Digital Single Market

Projects news and results26 September 2012

Latvia, land of innovative progress

Latvia is a land of extremes, not least its economy. Over the last decade alone, this Baltic state of 2.2 million people has experienced Europe's highest economic growth rates and its sharpest recession, alongside the continent's highest inflation and greatest deflation. After this severe economic crisis in 2008-2009, Latvia is today once again one of the European Union's fastest growing economies, helped by domestic demand and exports to other expanding northern and eastern European economies. Much pioneering innovation in the country is led by the University of Latvia, which is currently coordinating or participating in a wide range of EU-funded projects.

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From an almost entirely agrarian base, Latvia is gradually building a hi-tech industry - with a range of innovative projects pointing to rapid progress in the right direction.

Much pioneering innovation in the country is led by the University of Latvia, which is currently coordinating or participating in a wide range of EU-funded projects. One of them, QCS [2] (1), is set to have far-reaching implications for the future of computing.

Coordinated by Andris Ambainis, a professor of physics and mathematics, the three-year project is seeking to answer two key questions in the field of quantum computing: what sorts of problems will a quantum computer - potentially far more powerful than anything in existence today - be able to solve? And is it possible to build one?

'The construction of a usable quantum computer is still a long way away, but research into new areas of application is an important motivating factor,' the QCS team notes. 'Computer scientists and mathematicians are examining new applications, concentrating in particular on which specific tasks a quantum computer can execute more effectively than an ordinary computer.'

Latvia University is also involved in other fields of research that are likely to have even more immediate impact. Alongside the Latvian Ministry of Education and Science, the university's mathematics institute has been participating in the Osiris [3] (2) project, which aims to help European countries establish a coordinated approach to large-scale investments in transnational ICT research infrastructures. By supplying detailed policy advice to decision makers on different types of infrastructures and the issues to be taken into account in planning and building them, Osiris has led to improved research coordination in areas as diverse as high-performance computing, nano-electronics and the Future Internet.

Meanwhile in the Geo-Seas [4] (3) project, Latvia University's Faculty of Geography and Earth Sciences is expanding researchers' access to information about Europe's seas and marine environment. The initiative, which involves 30 organisations in 17 countries, draws on marine geological and geophysical data and data-products from national geological surveys and research institutes around Europe. It will therefore provide a new e-infrastructure, interconnecting diverse scientific resources and existing infrastructures, and providing researchers with easy access to a treasure trove of environmental, species and geographical data.

'Users are able to identify, locate and access pan-European, harmonised and federated marine geological and geophysical datasets and derived data products held by the data centres... This will create a joint infrastructure covering both oceanographic and marine geoscientific data,' explains assistant project coordinator Helen Glaves. As science starts to make ever more use of 'big data', access to such resources is growing in importance.

Looking toward the future of the Internet

While the focus of Geo-Seas is on improving access to data via the internet, the aim of another project with Latvian contributors is to lay the foundations for a Future Internet in which services, as well as information, will need to be easily deployable, accessible and manageable online.

In the Choreos [5] (4) initiative, the Socio-technical Systems Engineering Institute of Vidzeme University of Applied Sciences is bringing its expertise in simulation to bear on some of the main challenges of the Future Internet of services. The aim is to provide a software architecture that supports decentralised 'Ultra-large scale' (ULS) software solutions composed of heterogeneous software services. 'Examples of these new services can be found in areas such as health care, energy saving, home automation, transportation, car navigation, fleet management systems and so on,' project manager Hugues Vincent explains. 'Imagine the airport you are flying to is closed due to bad weather and you are diverted to a different airport - when the Choreos solution is deployed the Future Internet of services infrastructure will trigger a whole series of automatic adjustments: the new airport and baggage handlers get ready for the flight, new boarding cards are issued for any connecting flights, taxi and hotel reservations rescheduled etc. These services, autonomic and provided across all networks and connected devices, will be, for the most part, invisible to the user.'

Meanwhile, Latvian company Tilde, one of Europe's leading R&D and localisation firms specialising in smaller languages, is working in the similarly challenging domain of machine translation. In the Accurat [6] (5) project, Tilde coordinated a team of researchers from Germany, Greece, Croatia, Romania, Slovenia and the United Kingdom to develop new tools and methods for identifying and analysing comparable bodies, or 'corpora', of texts between different language pairs, and especially in specific domains, in an effort to improve existing machine translation technology.

'The applicability of current data-driven methods directly depends on the availability of large quantities of parallel corpus data. For this reason the translation quality of current data-driven machine translation systems varies dramatically from quite good for language pairs with large corpora available (e.g. English and French) to almost unusable for under-resourced languages and narrow domains where little data is available (e.g. Latvian and Croatian),' the Accurat team notes.

Tilde has since gone on to participate in the TAAS [7] (6) project, focused on creating a cloud-based platform for acquiring, cleaning up, sharing and reusing multilingual terminological data, which the team describes as one of the most important language resources for industry, academia and society in general. Significantly, in this project, the researchers will develop technology covering all official EU languages and addressing the terminology needs of both human and machine users.

The project's software will allow users to upload documents, from which terms potentially requiring translation will be extracted. The translations of these terms will then be matched from internal databases, acquired from external ones, and even exported to other uses and databases that need them. In this way, translators will be able to rely on software tools that can even help with specialist terminology in minority languages.

The projects featured in this article have been supported by the Seventh Framework Programme (FP7) for research.

(1) QCS: Quantum Computer Science
(2) Osiris: Towards an open and sustainable ICT research infrastructure strategy
(3) Geo-Seas: Pan-european infrastructure for management of marine and ocean geological and geophysical data
(4) Choreos: Large Scale Choreographies for the Future Internet
(5) Accurat: Analysis and evaluation of comparable corpora for under resourced areas of machine translation
(6) TAAS: Terminology as a Service

Links to projects on CORDIS:

- FP7 on CORDIS: http://cordis.europa.eu/fp7/home_en.html [8]
- QCS on CORDIS [9]
- Osiris on CORDIS [10]
- Geo-Seas on CORDIS [11]
- Choreos on CORDIS [12]
- Accurat on CORDIS [13]
- TAAS on CORDIS [14]

Other links: - European Commission's Digital Agenda website [15]

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