

"Smart traffic light" ("Smart traffic light") in order to prevent traffic jams at intersections

F.-M.F.N. Dotsent, Nematov Abdugani,
PhD, Dotsent Sadikov Rustamjon Toxirovich
PhD, Dotsent Ismoilov Shikhnazar Rashid ugli
Masters Student Kodirov Jamshid Alam ugli

Abstract:

In this article, we examine the various tasks and functions of intelligent traffic lights that contribute to their effectiveness in preventing congestion at intersections. From traffic monitoring and dynamic signal timing, to pedestrian safety prioritization and seamless integration with wider traffic management systems, smart traffic lights play an important role in improving traffic efficiency and ensuring smooth, sustainable traffic in cities. Let's take a closer look at how devices are revolutionizing the way we approach traffic management at intersections.

Key words: traffic, smart traffic lights, traffic, intersections, traffic.

Introduction.

In today's busy urban landscape, intersection congestion is a common problem, causing delays, inefficiencies and frustration among commuters. However, with the advent of smart traffic lights, a new era of intelligent traffic management is offering solutions to alleviate traffic congestion problems. Equipped with the most advanced technologies and sophisticated algorithms, these advanced traffic lights are designed to perform a number of tasks aimed at preventing traffic jams at intersections.[1]

Materials And Methods.

Intelligent traffic lights are a significant breakthrough in traffic management systems that offer capabilities beyond traditional signal control mechanisms. Using real-time data collection, analysis, and adaptive control strategies, these smart devices can proactively respond to changing traffic conditions and optimize traffic flow to avoid congestion. In urban areas around the world, intersection congestion causes delays, frustration, and the environment is a common phenomenon that causes environmental pollution. However, with the advent of smart traffic lights equipped with advanced technology and intelligent algorithms, there is a solution to this age-old problem. Smart traffic lights play a crucial role in preventing congestion at intersections through various tasks and functions tailored to effectively optimize traffic flow. One of the main functions of smart traffic lights is traffic monitoring. By using sensors such as road-mounted cameras, radar and rings, these smart traffic lights continuously monitor and analyze traffic conditions at intersections in real time. By detecting the size, speed, and direction of traffic, smart traffic lights gather important information for decision-making. Dynamic signal timing is another key function of smart traffic lights in preventing traffic jams. Based on the data collected from the sensors, these smart devices dynamically adjust the signal times according to the current traffic flow.[2]

Results And Discussions.

Smart traffic lights can help optimize traffic flow and reduce congestion at intersections by extending green lights for busy lanes or reducing waiting times for less congested lanes. In addition, smart traffic lights can effectively respond to changing traffic patterns uses flexible control algorithms. By analyzing incoming data and predicting traffic trends, these intelligent systems can optimize speed signal times to adapt to unexpected traffic conditions or events and prevent congestion before it happens. In addition to controlling traffic, smart traffic lights also put pedestrian safety first at intersections puts it in place. Smart traffic lights ensure safe pedestrian crossing by providing dedicated crossing times and signals, while minimizing disruption to vehicular flow. Smart traffic lights can be integrated into broader traffic control systems that coordinate signals at multiple intersections. This coordination helps to optimize traffic flow along the road network, further reducing congestion and improving overall traffic efficiency in cities. The data collected by smart traffic lights is also important for continuous analysis and optimization. By analyzing traffic patterns and trends over time, these intelligent systems can identify opportunities for future infrastructure improvements to improve signal times, predict congestion, and prevent congestion at intersections.[3]

Smart traffic lights are equipped with advanced technology and sensors to effectively manage traffic flow at intersections and prevent traffic jams. To achieve this goal, some of the main tasks performed by smart traffic lights are:

Smart traffic lights use sensors such as road-mounted cameras, radar and rings to continuously monitor traffic conditions at an intersection. They can determine the size, speed and direction of movement of vehicles in real time. Based on data collected from sensors, smart traffic lights dynamically adjust signal timing to optimize traffic flow. They can extend green lights for busy lanes or reduce waiting times for vehicles that reduce congestion. Smart traffic lights use adaptive control algorithms to respond to changing traffic patterns. By analyzing incoming data, they can quickly adjust signal times to accommodate unexpected traffic conditions or events. Smart traffic lights can prioritize emergency vehicles by changing signals to green along a route, allowing for quick and efficient destination access. Smart traffic lights can be integrated into a larger traffic control system that coordinates signals at multiple intersections. This coordination helps to optimize traffic flow along the road network and further reduce congestion. Smart traffic lights also take into account pedestrian traffic at intersections, providing dedicated crossing times and signals, ensuring safe pedestrian crossing and minimizes disruptions to vehicle traffic. By collecting and analyzing traffic data over time, smart traffic lights can identify patterns and trends in traffic flow. This information is used to optimize signal timings, predict congestion and plan future infrastructure improvements. By effectively performing these tasks, smart traffic lights play a crucial role in preventing congestion at intersections, improving overall traffic efficiency, and improving road user safety.[4]

Conclusion.

In conclusion, smart traffic lights are important in preventing traffic congestion at intersections by using advanced technologies, data analytics, and adaptive control mechanisms to improve traffic efficiency. By performing tasks such as traffic monitoring, dynamic signal timing, pedestrian safety prioritization, and integration with traffic management systems, smart traffic lights will transform urban traffic management and shape a smoother, more sustainable future for transportation.[5]

References:

1. Azizov Q.Kh. Fundamentals of organization of traffic safety. -T., "Science and technology", 2009, 244 pages.[1]
2. Azizov Q.Kh. Osnovi bezopasnosti dvizheniya smeshannih avtomobilnotraktornih potokov. - T.: "Fan", 2008. - 185 p. [2]
3. Rune Elvix i dr. Guide to road safety. Per.s norv.pod editor Prof. V.V. Silyanova M.: MADI (GTU) 2001.- 754 p. [3]
4. Clifford Winston, Ashley Langer, The effect of government highway spending on road users' congestion costs, Journal of Urban Economics, Volume 60, Issue 3, 2006, Pages 463-483[4]
5. www.ziyonet.uz[5]