Country Report
Speech Recognition in Norway

NUANCE

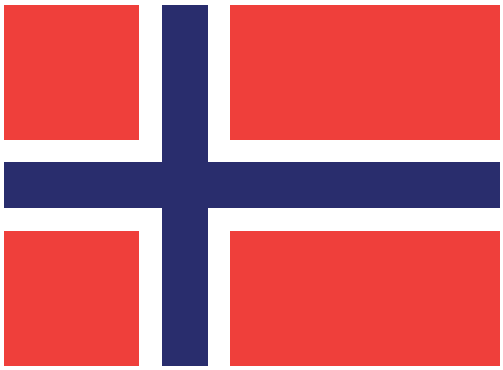
Executive Summary

Norway is among the countries with the highest penetration of speech recognition in healthcare institutions worldwide. It is home to one of the largest single-site installations of frontend speech recognition in a hospital, globally. It also features some of the most advanced multi-site installations available. And it is currently starting to provide low-barrier speech recognition solutions via a broadband healthcare network to practitioners in private practice.

This report gives an overview of speech recognition in Norway, including several case studies of successful implementations of hospital wide speech recognition solutions. It introduces the Norwegian company Max Manus – also active in Denmark and Sweden – as an important and highly successful provider of usable and powerful clinical documentation solutions based on Nuance speech recognition technology. And it provides information on the political background behind the success story of speech recognition in the Norwegian healthcare system.

The report argues that clear government goals and centralized or at least regionalized healthcare structures are important facilitators for large-scale speech recognition deployment in healthcare. On the side of the customers, a clear commitment from management and the readiness to invest time and manpower into training sessions are equally significant for good user acceptance and high adoption rates.

1. Healthcare IT – the Situation in Norway



Norway has traditionally been among the forerunners in bringing information technology into hospitals on a large scale. Starting in the 1990s, Norwegian hospitals were equipped with electronic medical records that made it possible for different departments to share medical data on a patient. From the early years of the 2000s, virtually all hospitals in Norway had electronic medical records in use, since it was, at that time, a strategic goal of the Norwegian government to digitize healthcare in general and hospital-based care in particular. Today, the two dominant providers of electronic medical records in Norway are the Norwegian company DIPS and Germany-based Siemens.

In recent years, the focus shifted towards building up an infrastructure for sharing medical data between medical institutions, for example between one hospital and another or between hospitals and doctors in private practice. Today, all hospitals and the majority of doctors in private practice are connected by a nation-wide network, “Health Net”. It provides secure broadband access for every institution and offers the possibility not only, for the doctor, to send and receive patient data or referral letters but also, for companies, to provide services which are then accessible to every doctor who is interested in them. Health Net is a high capacity network that is already being used for transmitting, for example, medical imaging data.

The political landscape in Norway is a great facilitator of healthcare IT. For many years, Norway’s healthcare system was divided into five health regions. After a merger four regions are left today: the Health Region North, the Health Region Middle, the Health Region West and the Health Region South-East. The regions enjoy broad autonomy on healthcare-related decisions and have the mandate to negotiate framework agreements with industrial partners for all regional hospitals.

2. Speech Recognition in Norwegian Hospitals

2.1 Radiology as pacemaker

Digital Dictation in the Norwegian healthcare system took off on a broader scale in 1993, when local company Max Manus started distributing its own digital dictation solution. From 2001 onwards, Max Manus also started to offer speech recognition technology, in particular the SpeechMagic solution from Nuance. Between 2003 and 2005, the process of implementing speech recognition in Norwegian healthcare institutions gained considerable momentum. As in other places, it was primarily radiologists who saw the advantages and thus became interested in buying the technology. Today, nearly 90% of all Norwegian radiologists are using speech recognition in everyday routine. And practically every radiologist in private practice is working with it.

2.2 Frontend versus backend

Speech recognition in Norway is predominantly, if not exclusively realized as frontend speech recognition: doctors dictate documents using speech recognition and correct them right away. The decision to go for frontend technology rather than backend solutions was an early one. In 2005, the top management of the Health Region South – at this time still separate from the Health Region East – became interested in using speech recognition in its hospitals. The explicit goals were to maximize cost savings, to reduce document turnaround times, and to enhance medical report quality. The management realized that these goals required frontend speech recognition.

