Hermes
Traffic
Intelligence

Hermes Traffic Intelligence

Technical Company Profile

Once upon a time

Hermes Traffic Intelligence was started in a desire to combine decision support based on incomplete sensor readings with optimization of rush hour traffic. These just happened to be the subjects of the Ph.D. projects undertaken by the founders of the company.

In pursuing the funding necessary to build the intended product, a service that would distribute traffic on the road network available, the founders met with Danish road authorities. From these meetings they saw the need for a company having the necessary skills to handle all steps of traffic data processing, from acquisition to advanced algorithmics and statistical post-processing. This is what the company has primarily been doing since 2010.

Pervasive Traffic Intelligence

We work to promote the idea of Pervasive Traffic Intelligence (PTI) and provide tools and processes to enable everybody to harvest the benefits from it. The core of PTI is *Dynamic Distributed Data Driven Decision Support Systems (5D2S)* related to traffic on any level and by any land based type (walking, cycling, cars, trucks, tanks etc.). This is not a single existing system but the concept of systems being developed to support decisions everywhere in traffic.

Decisions, decisions, decisions

Every single day uncountable decisions related to traffic are made. These are not only simple "which way to go" decisions by the everyday commuter, but also decisions on "who are allowed to go", "where are they allowed to go" and "how shall they be allowed to go".

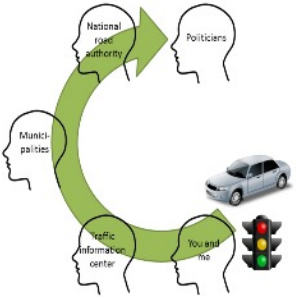
When a single driver decides whether to continue straight ahead or turn left to reach her destination, she is making an operational decision. The value is low: she might save a few minutes or a little fuel by making the right decision. Deciding the green wave flow or change red/green periods for a classic locally controlled intersection is a lot more costly as it requires tampering with the intersection control. This takes time and is costly, and thus it becomes a tactical decision. Deciding where to put new

Netmatching

By matching different network representations with each other we can migrate data registered to one network onto other networks. The netmatching is done by comparing stretches and intersections from the different networks to each other to find the best (partial) couplings.

lanes, lay out new roads, or upgrade existing roads is again orders of magnitude more expensive, and thus the value of the decision is much higher. These are strategic decisions.

The emergence of new decision makers with the rapid evolution of things attached to the Internet and the already abundant amount of obtainable data creates new requirements to the decision supports. With automatic decision makers in self-driving vehicles or fully connected and automated intersections, the highest precision and highest real world representation in the decision support provided will be required.



Decision maker centric

It is often stated that companies have "end-user focus" or that they are "customer centric". We find that these labels are not always easy to put on ourselves. If we process traffic data for a road authority the end user will be the driver experiencing less hassle in traffic or the bus passenger that arrives at her destination at the time stated in the time table. Although we focus to ease traffic for everyone in it, they will most often not know of us or indeed the need for traffic data processing.

Our focus is more often to deliver the information necessary for decision makers in traffic to make their decisions. By providing too much or too little information we do not make their decisions any easier. Therefore we would like to think of ourselves as "decision maker centric." This of course requires a lot of knowledge about the end-user and the traffic the end user is experiencing.

Intelligent Intersections

By equipping controlled intersections with sensors capable of detecting not only traffic approaching but also the type and amount of traffic we can make the intersections work smarter. Doing this will prevent unnecessary waiting at the light, and it will prioritise traffic according to political wishes.

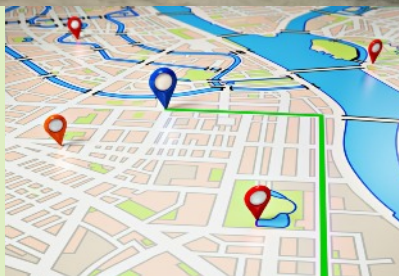
Apps on trag.me

We develop and apply specialized apps for harvesting data (e.g. route tracking) and presentation of results. Some apps may even do the actual data processing themselves. We use the name *trag.me™* as a common name for all the apps we develop. Most of these apps are not directly intended for the common market, and for that reason they will only be found on the www.trag.me webpage.

We do not consider ourselves an app development company, but providing our core services to app developers may improve the functionality of their traffic related apps.

Floating Vehicle Data

We have handled Floating Vehicle Data, i.e. positions and speeds reported from GPS units mounted in cars, for the Danish Road Directorate for several years. The handling consists of receiving data, distilling them, presenting them, and post-processing them for statistical purposes.

