

ACCIDENTS DATA ANALYSIS SYSTEM

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ABSTRACT

The Traffic Accident Data Analysis System is a data science-based application developed using Python to analyze and visualize road accident data. The system processes accident records to identify patterns related to accident severity, weather conditions, road surface types, lighting conditions, and peak accident hours. An interactive web interface is built using Streamlit, enabling users to explore accident trends through dynamic charts and dashboards. The project helps in understanding critical factors contributing to accidents and supports decision-making for improving road safety and traffic management.

EXISTING SYSTEM

1. Manual Data Analysis:

Accident data is traditionally analyzed using spreadsheets and static reports, which is time-consuming and error-prone.

2. Limited Visualization:

Existing systems provide basic charts that lack interactivity and detailed insights.

Example: Monthly accident reports without time-based or weather-based filtering.

3. No User Interaction:

Users cannot dynamically explore accident patterns or drill down into specific factors such as peak hours or road conditions.

PROPOSED SYSTEM

1. Interactive Data Analysis:

Uses Python and Streamlit to allow users to interact with accident data dynamically.

2. Visual Analytics:

Provides pie charts, bar charts, heatmaps, sunburst charts, and area graphs for clear understanding.

3. Real-Time Insights:

Automatically computes peak accident hours, most affected days, and dominant weather conditions.

4. User-Friendly Interface:

Sidebar-based navigation allows users to select different analysis modules easily.

5. Scalability:

Can handle large datasets efficiently using Pandas and optimized data processing.

6. Applications:

Traffic planning, road safety analysis, policy making, and academic research.

SOFTWARE REQUIREMENTS

- **Programming Language:**

- **Programming Language:**
Python 3.x

- **Libraries:**

- **Libraries:**
Pandas – Data manipulation

- **Libraries:**
Plotly – Interactive visualizations

- **Libraries:**
Streamlit – Web application framework

- **Tools:**

- **Tools:**
NotePad

- **Tools:**
Command prompt

- **Dataset:**

- **Dataset:**
traffic_accidents.csv

IMPLEMENTATION

1. Load accident dataset using Pandas.
2. Perform data cleaning and handling of missing values.
3. Extract time-based features such as hours and days.
4. Develop interactive dashboard using Streamlit.
5. Implement multiple analysis modules:
 - Drunk Driver Analysis
 - Weather-Based Analysis
 - Road and Light Condition Analysis
 - Weekly and Hourly Accident Trends
 - Accident peak hours
6. Display insights using interactive charts and graphs.

