REVIEW

UNLIMITED UNDERSTANDING: A EUROPE WITHOUT LANGUAGE BARRIERS

Georg Rehm & Hans Uszkoreit, editors of
the Strategic Research Agenda For Multilingual Europe 2020

Europe is facing a severe communication crisis. META-NET's recent study "Europe's Languages in the Digital Age," published last year in 31 volumes for 31 languages, shows that most European languages are threatened with "digital extinction": they are not sufficiently supported by information technology to survive in a digital world. Our immense linguistic diversity is a defining part of our continent's cultural heritage, but at the same time it is also an obstacle to commerce, trade, and further European integration. Despite enormous translation expenditures, currently only a small fraction of valuable information is made available in all European languages, and citizens do not have the opportunity to discuss vital questions across language borders. Communication between Greeks and Germans on the financial crisis, for example, happens through local media and national politicians, channels that do not always promote mutual understanding. At a time when the Internet and social networks are profoundly changing political decision making, the EU does not profit from these changes sufficiently. Danes do not debate with French citizens concerning the benefits and drawbacks of nuclear vs. fossil energy sources; EU citizens in the Mediterranean have no international dialogue on the possible consequences of a joint immigration policy, which should also involve their northern

neighbours.

In order to create a Europe without communication barriers that supports the free flow of information, ideas, and trade, while preserving cultural and linguistic richness and diversity, META-NET, a European network of excellence consisting of 60 research centres in 34 countries, has developed a Strategic Research Agenda (SRA) that outlines how focused investment in language technologies can generate considerable economic benefits that by far outweigh the costs. Over two years in the making, hundreds of language and technology experts and stakeholders have contributed to the plan. This document is being officially unveiled and presented to representatives of the European Commission, research and industry at a technology symposium on January 25, 2013, in Berlin, Germany.

The SRA shows how Europe can turn its linguistic and cultural diversity into a competitive advantage. The European language technology community, in both academia and industry, has strong competence in multilingual technologies and is in a pole position to play a leading role in the next IT revolution involving human language, knowledge, and emotion in meaningful ways. Apple's Siri and Google's voice search are just some first steps. Human language will become the preferred means for communication between people and technology. Software for realising this vision is required for diverse languages, services, and devices, creating a huge market. Language technology provides access to the digitised human knowledge aggregated on the Web and the daily avalanche of textual data (Big Data) will be semantically searchable, analysable, and utilisable for numerous novel applications.

In its proposed pan-European research programme, the SRA recommends that academic and industrial research and development efforts focus on three priority themes:

1. The **Translingual Cloud** will provide generic and specialised translation services to all European citizens, companies, and organisations. These services will encompass high-quality, precise, and reliable automatic translation technologies for spoken and written language as well as engaging human translators and interpreters for those tasks that machines alone cannot handle.

2. The **Social Intelligence and e-Participation** theme focuses on developing resources and tools to support understanding and dialogue within and across communities of citizens, customers, clients, and consumers to enable e-participation and establish more effective processes for preparing, selecting, and evaluating collective decisions.

3. The **Socially Aware Interactive Assistants** theme concentrates on the development of pervasive digital assistants that learn and adapt and that provide proactive and interactive support tailored to the specific situations, locations and goals of the user through spoken language interaction.

META-NET also advocates the design and development of a European Service Platform for Language Technologies to seamlessly provide language technologies to the users and customers.

"Europe badly needs high-quality machine translation software for all European and major non-European languages in order finally to overcome language barriers. These barriers harm the EU's long-term goal of establishing a single digital market because they hinder the free flow of knowledge, information, goods, products, and services," says Prof. Hans Uszkoreit, coordinator of META-NET and scientific director at DFKI (German Research Center for Artificial Intelligence). Dr. Georg Rehm (DFKI), co-editor of the Strategic Research Agenda and

Network Manager of META-NET adds: "After the Fukushima accident in March of 2011, all of Europe debated the pros and cons of nuclear energy, but only in the confines of specific language communities: there has never been a debate on the European level! The technologies we advocate will enable Europe to carry out these debates across language borders and to arrive at a new level of European identity among citizens."

Through a coordinated, large-scale effort leading up to 2020, these technologies can be developed, future-proofing European languages, providing new applications and services to citizens and creating a host of new opportunities for the European IT and language industries. The high per-capita financial burden for smaller language communities, the required transfer of technologies between languages, the lack of interoperability of resources, tools, and services, and the fact that linguistic borders often do not coincide with political borders all dictate a response that goes beyond what any one country can provide. This immense challenge must therefore be addressed at the level of the European Union, its member states, and associated countries, in close collaboration with industry. The SRA provides a roadmap for addressing these challenges in a way that will benefit all European citizens and secure Europe take a leading role in the world economy and technology marketplace.