Consequently, a framework agreement was negotiated that covered the introduction of frontend speech recognition in all hospitals of Health Region South. Political and health authorities, again, were helpful: A national goal already existed in 2005 that 80% of all discharge reports have to be made available by hospitals within seven days. Many hospitals have not been able to meet this goal for years. But hospitals like the Sykehuset Telemark HF Hospital, which introduced hospital-wide speech recognition as early as 2006, have demonstrated how frontend speech recognition can indeed be used to meet the goal.

2.3 Max Manus: Specialized in hospital-wide SR implementations

When it comes to implementing speech recognition technology in Norwegian healthcare institutions, the local company Max Manus is a key player in the market. Max Manus – a Norwegian war hero during World War II – founded the company in 1946 as a rather diverse supplier of office materials. During the 1960s, the company started focusing on healthcare and on dictation systems. In 1993, Max Manus brought its own dictation system to market, and in 2001 the company started to act as a distributing partner for the speech recognition technology SpeechMagic.

Today, Max Manus has 40 employees. It is offering both digital dictation solutions and speech recognition solutions, based on Nuance technology, to healthcare customers in Norway, Denmark, and Sweden. The company delivers speech recognition technology directly to healthcare providers and is, among others, specialized in integrating speech recognition into hospital-wide electronic medical records. In radiology, in particular, Max Manus also cooperates directly with major RIS vendors which increasingly offer speech recognition solutions as part of their products directly to radiology customers. Max Manus speech recognition solutions come in two versions, one for radiologists and one (called Multimed) for all other medical specialties except for pathology and psychiatry. All in all, nearly 90% of radiologists and all radiologists in private practice use speech recognition solutions that are provided by Max Manus. The Multimed version for non-radiology specialities is currently being used by around 4000 doctors.

- **Speech recognition adoption among radiologists at 90%**
- **4,000 doctors outside radiology use the Multimed version of speech recognition solution**

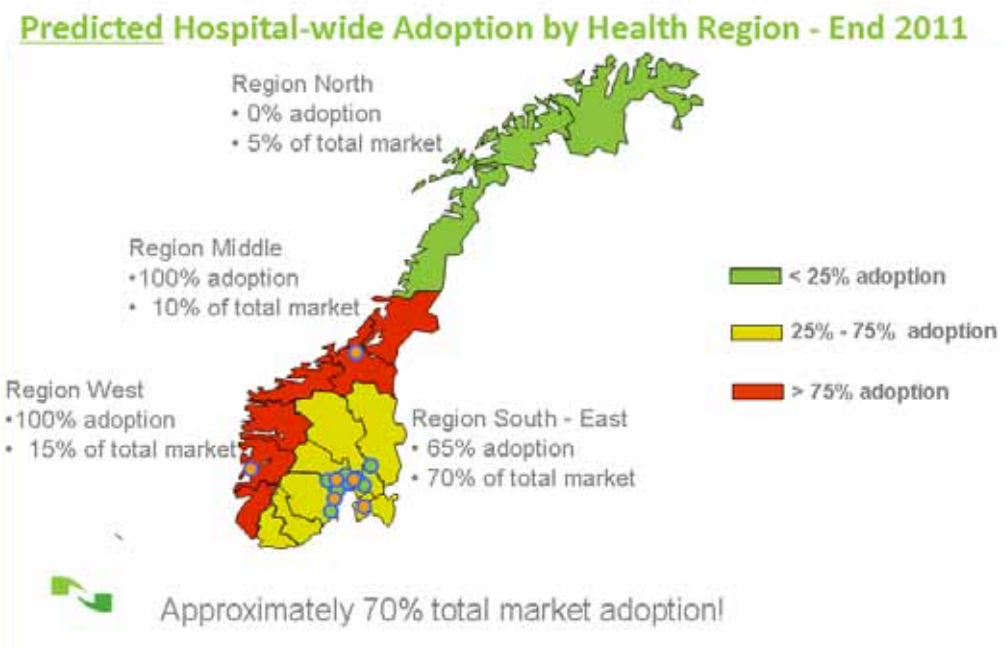
2.4 From region to nation: the national tender for speech recognition

The high acceptance of speech recognition among radiologists in Norway did not go unnoticed. As mentioned above, the Health Region South issued a tender for its framework agreement on speech recognition in 2005. The tender was won by Max Manus, and implementation of speech recognition in the first South Region hospitals started in 2006.

