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WHITE PAPER

Reducing CO_2 emissions in traffic

End report of the AI4Cities -project

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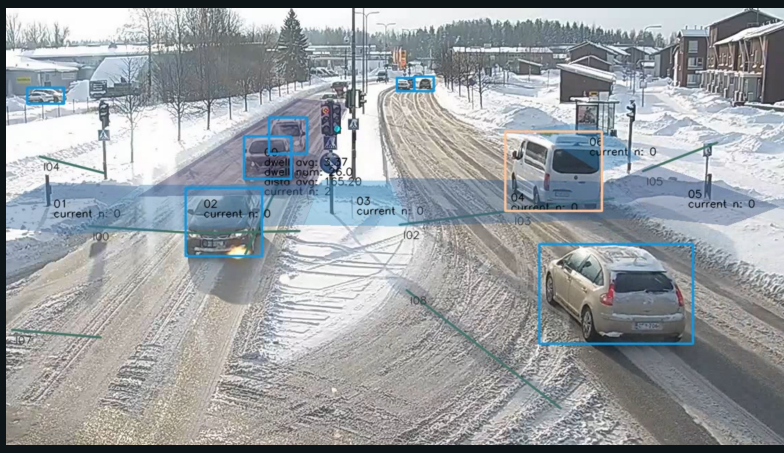
The solution



MarshallAI together with Dynniq Finland Oy reduce emissions from road traffic. Ix3 combines state-of-the-art machine vision and traffic management systems to form the traffic management solution for tomorrow. The solution is an excellent tool for different cities to deliver a part of the emission reduction targets outlined in the ambitious carbon neutrality plans, especially related to transportation.

Traffic management has for decades been based on time interval based phases. Dynamic inputs have been limited to induction loops giving simple point information at a preset distance and push buttons indicating simple presence.

The Ix3 system outperforms the accuracy of traditional sensors and increases the amount of data at hand using deep learning based artificial intelligence and visual sensing. This enables two types of features through completely new traffic control logics based on the complete situational awareness in the intersection:

1. **Traffic optimisation**, removing dead seconds without any negative effects.
2. **Traffic prioritisation**, promoting certain traffic users.

The solution provides dynamic information about all objects throughout the intersection to make intelligent traffic optimisation decisions. The system requires no interaction from the traffic users, makes traffic in cities more efficient, increases safety, reduces congestion, reduces wasted time of traffic users and above all reduces emissions.

Ix3 reduces emissions directly by optimising the traffic management by removing unnecessary stops and idling in traffic lights (dead seconds), without any negative effect for any traffic users. This means shortening excessively long phases depending on the actual real-time situation. Live pilots during the AI4Cities project in Meudon, Paris region, France and Helsinki, Finland showed more than 2% emission reduction of the baseline. Previous phases in other intersections showed an even higher potential up to 7%.

