



**CENTRAL
CO-ORDINATION:**
Bente Maegaard
Center for Sprogteknologi
Njalsgade 80
DK - 2300 Copenhagen S
Tel: +45 35 32 90 90
Fax: +45 35 32 90 89
euomap@cst.dk
www.hltcentral.org/euomap

Human Language Technologies: the path-to-market

Amy Neale, UK Euromap Language Technologies

The development of Human Language Technologies (HLT) has, in the past, been constrained to the environment of the prototype: developed in a lab, with no intentions to be of use to real people in the real world.

The area has been dogged by stories of the machine translation system that generates gobbledygook, or the speech generation system that produced highly synthesized, robotic samples of language.

But the present research landscape for speech and language technologies has moved on, and technologies are now being legitimised by their applicability and usefulness. The research base is meeting the challenge of providing tools that will find a place in the mass market, particularly as this market seeks to meet the needs of a globalized society that is accessible to and by everyone.

HLT is a growing research area, with the European Commission currently funding no fewer than sixty HLT projects, and focusing on providing extra funding for the area in the immediate future. The time is ripe for this research to be transferred into commercially viable products, as we witness the appearance of real mobile computing, and access to information and knowledge via our mobile phones and pda's.

The location-specific nature of the keyboard means that as a device it is starting to get left behind: we are moving away from the keyboard as the preferred method for computer interaction as more people have mobile phones than have PC access. As we become increasingly more mobile and come to expect 'ubiquitous computing' other human-computer interaction tools are coming to the fore.

It is not just our access to the information that is changing, it is our expectation of how this information is pre-tailored for specific requirements, and delivered in the most functional mode. The area of information delivery also falls under the broad-based term: HLT.

Innovation Policy

The wealth of HLT research is contributing to a necessity for widespread 'innovation policy', and mechanisms to enable the commercial take-up of pre-product research. An acceleration of the rate of HLT transfer from the research base to the market is needed in order for end-users to clearly see the benefits of the state-of-the-art research base.

The pan-European EC funded project, Euromap Language Technologies, is an example of such an innovation initiative. This project is dedicated to promoting greater awareness of HLT. The 11 institutions involved across Europe combine to act as a resource and marketing support unit providing information to all communities involved in HLT and to those interested in the benefits that such applications can bring to their operations.

How is HLT being applied?

HLT tends to fall into one of two spheres: technologies at the interface between language users and systems, and technologies that allow for processing and analysing language for other uses.

Interface technologies

The use of speech as an interface for humans and machines focuses on the user, and so interface technologies have a strong 'enabling' function. These technologies fall into the areas of speech recognition, speech synthesis, speaker identification, and voice recognition.

Their purpose is to allow for efficient communication and interaction for achieving tasks in a variety of areas.

Customer Relationship Management

CRM (Customer Relationship Management) is the buzz phrase in the call centre sector, with telephone and online sales and support departments employing essential tools to manage incoming enquiries and channel business interests.

Because speech recognition technology supports natural language and gives greater control to the end users, it is being implemented as the next phase of call centre development. Customer satisfaction rates for this new technology are high, and a speech-recognition based call can be 8 to 10 times less expensive than a live agent call.

Financial Services

An example of a thriving speech technology application is its employment in the financial services arena, where precise information is sought at the touch of a button. This sector is starting to use HLTs both for the interface for accessing information and for the processing of this information. Customers are coming to expect instant access to their personal finances over the phone, and guiding a system by speech allows them to have this access. The information can be highly protected with the use of voice identification and recognition.

A forerunner in the area is UK bank, LloydsTSB. They have deployed a telephone accessible speech recognition system for their customers since 1997 and have now introduced fourth-generation natural language speech recognition technology into the service which takes the concept of natural speech one step further, enabling customers to input some of their instructions using sentences rather than isolated words or phrases.

e-Travel

Another suitable sector that finds itself ready to adopt speech technologies is the travel industry. e-Travel online tools have exploded in recent years, with e-travel becoming one of the fastest growing e-commerce sectors. HLTs are beginning to assist e-travel vendors not only with speech driven reservation systems, but also with web-site translation tools and multilingual information terminals.

Processing technologies

On the others side of the HLT landscape are the technologies that both generate language and handle textual information to make it more accessible to the user. Language processing technologies automate the production of large bodies of information (for example, corporate publications), and the subsequent retrieval and management of this information.

Information Retrieval

The obvious domain of application for such technologies is the ever-growing www of information. Making sense of the web means better navigation aids to help the user find the exact information they want. We are beginning to see cutting edge HLTs being developed for this, and the web as we know it will change to become a more user-friendly environment as a result, incorporating intelligent retrieval and filtering, personalized search selection and multilingual access.

One company who have been steering a course towards tailored information access for some time are the French company Lexiquet, who were recently acquired by the data mining industry leaders SPSS. Lexiquet have developed tools that can interrogate bodies of textual information to extract meaning and eliminate the ambiguity of the words.