RESULTS

Traffic Analysis

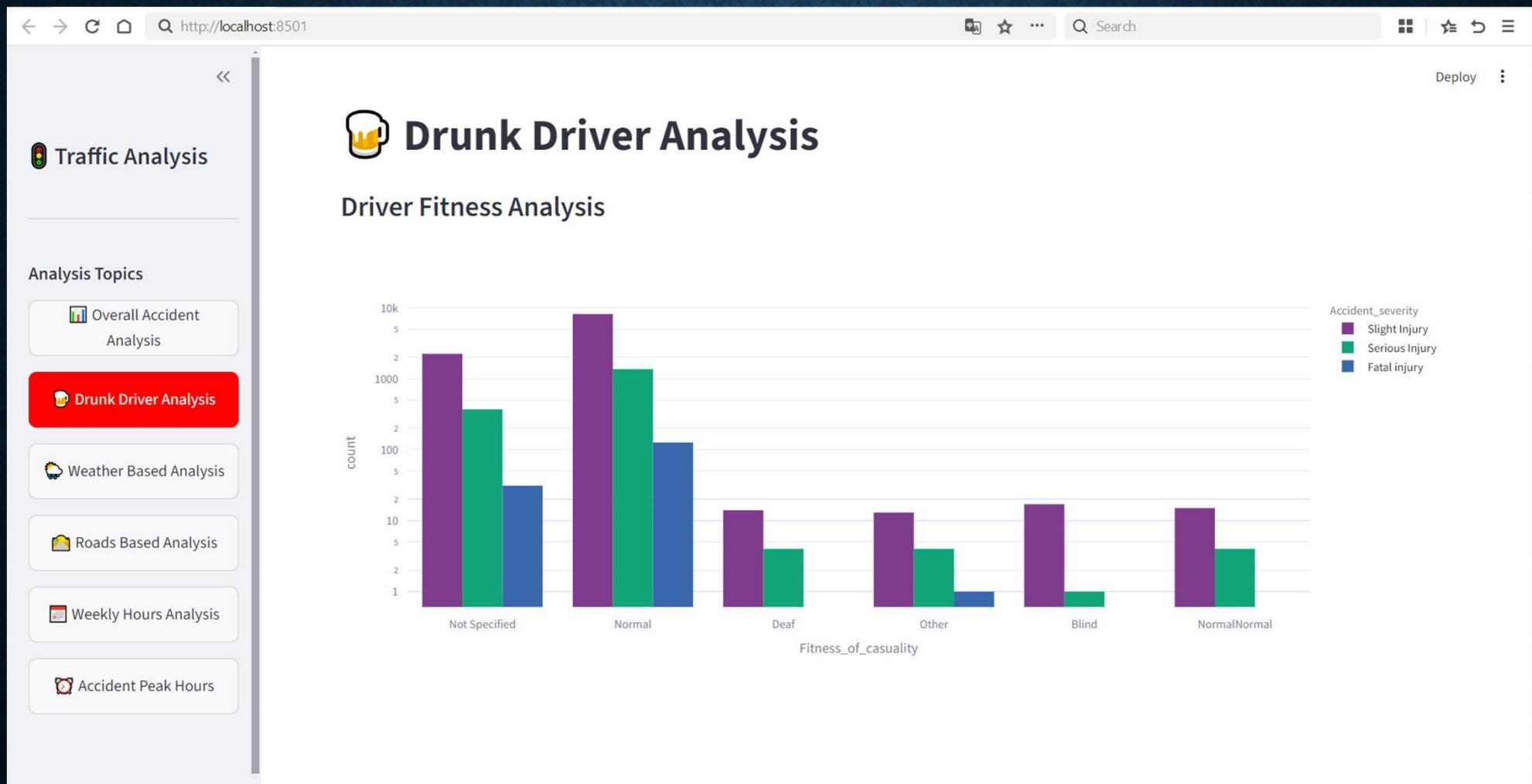
Total Records: 12,316 | Top Weather: Normal | Peak Hour: 17:00