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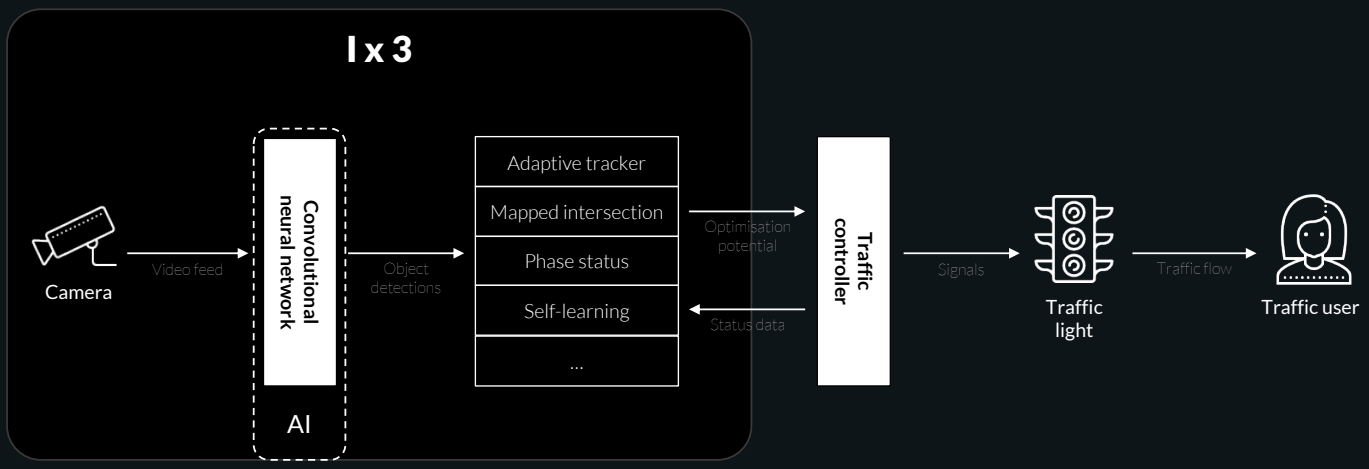
The Ix3 solution understands the volumes of traffic users including their type and enables the cities to prioritise certain traffic users. As an example the solution can let heavy traffic / public transport through more fluently by extending cycles when there is a vehicle approaching, in order to reduce CO2 emissions. Alternatively the solution can promote green traffic users and e.g. prioritise groups of pedestrians and cyclists. The possibilities are broad and should be planned accordingly with the partner cities inline with their priorities. The system enables easy and efficient ways to test different traffic control schemes in use without compromising traffic safety. Prioritisation is a powerful tool for longer term effects on the choices made by traffic users.

Other benefits of the Ix3 include the exceptionally detailed and accurate real-time traffic data that is collected. This data can be used for traffic planning but can also be easily provided for 3rd parties. The advanced machine learning features also promote traffic safety by detecting traffic violations, accidents and even close-calls / near-misses. This enables identifying hazards before the accidents occur.

Architecture

The Ix3-system consists of three main parts: the camera sensors, the MarshallAI machine vision platform and the integration to the traffic management systems and controllers. Traffic cameras are installed in intersections to sense traffic. The visual data is processed by the machine vision platform in real-time to constantly form a complete understanding of the traffic situation in the intersection. This information is transferred to the traffic management system, resulting in an optimised experience for each traffic user.



Proven results

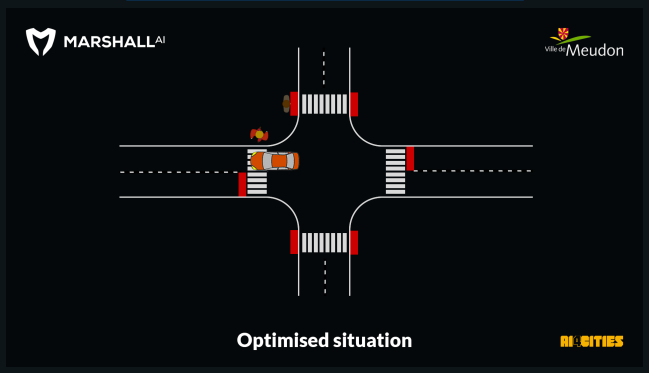
Ville de Meudon

During the last phase of the AI4Cities project we piloted the solution live in two cities, Meudon in the Paris region and Helsinki. The annualised reduction potential was at an average **55 509 stops** by vehicles and **360 hours** of irrational waiting time. Together these form approximately **2%** of emissions.

Cities get in touch!

The Ix3-system is a great tool for cities who have ambitions of reducing emissions or improving their traffic management. As Ix3 enables reducing emissions both by not altering current traffic priorities (optimising) and with e.g. promoting green ways of traffic (prioritising), the system is strongly aligned with most city specific emission reduction plans and roadmaps.

CLICK TO SEE THE VIDEO!



The turnkey solution is available at an OPEX cost between 3 and 10keur per year, depending on volumes. Customer involvement is limited to identifying the intersection, arranging the installation permission and coordinating traffic controller programming.

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