

Describe a real-world problem that would benefit from the application of AI.

The real-world problem I would like to address is the issue of traffic congestion. Traffic congestion in cities is a huge issue that impacts millions of people (probably billions world-wide) every day. It leads to longer travel times, which leads to increased fuel consumption, that contributes to greater air pollution and has adverse effects on the public's health and the environment.

Propose a solution to a real-world problem by describing applicable AI techniques.

An AI-based solution to this would be the implementation of an intelligent traffic management system (TMS). The TMS would use certain AI techniques like Machine learning and Computer vision to track traffic data in real time to optimize traffic flow.

Machine learning algorithms would be able to predict traffic patterns based on both past and current data. This would allow it to anticipate traffic congestion before it happens and adjust the lights and signals to minimize the impact of the bad traffic. One of the ways it would be able to do this would be through Computer vision. Cameras installed at intersections (and possibly throughout other parts of the road) would capture real-time traffic flow, pedestrians, and road conditions. Considering vehicle speed and what factors may be contributing to that the TMS would be able to react and possibly redirect traffic down a better route or even just optimize signal timings.

Identify necessary system components, such as hardware or services, needed for your solution.

A camera infrastructure and other sensors installed at strategic locations throughout the city, probably on every intersection, regardless of whether it has a traffic signal.

The processing hub, where all traffic data is processed and controlled. Obviously, each light should continue to have a local processing unit, but an AI system should be able to synchronize lights together to effectively improve the flow of traffic. To go along with this, there should be some sort of remote traffic control devices.

A communication network that cannot be interfered with.

Identify potential ethical concerns with your solution.

There are several ethical concerns about this system.

Privacy is a large one. It would be important to restrict the usage of the cameras and sensors to traffic management only, and not to be used for surveillance. It would need to be sure to not compromise any individual's privacy, nor reveal sensitive information.

There would be a huge amount of data passing through the system. This would make it a large target for cyber-attacks. Security measures would be super important.

Being transparent about how the system makes its decisions would also be important. A system log with the decisions made and WHY, would help with accountability and trust in the system.