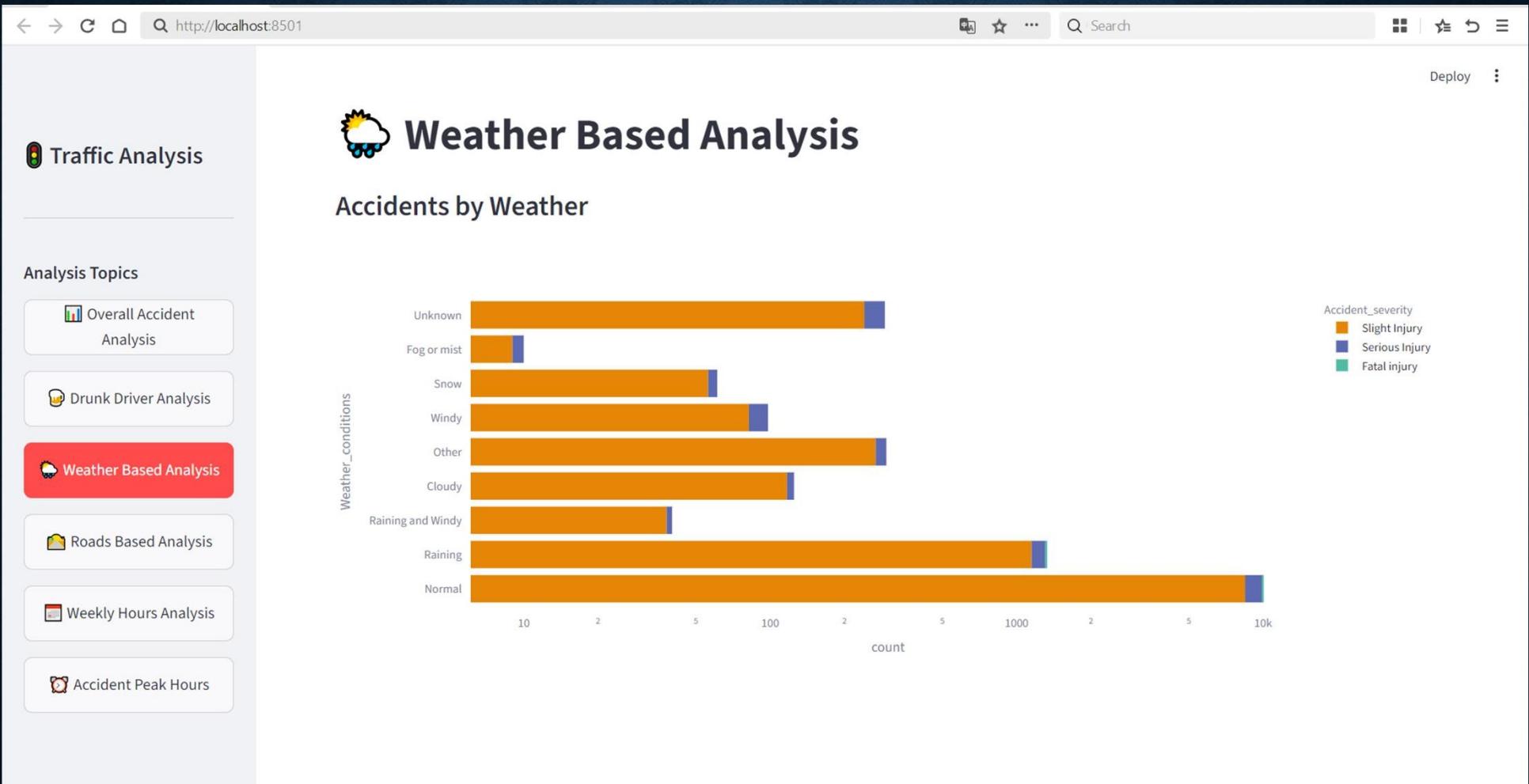
Severity Breakdown

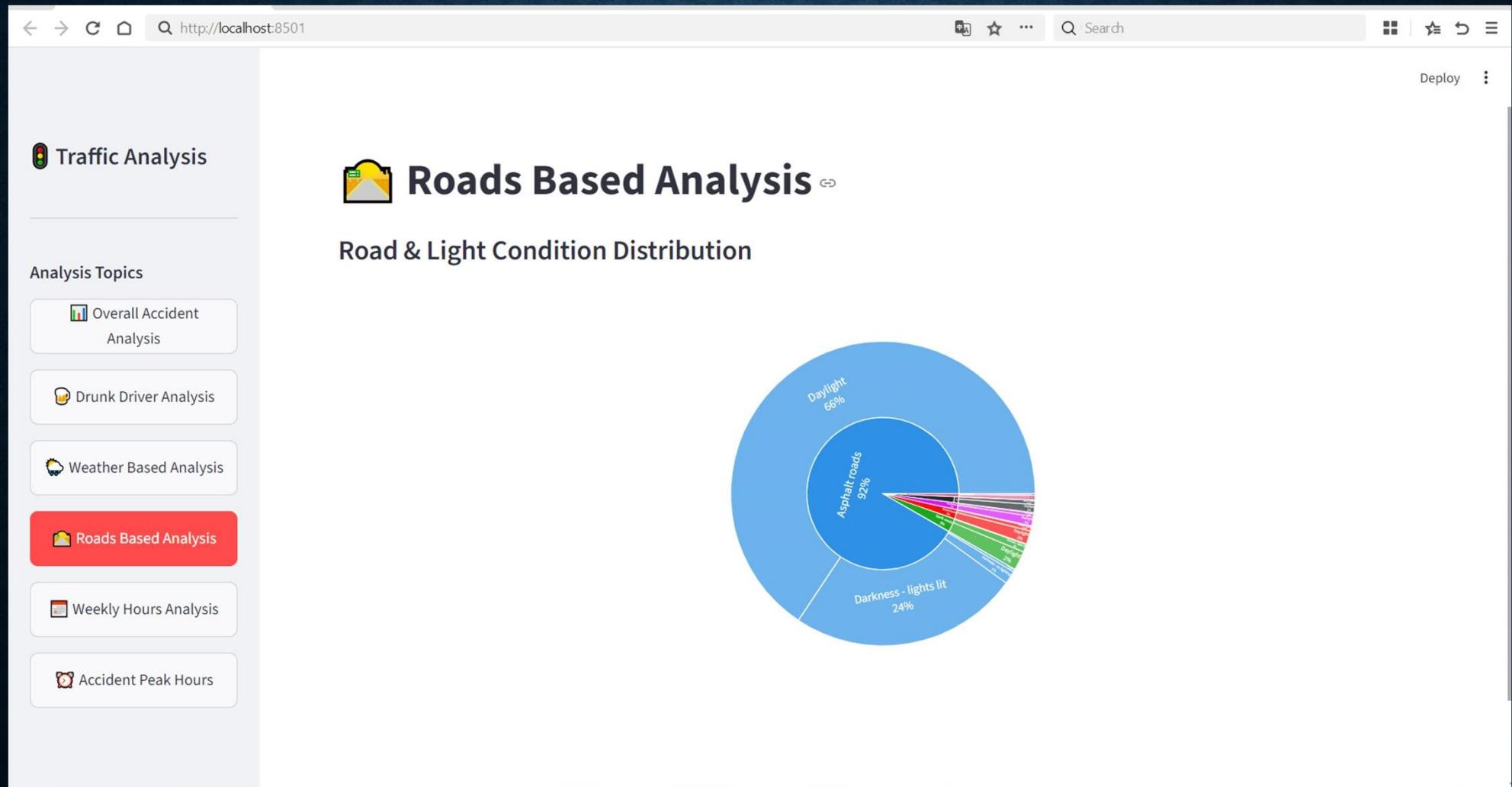
Injury Type	Percentage
Slight Injury	84.6%
Serious Injury	14.2%
Fatal injury	1.28%