These new tools are essential in our knowledge-satiated environment. Studies show that knowledge workers spend at least as much time looking for and sorting through information as they do in using it productively.

"We live in a text-rich environment," said Jack Noonan, president and chief executive officer, SPSS Inc. "Estimates suggest that more than 80 percent of the information available today exists in some type of text format whether it is reports, e-mail messages, research documents or other text-rich information sources."

Not only can language processing technologies assist in accessing information locked in the www, but they are also being employed to assist organizations in producing and accessing digital content for a linguistically diverse global marketplace.

A company's intranet can use HLTs for Knowledge Management, workflow support, information retrieval, and tools to support the multilingual creation of and access to corporate documentation.

Multilinguality and HLT

With the rise of the multilingual web, with more websites now being produced in languages other than English than ever, the need for instant document translation has escalated. Users need fast access to web pages in languages other than their own, and businesses need to localize their e-commerce and corporate sites.

We are seeing the growth in online, automatic translation, and in language-sensitive search engines allowing the user to search the whole web in their native tongue.

Market research house IDC report that the Globalisation and Localisation Service (GLS) industry totalled E4.23 bn in 2000, driven by technology innovation and the widespread adoption of the internet and e-business, and the market for localisation, translation and interpretation (LTI) will comprise the largest part of the GLS market in 2005. IDC predict that the multilingual content management systems, machine translation and linguistic tools market will reach E319m by 2005.

SDL are a leading global GLS company, whose two key products – SDLWebFlow and SDLX – are language technologies that respectively provide multilingual content management, and computer aided translation using translation memory. SDL are delivering a strong 'pull' solution to the very real demand for these localization solutions.

Across the whole landscape, HLT provides the means for achieving communicating in a multilingual environment. With over 40 languages being used extensively across Europe alone, automated language translation and automated multilingual production is the most effective way forward for global communication. And while the US has typically been ahead of Europe in its development of language (particularly speech) technologies, the convergence that is happening in Europe, and the excellent multilingual dimension to emerging language technology tools mean that Europe is at the forefront of development of globally applicable tools.

Rose Lockwood, director of research for Berlitz GlobalNET states that 'as the world's largest multilingual economic area, the EU will depend on effective language technology applications to knit together an integrated economy based on networked businesses.'

Integrating 'interface' and 'processing' technologies

The direction for the future will be the integration of HLTs into single, combined technology products for the full generation, interpretation and reception of language based information. And companies who are able to offer a suite of HLT products look likely to be the winners in transfer of HLT to the end-user.

Telematics

A key area to watch for this type of integrated technology is the emerging telematics industry. These types of integrated technology can offer teliagnostics, telematics content (traffic reports, navigation directions) and in-car commerce. Management consultants McKinsey & Co report a lack of confidence about the prospect of the automotive industry itself developing telematics technologies, and so the door is open for HLT companies to fill the requirements. However, General Motors has developed its own successful 'On-Star' system, which includes voice-activated telephoning, navigation, roadside assistance, and remote diagnostics.

Voice Portals

The rise of voice controlled electronics in hand-held computing devices and in voice portals accessed through our mobile phones is the new age 'time-management', where users can pick up their email as voicemail and access diary and phone book details through a voice portal.

UK market consultancy Ovum forecasts that by 2005 the voice portal market will be worth \$26 billion, with a major service being the 'personal assistant', through which people can dial in and have access to their personalized data (diary, phonebook, etc.), and to any website they want to access information from.

For the time being, 365 Corporation, who last year launched Eckoh, the first UK voice portal, have just signed a deal with Virgin Mobile to provide a similar voice portal service for Virgin customers. 365 Corporation uses Philips speech recognition technology to enable its service.

Where does the Euomap Language Technology Project fit in?

By providing both national HLT path-to-market services in 11 different European countries, and a centralized pan-European service, Euomap gives developers, suppliers and end-users access to state-of-the-art information. The project to acts as a one-stop-shop for HLT, and enhances services in the arena – R&D services, innovation services, market-enabling services, and all the mechanisms necessary for successful technology transfer out of the lab and into the marketplace.

As the Information Society moves away from office based computing and towards location-aware mobile computing, Accenture – the management and technology services consultancy - report that we are moving towards a world of not only 'e-commerce', but also 'ubiquitous-commerce' incorporating wireless applications, television, voice applications and silent 'intelligent' applications enabling this ubiquity. They report that as soon as 2005 we will witness radical changes in the marketplace, and their survey shows that 24 per cent (almost five times as many as today) of businesses will use voice commerce within the next three years.

Language and speech technologies, after decades of research and development, have reached near-market maturity where a growing number of companies are offering value-added services and solutions to a broad spectrum of potential users.

For more information see <http://www.hltcentral.org>, or contact euomap@itri.bton.ac.uk to see how your organization can get involved.