In the same year, a national tender was issued for a framework agreement on the introduction of speech recognition technology in all Norwegian hospitals. Again it was Max Manus that won the tender. The framework agreement implies that health regions or individual hospitals that are interested in integrating speech technologies into their electronic medical record system can implement the solutions according to the negotiated conditions in the framework agreement. It does not mean, though, that all hospitals necessarily have to use speech recognition.

In autumn 2010, all seven hospitals of the Health Region Middle have been equipped with speech recognition technology. The Health Region Middle now has an adoption rate of 100%. With its seven hospitals it equals 10% of the total national market in Norway. The Health Region Middle went for a centralized solution with a single server that provides access to frontend speech recognition for all seven hospitals via a network. The project was facilitated by the fact that all networked institutions use the same electronic medical record system, in this case the DIPS hospital information system.

In the Health Region South-East, which alone makes up 70% of the total Norwegian market, there are already various hospitals using speech recognition technology hospital-wide. The overall adoption rate in the South-East Region is projected to be 38% by the end of 2011.



3. Customer Stories

3.1 Aker Hospital

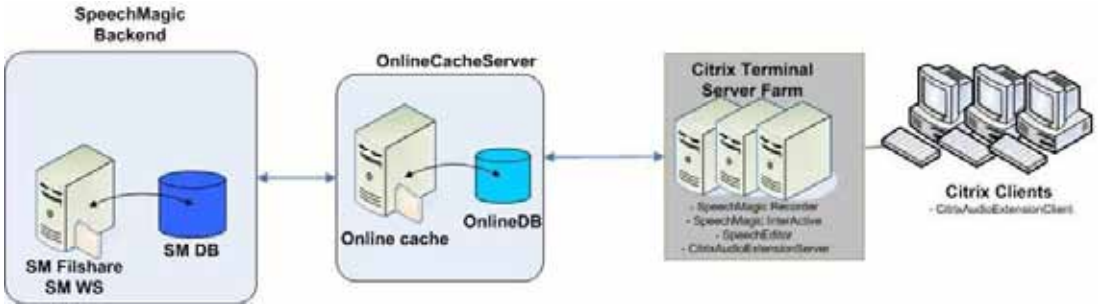
Aker universitetssykehus

Background:

Aker Hospital is situated in the Oslo region. There are 200 medical doctors in full time positions. Citrix is implemented hospital-wide. Max Manus was chosen to realize a hospital-wide implementation of SpeechMagic speech recognition technology.

Installation:

Aker Hospital was the first hospital in the world that went for a hospital-wide implementation of the SpeechMagic frontend speech recognition technology in a Citrix environment. Since Citrix scalability was unknown at that time, intensive testing with Nuance personnel on-site was necessary. It turned out that one server was capable of supporting up to 20 simultaneous sessions, so that, in the end, nine servers were used for 200 named users with their respective Citrix clients.



Results and lessons learned:

Aker Hospital realized annual gains of €1.2 million from reduced transcription needs, an equivalent to 30 fulltime transcriptionist positions. In addition, turnaround time improved. With around 50%, user adoption of speech recognition in Aker Hospital is lower than in other Norwegian hospitals. This is mainly due to a voluntary approach to getting users to shift from transcription to speech recognition.

3.2 Ullevål University Hospital

Background:

Ullevål University Hospital is the largest hospital in Norway. And with 1000 users, the hospital-wide installation of speech recognition, which was realized by Max Manus in 2008, is among the largest deployments of frontend speech recognition in one single site in the world.