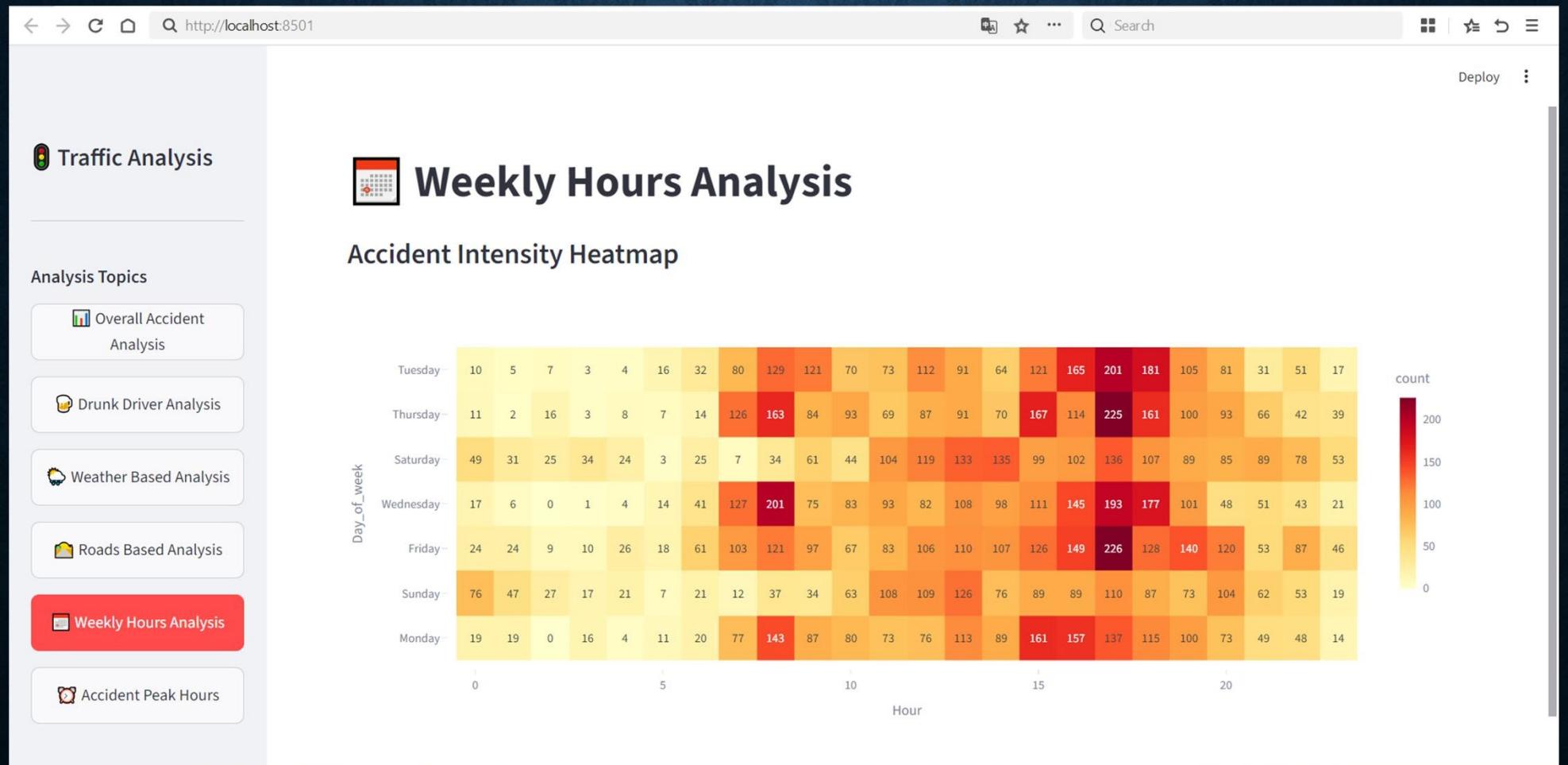
Weekly Frequency

Day	Value
Friday	2000
Thursday	1850
Wednesday	1800
Tuesday	1750
Monday	1650
Saturday	1650
Sunday	1450











CONCLUSION

The Traffic Accident Data Analysis System demonstrates the effective use of data science techniques for analyzing real-world traffic accident data. By combining Python, Pandas, Plotly, and Streamlit, the project delivers meaningful insights through an interactive and user-friendly interface. The system helps identify critical accident patterns and supports initiatives aimed at reducing road accidents and improving public safety.

FUTURE ENHANCEMENTS

- Integration of real-time accident data
- Location-based accident analysis using maps
- Predictive analysis for accident-prone areas
- Integration with government traffic databases
- Mobile-friendly dashboard interface

REFERENCES

- Python Documentation – <https://docs.python.org>
- Pandas Documentation – <https://pandas.pydata.org>
- Plotly Documentation – <https://plotly.com>
- Streamlit Documentation – <https://streamlit.io>

THANK YOU