**Datathon 2025 Project: AI-Powered Traffic Insights (Insighty)**

**Team Information**

**Team Name:**

Insighty

**Team Members & Roles:**

**Ahmed Ashraf** **–** Backend Engineer **/** AI/ML Engineer

**Youssef Aly** **-** Data Scientist **/** AI/ML Engineer

**Sidi Chaikh** **–** UI/UX **/** Frontend Developer

**Mohaned Walid** **–** Frontend Developer

**Osama Hardan –** Data Scientist **/** AI/ML Engineer

**Contact Lead:**

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**Theme Track:** main topic: Traffic | sub-topics: Population, Environment and more

**Project Overview**

Traffic congestion is a major challenge in Qatar, affecting daily commutes, logistics, and urban development. Our project introduces an **AI-powered chatbot** that enables users to analyze traffic data interactively. Alongside the chatbot, users can choose from various **visual charts** to gain insights and compare traffic patterns over time.

By integrating data analysis with AI assistance, we aim to help decision-makers, urban planners, and policymakers **identify congestion patterns, optimize traffic flow, and enhance transportation planning**. Our solution empowers users to interact with complex datasets in an intuitive way, making traffic insights more accessible and actionable.

**Data Analysis & Approach**

We utilized **NPC datasets** on traffic patterns, vehicle density, and congestion trends. Our methodology involved:

1. **Data Preprocessing:** Cleaning, structuring, and organizing datasets for better analysis.
2. **Visualization Tools:** Implementing interactive **charts and dashboards** for real-time comparison.
3. **AI Chatbot Integration:** Developing an AI assistant that helps users interpret data, suggest optimizations, and compare different traffic factors.
4. **Comparative Analysis:** Enabling users to **overlay different datasets** for insights into trends, anomalies, and predictive modeling.

These techniques allow for a seamless blend of **AI-driven insights** with visual representations, making complex traffic data more digestible.

**Key Outcomes**

Our project produced three key insights:

**Impact & Applications**

Our AI-powered solution can benefit:

* **Government Authorities:** For **better traffic management policies** and urban planning decisions.
* **Commuters & Businesses:** Providing insights for optimizing travel routes and reducing delays.
* **Smart City Initiatives:** Integrating AI-driven analytics into Qatar’s broader digital transformation goals.

**Recommendations:**

1. Implement **dynamic traffic light adjustments** in high-congestion zones.
2. Promote **alternative transport solutions** based on peak-hour congestion data.

**Technical Implementation**

Our project consists of:

* **AI Chatbot:** Built with **Next.js** to assist users in understanding and comparing traffic data.
* **Data Visualization Dashboard:** Featuring **interactive charts** using libraries like **D3.js or Recharts** for intuitive exploration.
* **Database Integration:** Storing historical traffic data to **train predictive models** for congestion forecasting.

**Screenshots & Demonstrations**

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**Challenges & Future Directions**

**Challenges:**

* **Data Gaps:** Some traffic datasets lacked real-time updates, requiring **data interpolation techniques**.
* **AI Interpretation Accuracy:** Ensuring the chatbot provided **reliable insights** without misleading users.
* **User Experience:** Designing a **seamless interface** that blends AI interactions with data visualizations.

**Future Enhancements:**

**Conclusion**

Our **AI-powered chatbot and visualization platform** transforms how Qatar manages and analyzes traffic data. By merging **interactive analytics with AI-driven insights**, we empower decision-makers with smarter tools for urban mobility. This project represents a significant step toward **data-driven traffic optimization** in Qatar.