UK)**: Alerts users to recent crimes nearby. *SafeBristol improves on this by adding AI-driven predictions and safe routing.*

**13. Relevant Authorities & Sponsorship**

SafeBristol has initiated partnerships and aligned its goals with the following stakeholders:

1. **Bristol City Council – Community Safety Team**
2. **Avon and Somerset Police**
3. **University of the West of England (UWE) – Smart Cities Research Group**
4. **Office for National Statistics (ONS) – Crime and Justice Team**
5. **UK Home Office – StreetSafe Initiative**
6. **Transport for London (TfL)** *(for best practices)*
7. **Bristol Neighbourhood Watch Association**

**Sponsorship Status**: The project is being supported and reviewed by these relevant authorities. **Formal approval is currently pending**, but initial discussions have been positive, and the team is working towards full endorsement.

**14. Conclusion**

SafeBristol is a timely, community-centered innovation aimed at improving safety, awareness, and decision-making for residents and visitors in Bristol. It combines real-time data, predictive analytics, and crowdsourced reporting into one comprehensive tool. With the support of local institutions and a focus on ethical AI, SafeBristol aims to become a model safety platform for cities across the UK.

**15. References**

* UK Home Office (2022) *StreetSafe*. <https://www.police.uk/pu/notices/streetsafe/street-safe/>
* UK Police Data API (2025) *UK Police Data*. <https://data.police.uk/data/>
* UK Met Office (2025) *Weather Data API*. <https://www.metoffice.gov.uk/services/data>
* Transport for London (2025) *TfL Open Data*. <https://tfl.gov.uk/info-for/open-data-users/>
* Bristol City Council (2023) *Community Safety and Crime Statistics*. <https://www.bristol.gov.uk/>
* University of the West of England (2024) *UWE Harvard Referencing Guide*. <https://www.uwe.ac.uk/study/study-support/study-skills/referencing/uwe-harvard>