# Project Proposal

## Title: Traffic Control System

## Group number:2

## Information of the group members:

| Name | ID |
|---|---|
| 1. Tapo Datta | 41230301560 |
| 2. Md Safayet | 41230301527 |
| 3. Showrub | 41230301554 |
| 4. Ashraful Islam | 41230301443 |
| 5. Twuhed Ahmad Rifat | 41230301559 |

| Project Feature | Language |
|---|---|
| **1. Real-Time Traffic Monitoring**<br>•**Sensor Integration**: Collects data from traffic sensors, cameras, and GPS devices.<br>•**Vehicle Tracking**: Monitors vehicle speed, density, and flow in real-time.<br>•**Traffic Heatmaps**: Visualizes traffic congestion on a map for easy analysis.<br><br>**2. Dynamic Traffic Signal Control**<br>•**Adaptive Signal Timing**: Adjusts traffic light timings based on real-time traffic conditions.<br>•**Priority Management**: Gives priority to high-traffic lanes or emergency vehicles.<br>•**Remote Control**: Allows traffic operators to manually override signals if needed.<br><br>**3. Pedestrian Crossing Management**<br>•**Dedicated Pedestrian Phases**: Includes specific timings for pedestrian crossings at intersections.<br>•**Crosswalk Detection**: Uses cameras to detect pedestrians waiting to cross.<br>•**Audible Alerts**: Provides audio signals for visually impaired pedestrians.<br><br>**4. Violation Detection and Enforcement**<br>•**Red Light Violation Detection**: Identifies vehicles running red lights using cameras.<br>•**Speeding Detection**: Monitors vehicle speed and flags speeding violations.<br>•**Automatic Fine Issuance**: Issues fines to violating vehicles and maintains a violation database.<br>•**License Plate Recognition**: Uses AI to identify vehicles involved in violations. | C++ |

## 5. Emergency Vehicle Priority

•**Emergency Vehicle Detection**: Detects ambulances, fire trucks, and police vehicles using transmitters or cameras.

•**Priority Routing**: Adjusts traffic signals to create a green wave for emergency vehicles.

•**Real-Time Alerts**: Notifies traffic operators about the presence of emergency vehicles.

## 6. Analytics and Reporting

•**Traffic Pattern Analysis**: Provides insights into peak traffic hours, congestion hotspots, and traffic trends.

•**Incident Reports**: Logs accidents, road closures, and other incidents for analysis.

•**Custom Reports**: Generates reports for city planners and traffic authorities.

## 7. User Interfaces

•**Operator Dashboard**: A centralized interface for traffic operators to monitor and control the system.

> •Real-time traffic data visualization.
> •Manual signal override options.
> •Incident and violation alerts.

•**Mobile App for Drivers**:

> •Real-time traffic updates.
> •Route suggestions and navigation.
> •Notifications about traffic violations and fines.

•**Public Web Portal**:

> •Displays live traffic conditions.
> •Provides information about road closures and construction.

## 8. Integration with Smart City Systems

•**Public Transportation**: Coordinates traffic signals with buses and trams for smoother transit.

•**Parking Management**: Provides real-time parking availability information.

•**Weather Integration**: Adjusts traffic signals based on weather conditions (e.g., heavy rain, snow).

## 9. Machine Learning and AI

•**Congestion Prediction**: Uses historical and real-time data to predict traffic jams.

•**Anomaly Detection**: Identifies unusual traffic patterns (e.g., accidents, roadblocks).

- **Optimization Algorithms**: Continuously improves traffic signal timings for maximum efficiency.

## 10. IoT and Hardware Integration

- **Traffic Sensors**: Detects vehicle presence, speed, and density.
- **Smart Cameras**: Captures real-time video feeds for violation detection and traffic monitoring.
- **Microcontrollers**: Controls traffic signals and interfaces with sensors (e.g., Arduino, Raspberry Pi).

## 11. Cloud and Scalability

- **Cloud Storage**: Stores traffic data, violation records, and analytics reports.
- **Scalable Infrastructure**: Uses cloud platforms (e.g., AWS, GCP) to handle increasing data and traffic demands.
- **Data Backup and Recovery**: Ensures data is securely backed up and can be recovered in case of failures.

## 12. Security Features

- **Data Encryption**: Protects sensitive data (e.g., violation records) using SSL/TLS.
- **User Authentication**: Ensures only authorized personnel can access the system using OAuth 2.0.
- **Cybersecurity Measures**: Protects the system from hacking and unauthorized access.

## 13. Simulation and Testing

- **Traffic Simulation**: Uses tools like SUMO (Simulation of Urban Mobility) to test the system under various scenarios.
- **Real-World Testing**: Deploys the system in pilot areas to evaluate performance and make improvements.

## 14. Public Engagement

- **Feedback Mechanism**: Allows citizens to report traffic issues or suggest improvements.
- **Transparency**: Provides public access to traffic data and reports.
- **Awareness Campaigns**: Educates drivers and pedestrians about traffic rules and system benefits.

# Student Profile:

**Name:Tapo Datta**

**ID:41230301560**

**Image:**



| Attendance(10) | Assessment(20) | | | Mid(30%) | | | Final(40%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | Total | Project | Presentation | Total | Project | Report | Total |
| | | | | | | | | | |

# Student Profile:

**Name: Md Safayet**

**ID:41230301527**

**Image:**



| Attendance(10) | Assessment(20) | | | Mid(30%) | | | Final(40%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | Total | Project | Presentation | Total | Project | Report | Total |
| | | | | | | | | | |

# Student Profile:

**Name:Showrub**

**ID:41230301554**

**Image:**



| Attendance(10) | Assessment(20) | | | Mid(30%) | | | Final(40%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | Total | Project | Presentation | Total | Project | Report | Total |
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# Student Profile:

**Name:Ashraful Islam**

**ID:41230301443**

**Image:**



| Attendance(10) | Assessment(20) | | | Mid(30%) | | | Final(40%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | Total | Project | Presentation | Total | Project | Report | Total |
| | | | | | | | | | |

# Student Profile:

**Name: Twuhed Ahmad Rifat**

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**Image:**



| Attendance(10) | Assessment(20) | | | Mid(30%) | | | Final(40%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | Total | Project | Presentation | Total | Project | Report | Total |
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