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| UR ID | Description |
| UR-01 | The ITMS should facilitate the smooth and efficient flow of traffic across the intersection. |
| UR-02 | The ITMS should minimize waiting times for vehicles at the intersection. |
| UR-03 | The ITMS should prioritize traffic flow based on the volume of traffic in each lane. |
| UR-04 | The ITMS should adapt to changing traffic conditions and volumes in real-time. |
| UR-05 | The ITMS should ensure fairness, allowing vehicles from all lanes to pass within a reasonable time. |
| UR-06 | The ITMS should facilitate easy integration with existing traffic infrastructure to ensure a smooth transition and interoperability. |

### User requirements

### Functional requirements

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| --- | --- |
| FR ID | Description |
| FR-01 | The ITMS must be able to detect the presence and volume of vehicles in each lane of the intersection. |
| FR-02 | The ITMS must control traffic lights to manage the flow of traffic through the intersection. |
| FR-03 | The ITMS must implement a priority system, allowing lanes with higher traffic volumes to pass first. |
| FR-04 | The ITMS should provide traffic light signals that adapt based on real-time traffic conditions. |
| FR-05 | In cases of equal priority, the ITMS should implement a First-Come-First-Serve (FIFO) policy. |
| FR-06 | The ITMS should manage and coordinate continuous flows of traffic efficiently and fairly. |
| FR-07 | The ITMS must be capable of handling multiple scenarios for a given intersection, such as one car at the intersection, two cars at opposite or perpendicular lanes, and queues of cars in multiple lanes. |
| FR-08 | The ITMS must be able to collect and process data from various sources such as cameras, sensors, and external databases to make informed decisions. |

## Nonfunctional requirements

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| NFR ID | Description |
| NFR-01 | The ITMS should be able to operate reliably and continuously, 24/7, without manual intervention. |
| NFR-02 | The ITMS should be scalable, capable of managing intersections of various sizes and complexities. |
| NFR-03 | The ITMS should be resilient to network delays or faults, maintaining its operational integrity. |
| NFR-04 | The ITMS should comply with relevant traffic regulations and laws to ensure safety and legality. |
| NFR-05 | The ITMS should be secure, protecting the integrity and confidentiality of its operational data. |
| NFR-06 | The ITMS should be decentralized, capable of operating independently at each intersection while coordinating between intersections as needed. |
| NFR-07 | The ITMS should provide timely responses to changing traffic conditions, ensuring minimal delays. |
| NFR-08 | The ITMS must comply with data privacy laws and regulations to ensure the privacy and security of individuals' data. |
| NFR-09 | The ITMS could provide detailed logs and reports to assist in monitoring, troubleshooting, and performance evaluation. |

Table 6, Non-functional requirements