

Introduction to the Minitrack: Intelligent Systems in Traffic and Transportation

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Recent scientific and technological advances in the fields of Artificial Intelligence, Computational Intelligence, Optimization-Metaheuristics, Geographical Information Systems, Simulation and others allow to build Intelligent Systems, which are able to support decision analysis and problem solving in the field of Traffic and Transportation.

Examples of those Intelligent Systems have been elaborated and published during the last years. Therefore, in January 2000 a Minitrack "Intelligent Systems in Traffic and Transportation" was organized for the first time within the frame of the Decision Technologies for Management Track of the HICSS-33. This Minitrack addressed the modeling and the implementation aspects of Intelligent Systems to solve important real world problems in Traffic and Transportation.

During HICSS-34 the Minitrack Intelligent Systems in Traffic and Transportation takes place a second time.

The Minitrack focuses on Intelligent Systems which are able to assist the design phase (strategic planning) of Traffic and Transportation systems and/or the management-phase (tactical and operational planning). The purpose of transportation logistics is to design, to organize and to manage transportation in order to meet customer service demand and cost and environmental requirements. Such logistics systems must comply with regulations on traffic, laws on labor and other types of constraints. In the field of transportation logistics we will focus on the analysis of urban, regional and intercity transportation networks for both passenger and freight transportation. Complex hybrid-type systems which include air, road and rail transportation are of particular interest.

Intelligent Systems which are designed to solve real world applications in Traffic and Transportation are built on the basis of an advanced software engineering concept including object-oriented software development and integration with non-standard databases and GIS.

On the algorithmic side several so-called Intelligent Techniques coming from AI, the OR and the CI, such as Tabu Search Metaheuristics, Evolutionary and Genetic Algorithms, Constraint Programming, but also high performance Optimization or Simulation techniques are used.

Due to the increasing interest during HICSS-34 the Minitrack Intelligent Systems in Traffic and Transportation consists of 3 sessions with all together 9 presentations, where 5 of them are in Traffic and 4 in the Transportation field.

Two papers deal with Multi-Agent Systems in Traffic Management and Control. One paper proposes an approach for designing traffic responsive and coordinated ramp control using a self adapting fuzzy system. Finally, there are two papers dealing with Air Traffic. One of them considers an Airport Gate Assignment Problem. The proposed system dynamically assigns airport gates to scheduled flights based on passengers daily origin and destination flow data. The other one deals with Runway Operations Planning and Control.

In the Transportation related sessions of the Minitrack there are two papers dealing with scheduling type problems. One of them proposes a solution of Real World Train Timetabling Problems, the other deals with Dynamic Vehicle Dispatching using several techniques such as agents and genetic programming. One presentation proposes Real-Time Decision Tools for the Trucking Industry. Finally, a case study of the Deutsche Post Transportation Networks is used to illustrate how large organizations in the logistics area build their Operations Centres in order to perform the following functions: performance measurement, online-monitoring and control, customer care and marketing.

The nine presentations cover some of the most important fields of Traffic and Transportation. State of the art Intelligent Techniques are used to implement Intelligent Systems that solve real world problems.