Installation:

The project had a tough timeframe: There was only one year between the approval of the pilot project in January 2008 and the end of the hospital-wide rollout in February 2009. Scalability was an obvious issue in an installation of this size. It was solved using Nuance's offline synchronization technology with local caching servers.

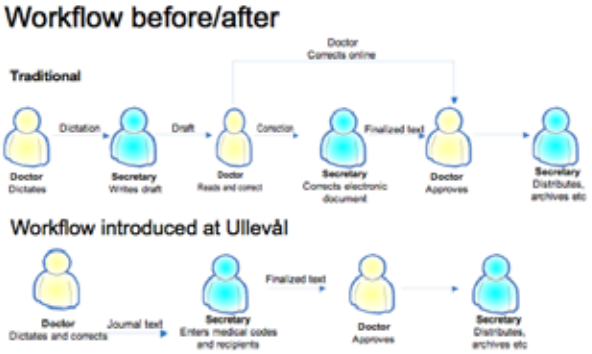
Results and lessons learned:

Dictation workflow at Ullevål University Hospital involved five steps before introduction of frontend speech recognition. With speech recognition, it was reduced to three steps. A further reduction to the ideal one step workflow – where a doctor dictates, corrects and approves a document while a secretary archives, distributes and codes it – seemed possible but could not be realized due to the very limited time available.

- **Hospital-wide roll-out within only one year**
- **1000 users**
- **2.3 million euro savings on transcription costs**

In spite of this drawback, Ullevål University Hospital realized savings of €2.3 million per year, an equivalent of 60 full time transcriptionist positions. In addition to these financial benefits, up-to-date medical records, an increased IT know-how among clinicians, and an improved EMR workflow are among the key gains that are mentioned by the customer. User acceptance is good: 75% of users regularly use speech recognition to create their documents.

Workflow before/after



3.3 Case Study 3: Sykehuset Telemark HF Hospital

Sykehuset Telemark

Background:

Sykehuset Telemark HF Hospital is part of a hospital network which involves three distinct hospitals at five physical locations. There are a total of 600 users, 400 of them at Sykehuset Telemark HF Hospital. Max Manus implemented Nuance's SpeechMagic technology in 2006.

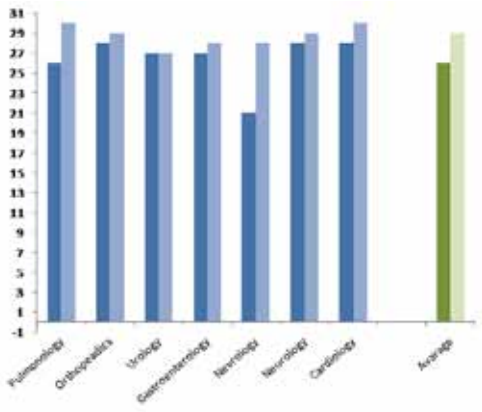
Installation:

Since the institution comprises several locations, network latency was among the limiting factors for a centralized installation. The problem was solved using Nuance's offline synchronization technology with local cache servers.

Results and lessons learned:

- **7 out of 10 patients receive their discharge summaries right away**
- **600 users**
- **900,000 euro savings on transcription costs**

Sykehuset Telemark HF Hospital managed to generate savings of €900,000 annually, an equivalent to 24 full time transcriptionist positions. With around 90%, user acceptance is extraordinarily high. Document turnaround times have improved considerably. 7 out of 10 patients now receive their discharge summaries right away. More than 80% of all discharge summaries are out within 7 days. This means that Sykehuset Telemark HF Hospital is among the few big hospitals that manage to meet the government goal of an 80% availability of discharge summaries within a week. At Sykehuset Telemark HF Hospital, hospital management was able to document and even quantify quality gains in documentation. They analyzed 200 discharge summaries before and after the introduction of speech recognition. There were eight evaluation dimensions: problem description, diagnostics, evaluation, follow-up, medication, consistency, readability, and discharge report time. For each dimension, a maximum of 4 points was assigned. The maximum total score was 32 points. Analysis was done separately for the different departments involved. Overall, documentation quality as measured on the predefined scale mentioned above showed a 12% improvement. Documentation quality improved in every single speciality except for urology, where documentation quality was high to begin with and remained constant after introduction of speech recognition. The largest gains in documentation quality were reached in neurology, pulmonology, and cardiology.



