**Project Overview: AI-Powered EV Charging Station Map for Hong Kong**

**Project Goals:**

1. **Primary Goal:** Create a user-friendly, AI-enhanced map of EV charging stations in Hong Kong to help EV owners find compatible chargers quickly and efficiently.
2. **Secondary Goals:**
   * Provide real-time and predictive insights (e.g., availability, pricing, route optimization).
   * Enhance user experience with AI-powered features like chatbots and personalized recommendations.
   * Promote sustainable EV adoption by making charging more accessible and convenient.

**Key Features:**

1. **Interactive Map:**
   * Display all public EV charging stations in Hong Kong.
   * Filter by charger type (e.g., Type 2, CCS, CHAdeMO, Tesla Supercharger).
   * Filter by car model compatibility.
2. **AI-Powered Features:**
   * **Predictive Availability:** Forecast station availability based on historical data and real-time usage.
   * **Route Optimization:** Suggest optimal routes with charging stops based on car range, traffic, and station availability.
   * **Chatbot:** Provide real-time assistance via NLP-powered chatbot (e.g., “Where’s the nearest CCS charger?”).
   * **Sentiment Analysis:** Analyze user reviews to highlight popular or problematic stations.
   * **Dynamic Pricing Insights:** Show cost-saving tips based on time-of-use pricing and nearby station rates.
3. **User-Friendly Interface:**
   * Mobile and desktop compatibility.
   * Multi-language support (e.g., English, Cantonese).
   * Real-time updates and notifications.

**Technical Components:**

1. **Frontend:**
   * Frameworks: React, Angular, or Vue.js.
   * Mapping: Google Maps API, Mapbox, or OpenStreetMap.
2. **Backend:**
   * Frameworks: Node.js, Django, or Flask.
   * Database: PostgreSQL or MongoDB.
3. **AI/ML Models:**
   * Predictive Availability: LSTM, ARIMA.
   * Route Optimization: Graph algorithms (e.g., Dijkstra’s, A\*).
   * Chatbot: OpenAI GPT, Google Dialogflow.
   * Sentiment Analysis: BERT, VADER.
   * Image Recognition: TensorFlow, OpenCV.
   * Anomaly Detection: Isolation Forest, Autoencoders.
4. **APIs and Integrations:**
   * Charging station data APIs (e.g., government databases, PlugShare).
   * Traffic and weather APIs for route optimization.
   * Payment gateway integration (if offering premium features).