

ADVANCE Annual Report (1 October 2010-end December 2010)



<http://www.advance-logistics.eu/>

Short project description

In the logistics industry, the advantages of networks with small local partners are widely recognised, as these bear the potential of offering flexible services at affordable costs. Small participants are more flexible, react faster to changes and offer higher variety—however, not entirely without drawbacks. In the age of track-and-trace solutions and specialised, small consignments, the amount and variety of data accompanying logistics processes often presents major challenges: it is difficult to filter the onslaught of data and make its appropriate portions available at the right time and place to support correct decisions, make better forecasts and issue timely warnings. The three-year FP7 project ADVANCE aims to tackle this problem by investigating and advancing the related scientific backgrounds as optimisation and machine learning, and offer a modelling and decision support framework which companies and networks can use to build solutions covering their own specific needs.

Summary of Activities

Having started in October 2010, the project is still in its initial phase, and the consortium is focusing its work on gaining in-depth knowledge of the targeted application area within the logistics industry, as well as the underlying theoretical findings, especially in the modelling and optimisation of logistics networks. In parallel to this, initial steps of providing suitable technological support have been taken as well: fundamental elements of the solution framework are now being outlined in accordance with the needs deemed important by the theoretical findings.

Being on time, in some tasks ahead of schedule, the project will continue according to plan in the months to come, with the evaluation of the detailed scenario of industrial application, and resulting specialisation in the research and development activities.

Scientific backgrounds—optimisation in logistics networks

Several areas of optimisation and artificial intelligence must be relied on to solve the information handling problems targeted in the project, and considerable efforts are planned to be spent on selecting and harmonising solution components from all these areas into a practicable and industry-ripe solution. In the first months of the project, the modelling and global optimisation of logistics networks—primarily the so-called hub-and-spoke type characterising the project's key application scenario—were surveyed. It was revealed that the required methods are highly specialised for each case, conveying two implications:

- i) the solution framework should be able to host a wide spectrum of algorithms in order to guarantee the targeted versatility,
 - ii) researchers, developers and users should be made aware of the high degree of required specialisation to prevent pitfalls at less experienced companies.
- The perceived degree of specialisation will have an impact on further research within the project as well.

Evaluation of the application scenario

In the first months, numerous interviews were conducted in close collaboration with the main industrial partner of the project. Findings gained in this dialogue were substantial for the success of the project and already presented new knowledge regarding the targeted application field, namely:

- i) The exact class of application scenarios—influencing, e.g., the particular choice of algorithms—could only be identified with knowledge at hand that resulted from the industrial interviews;
- ii) Fundamental applicability limits, depending on partner confidence, limits of business models, etc., were identified—well noted, many theoretical considerations were found to be made in disregard of these practical limitations;
- iii) Important information was obtained regarding user behaviour, expectations of business partners and operating personnel—again, these have a major impact on research and development decisions taken in the project.

Building the solution framework

In the current stage of the project, the development of the solution framework is in its very beginnings, and most efforts were, so far, focusing on identifying the building blocks that would adequately serve the construction of a range of solutions, as well as selecting the preferred tools of prototype implementation. First findings were gained regarding suitable data modelling approaches, and involvement of standardisation experts ensures that the framework will not “start with yet another clean sheet” where existing industrial standards are at hand.

User Involvement, Promotion and Awareness

Constant and close collaboration with Palletways, the main industrial consortium member, ensures that the knowledge gained about the application area is realistic and represents the de-facto situation of industrial practices and expectations. The excellent commitment of the industrial partner is a substantial contribution to the success of the ongoing research and development efforts, the more so as industrial contacts rely on experts who have a scientific background themselves and conduct outstanding mediation between scientific and industrial perspectives. This bridging of attitudes is also expected to be of advantage while approaching the targeted users, once the solution framework reaches adequate ripeness.

Even though the project has only completed its first months, several scientific publications are already in preparation, among them one refereed and accepted journal article, and will report on the ADVANCE project within the next months. Also, the industrial community was informed on several occasions about the ongoing project in online news reports.

Future Work

In 2011, most of the underlying solution framework elements are planned to be implemented. This is vital for the practical test of theoretical results and will proceed hand-in-hand with the creation of scientifically founded user interfaces that employ cognitive models for improved user feedback. The largest part of theoretical research

of the coming year is, however, planned to focus on optimisation algorithms and machine learning techniques. It is expected that these will yield new additions to the current state-of-the-art solutions. Collaboration with the industry will be maintained at its current quality, offering the opportunity of instant and realistic feedback about recent results, keeping theoretical research on a proper path. Massive testing and field evaluation are due in the second half of the project.

Further Information

The official project web site (<http://www.advance-logistics.eu>) provides further information about the goals and results of the project, and keeps visitors informed about related recent news.

More information can also be obtained from project coordinator Elisabeth Ilie-Zudor at the e-mail address ilie@sztaki.hu.