3.4 Case Study 4: Vestre Viken Health Trust

Background:

Vestre Viken Health Trust was established in July 2009. It involves five hospitals in different locations near the Norwegian capital Oslo (Ringerike, Buskerud, Asker, Baerum, Kongsberg). Max Manus introduced Nuance SpeechMagic speech recognition technology at Vestre Viken before the recent merger for all somatic disciplines in the different hospitals between 2006 and 2008. Buskerud, in particular, was part of the speech recognition installation at Sykehuset Telemark HF Hospital mentioned above before it became part of Vestre Viken Health Trust in 2009. Radiologists at Vestre Viken had already been using speech recognition since 2003/2004.

Installation:

Speech recognition implementation at Buskerud Hospital was a large scale project, and implementation at Asker/Baerum involved several locations. In both cases offline synchronization with local c ache servers was used to overcome scalability problems. The project was complicated by the fact that in the beginning the hospitals used different EMR solutions from different providers. This was overcome as a result of the merger so that now, with the DIPS EMR, one single EMR solution is in place for all hospitals involved. The installation covers all somatic disciplines except pathology.

Results and lessons learned:

The introduction of speech recognition received generally positive user feedback from doctors, in particular with regards to documentation time and information being spread more efficiently from one department to another and/or from hospital to referring physician.

4. Speech Recognition in Ambulatory Care

Apart from private radiologists who use speech recognition almost without exception, speech recognition in Norway has been largely confined to the hospital sector so far. But this is about to change. The Norwegian national healthcare network Health Net is likely to become a great facilitator of speech recognition adoption in ambulatory medical institutions including general practitioners' offices.

In the past, deploying speech recognition in private practices was somewhat difficult in Norway for logistical reasons. Norway is a big but in large parts sparsely populated country and GP practices are scattered across the countryside, making it difficult for speech recognition providers to offer their solutions – that regularly involve on-site services – at a sensible price.

The national Health Net now gives speech recognition providers the possibility to offer speech recognition via application service providers (ASPs) who in turn can provide access to doctors via the Health Net network. In such a scenario, service and maintenance work can be completely centralized. And this will automatically result in far more competitive offers than had previously been possible in terms of individual installations.

5. Speech Recognition in Norway: Lessons Learned

In using speech recognition technology in healthcare, Norway is among the forerunners in the world. In particular when it comes to hospital-wide use of speech recognition, there is little or no other place in the world where so many large scale installations can be found.

Keys to success

1. IT friendly environment
2. Professional training and support
3. Executive in-house leadership

This automatically leads to the question in what way the situation in Norway is different from other countries where adoption of speech recognition is slower. Important in this context is certainly a healthcare IT friendly environment. In Norway, broad adoption of hospital-wide electronic medical records was defined as a government goal at a time when, in most other countrie,s department-specific IT systems were considered the latest innovation.

Another early government goal, accelerating delivery of discharge letters, put the necessary pressure on hospital administrations to think about technologies and concepts to improve document management and document turnover times. This led many hospitals to consider speech recognition at a time when elsewhere in the world only radiologists knew about the merits of the technology.
Apart from politics, the Norwegian example also shows what should be done at the implementation level in order to reach both acceptance among users and high adoption rates in the medical fields. The company Max Manus, which has realized most large scale implementations of speech recognition in Norway, puts a focus on providing proper training in order to get doctors used to the technology. What is recommended – and in many hospitals achieved – is three sets of three-hour training per doctor.
Apart from training, executive in-house leadership is the second important success factor. Even in speech recognition prone Norway, not every speech recognition project is equally successful. High adoption rates can best be reached when there is a clear commitment by the hospital top management in favor of speech recognition – and a certain willingness to push users towards using it when it is available.

The experience speaks for itself ™

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