Language Technology: Background

Language technology supports us in everyday tasks, such as writing e-mails or reserving flights. It enables software that can process spoken or written human language. We benefit from it when searching for and translating web pages, operating our car's entertainment system or our mobile phone with spoken commands, or getting recommendations in an online store. In the near future, we will be able to talk to computer programs as well as machines and appliances,
including the service robots that will soon enter our homes and work places. Wherever we are, when we need information or help, we will simply ask for it. Removing the communication barrier between people and technology will change our world. Language technology will allow all people to collaborate, learn, do business, and share knowledge across language borders and independently of their computer skills.

Today language technology systems primarily rely on statistical methods that require large volumes of written or spoken language data for training. Especially for languages with relatively few speakers it is difficult to acquire sufficient data. However, recent developments are pointing past these limitations and language technology is one of the key growth areas in information technology. Large international corporations such as Google, Microsoft, IBM, and Nuance have invested substantially in this area. In Europe, because of its rich technological, cultural and linguistic expertise, is in a prime position to lead, with already hundreds of small and medium enterprises with specialised multi-lingual technology applica¬tions or services.

About META-NET and META

META-NET, a Network of Excellence of 60 research centres in 34 countries, and involving several EU projects, is dedicated to the technological foundations of a multilingual European information society.

META-NET is forging META, the Multilingual Europe Technology Alliance. More than 600 organisations in 55 countries have already joined, including research centres, universities and private companies.

Selected Quotes on the Results of the META-NET Study "Europe's Languages in the Digital Age"
- **Latvia**: "For such small languages like Latvian keeping up with the ever

increasing pace of time and technological development is crucial. The only way to ensure future existence of our language is to provide its users with equal opportunities as the users of larger languages enjoy. Therefore being on the forefront of modern technologies is our opportunity." — Valdis Dombrovskis (Prime Minister of Latvia)

- **Portugal**: "Language technology is of utmost importance for the consolidation of Portuguese as a language of global communication in the information society." — Pedro Passos Coelho (Prime Minister of Portugal)

- **Czech Republic**: "META-NET brings a significant contribution to the technological support for languages of Europe and as such will play an indispensable role in the development of multilingual European culture and society." — Ivan Wilhelm (Deputy Minister for Education, Youth and Sport)

- **Greece**: "Further support to language technologies safeguards the presence of Greek language and culture in the digital environment, while at the same time promoting development and fostering communication among citizens within the Information Society." — George Babiniotis (Minister of Education, Lifelong Learning and Religious Affairs)

- **Finland**: "Without languages we could not communicate. The META-NET network is a valuable support for a multilingual Europe." — Alexander Stubb (Minister for European Affairs and Foreign Trade)

- **France**: "META-NET provides an invaluable contribution to the development of a genuine European strategy in support to multilingualism, based on existing technologies while encouraging the development of new innovative technologies." — Xavier North (Délégué Général à la Langue Française et aux Langues de France)

- **Lithuania**: "Conserving Lithuanian for future generations is a responsibility of the whole of the European Union. How we proceed with developing information technology will pretty much determine the future of the Lithuanian language." — Andrius Kubilius (Prime Minister of the Republic of Lithuania)

- **Sweden**: "High-quality language technology may be the most effective means of preserving the linguistic diversity of Europe. Being able to use all languages fully in modern society is a question of democracy. In this connection META-NET fulfils a central, even crucial, function." — Lena Ekberg (Swedish Language Council)

- **Slovenia**: "It is imperative that language technologies for Slovene are developed systematically if we want Slovene to flourish also in the future digital world." — Danilo Türk (President of the Republic of Slovenia)

- **UK**: "The work of META-NET is an important step towards a future in which Language Technology will be all around us, allowing us to collaborate, conduct business and share knowledge with friends and colleagues, whether or not we speak the same language." — David Willets (Minister of State for Universities and Science, Department for Business, Innovation and Skills)

- **Germany**: "Europe's multilingualism and our scientific expertise are the perfect prerequisites for significantly advancing the challenge that language technology poses. META-NET opens up new opportunities for the development of ubiquitous multilingual technologies." — Annette Schavan (Minister of Education and Research)