




ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

INTELLIGENT TRANSPORTATION SYSTEMS AND MONITORING

The transport systems have improved since the advent of pervasive ICT technologies, advanced and integrated monitoring functions, Artificial Intelligence and Big Data analytics realizing Intelligent Transportation Systems and related services. Monitoring of weather and road conditions, accidents, congestion, vehicular flows dynamics, mobility matrix of people and goods have impacts towards transport safety and efficiency.



Advanced monitoring is made possible by the adoption and integration of a number of sensing technologies, including image analysis and pervasive sensing, and vehicular and roadside infrastructures for communications. The advent of Intelligent Transportation Systems is leading the transport systems and their management to realize autonomous and supervised actions towards improved safety and efficiency of transport for people and goods.

Research at the University of Bologna covers a wide range of issues:

- Development of methodologies, platforms and tools for distributed data collection, advanced data analysis, and decision support systems towards transport efficiency, e.g. crowd-based and infrastructure-based traffic monitoring and control systems, optimization of network utilization and resources or bottlenecks
- Methodologies and systems for automatic detection of risks and real-time alerting systems for improving traffic safety, emergency call, emergency response
- Methodologies and paradigms for congestion detection, forecasting (including external factors and access to multi-factorial open data) and control, network equalization and user services for optimization of users' experience
- Advanced service platforms for user awareness and user acceptance, policy enforcement and paradigm shift towards sustainable mobility , e.g. electric mobility, multi-modal public transport, fleet management
- Advanced warning and monitoring against rule infringement in transport and abuse of accesses to controlled traffic areas
- Economic and environmental evaluation of risks and opportunities, analysis of integrated scenarios where multiple transport systems and energy resources are mixed towards safe and sustainable transport

HIGHLIGHTS

Advanced monitoring, data analysis, multi-factorial optimization methodologies and services for traffic safety and transport network efficiency, including crowd-sensing systems, image analysis, open and big data analytics, resources and network optimization.

Advanced modeling and simulation of transport systems and networks, including bottlenecks and energy resources (e.g. electric grid) and variable traffic and road conditions. Pre-deployment analysis and decision support for planning of transport systems, resources and infrastructures based on traffic and mobility demand data in defined contexts.

Pervasive applications and advanced added value services for mobility users, policy enforcement, abuse elimination, fleet monitoring and multi-factorial optimization of transport services.