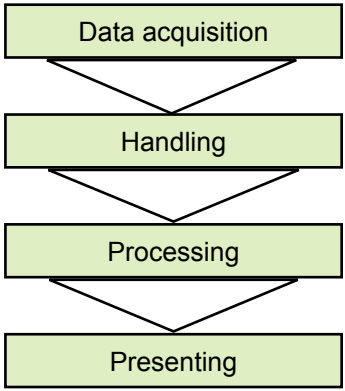


End to end integration

Our core competencies are in highly advanced data processing algorithms and interpretation. We focus on improving the quality of the data used and the methods applied to obtain valuable results.

In a successful ITS project it is vital that all ends meet. To ensure this there needs to be a holistic understanding of the data throughout the handling and processing. Knowing the intended use of data and the results expected when data have been processed will help in defining how data are first acquired. In the other end, having technical knowledge about sensors and probes used for measuring data will help in understanding and interpreting both the raw data and the results from processing them. We believe that we understand the full data lifecycle, and by that is able to offer our customers end to end integration.

We work with all aspects of handling traffic data, from acquisitioning and handling to processing, storage, and analysis. The processing we work with is bending theory to reality. Mathematics, computer science, operations research, and artificial intelligence are squeezed through common sense to provide valuable information on reality.



Trigger Framework

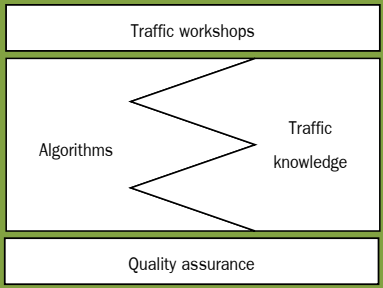
The ability to detect and mitigate disruptive events in daily traffic offers road authorities the ability to minimize delays and congestion. This leads not only to significant economic benefits through reduced journey times and fuel consumption, but also reduced CO2 emissions and improved air quality. It can e.g. be used with events, bad weather, and traffic accidents.

A look into our toolbox

It is often said that if the only tool you have is a hammer all of your problems tend to be nails. We try to make the tools fit the problems and not the other way around. For this we take pride in having a large number of tools available, either in the sense of technologies and domains that we know and master, or in the sense of tools we have developed for solving specific problems.

We have developed tools for e.g. high precision map matching, network matching, data migration, process control, quality assurance, and a host of specific micro tools for data incision, processing, and inspection. We lean on statistical approaches combined with algorithms and heuristics to provide efficient generic tools for specialized purposes. All tools and applications are developed with continuous integration as paramount criteria, allowing us to guarantee operation, portability, and release stability.

In short we offer improved traffic data usage, e.g. in traffic workshops for road authorities or by processing actual traffic data. We base the tools on our extensive knowledge of algorithms and traffic, and we ensure high quality of all of our tools, and the results they produce, by having a comprehensive and well working quality assurance system.



Corridors with Aggressive Cyclists

When asking the bicyclists in Copenhagen about their perception of traffic we found that their biggest nuisance is in fact other cyclists; especially aggressive cyclists that by their behaviour force other cyclists to sway or break abruptly. Bicyclists running our non-interactive smartphone app will help us detect the corridors where aggressive cyclists are most dangerous.

The Team

The company was founded by Lars Rosenberg Randleff and Jørgen Bundgaard Wanscher, and the founders now hold the positions as CEO and CTO.

The team now also contains software and traffic engineers. This ensures not only that development tasks can be performed quicker and better but also that the solutions will be solidly rooted in knowledge about the traffic domain.

Just as a curiosity: the spoken languages among the people in the team are Danish, English, Lithuanian, Greek and Farsi.

CEO Lars Rosenberg Randleff:

- Customer contact/contract management
- B2B relations
- Employee management
- Business, innovation, sales and traction manager
- Principal manager of core projects
- Theoretical and technical lead on decision support under uncertainty (using e.g. Artificial Neural Nets and Bayesian Nets)

CTO Jørgen Bundgaard Wanscher:

- Specialist in Data Driven Decision Support and Pervasive Traffic Intelligence
- System and methodology specialist
- Data processing, real-time, and stabilization expert
- Systems Reliability Engineering

Road Surface Quality

The road surface quality for roads in a large area can be measured using crowdsourcing. In doing this the public will measure the road surface by using a smartphone mounted on the inside of the windshield of their car. Poor road quality will cause the smartphone to vibrate which will be measured by accelerometers in the smartphone. All measurements will be presented on a website.

In the middle of knowledge

Hermes Traffic Intelligence are situated at the campus of the Technical University of Denmark (DTU) in Lyngby, north of Copenhagen, Denmark. This location gives us an advantage in both easy access to academia and research within traffic related issues, and in the recruitment of employees among some of the best brains in Denmark.

The office is located at the Scion DTU Science and Technology Park, where the premises are shared with many other small and medium sized companies. This constitutes a highly innovative atmosphere where bringing new ideas to live and to the market are within the genes of the companies.

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