

ALLADIN

Natural language based decision support in neurorehabilitation

A helping hand for making the right decision in neurorehabilitation: ALLADIN provides the solution to a worldwide need to tailor the rehabilitation of stroke patients, so that it meets both their functional and societal needs, and restores their independence.

Objectives of the project

A stroke occurs when a blood clot blocks the blood circulation in the brain or when a blood vessel ruptures. The cells in the affected brain area are destroyed and the patient loses the use of one side of the body.

Every year there are about 20 million new stroke incidents in the world. This means that approximately one in every thousand people will get a stroke.

Today we know that physical and functional training are of paramount importance in stroke rehabilitation in enabling patients to regain a good level of independence. Despite this, we are still unable to answer the questions every patient has: *"Will I be able to walk again; will I be able to drink tea with my friends..."*

The **ALLADIN** project:

- Offers a reliable standard for **calculating and predicting** the functional recovery of stroke patients.
- Creates conformity in the communication and understanding of **neurorehabilitation data**.

- Makes **clinical reasoning** and quantitative measurements exchangeable in a user friendly way.
- Outputs a numerical code attached to an operational definition of a milestone, or marker for functional recovery, very similar to the International Classification of Functions (ICF).



Project Description

The **ALLADIN** project focuses on the development of a user-friendly, natural language based decision support software for neurorehabilitation, in particular for strokes. **ALLADIN** provides an adequate and fast solution for a client centred practice, for discharge planning and for the utilization of rehabilitation resources. It fulfils the social and political expectations by substantially reducing costs, by measuring therapeutic efficiency in terms of mean quality-adjusted duration.

The **ALLADIN** project studies daily activities from a new perspective. A completely new diagnostic device was designed together with software to evaluate stroke patients. Modern sensors measure 'drinking',

Scenario

Jorunn is physiotherapist at the Maria Middelaers Hospital in Gent. She treats Maria, group leader of a local seniors citizens' club in London, who got a stroke and was hospitalised, while on holiday in Belgium. After 4 weeks Maria preferred to go home and continue rehabilitation in a specialized centre in London. Jorunn uses ALLADIN to assess Maria and talks frequently about Maria's performance to her portable digital assistant, connected through a wireless LAN with the hospital information system. Every time she does this, ALLADIN automatically produces an updated marker or milestone for recovery. When Maria arrived back in London, her neurologist there already knew what Maria's prognosis for a successful outcome was and could plan her rehabilitation programme



'turning a key', 'lifting a bag' etc and forces and torques exerted by the patient are graphically represented.

"...We take everyday life situations into the laboratory and the patients enjoy it..!"

The values patients receive during the assessments are compared to 'models' of normal functional behaviour, also developed during the **ALLADIN** project. Data mining technology charts the patients according to their remaining capabilities and gives the neurologist and therapist an instrument to refine future decisions.

ALLADIN listened to the wishes of physicians and therapists working in small practices, who cannot afford to buy such expensive diagnostic tools. Consequently a cheap application was built with a speech recognition module imbedded in a PDA. It extracts clinically relevant information from 'natural language descriptions' recorded by the physician or therapist about his/her patient.

Expected Results & Impacts

As a result of this project, doctors will be able to give stroke patients reliable predictions on the level of functional independence they can expect to regain. The therapy is no longer focusing on symptoms instead therapy recommendations will guide patients to regaining independence and their day to day lifestyle.

ALLADIN will become an indispensable health information technology. It supports honest medical decision making about whether an investment in a therapeutic intervention for a European citizen is going to provide value for money in a social context.

ALLADIN addresses an important new market: decision support at bedside. Bedside decision support for rehabilitation is an emerging market with no competition. The use of the **ALLADIN** system can efficiently discharge the clinical staff of repetitive tasks such as filling out evaluation reports, which, in practice, often are not performed but importantly, help the hospital staff to make the right decisions about the further follow up of stroke patients.

Rehabilitation services using **ALLADIN** will not only become more attractive for patients opting for a personalised approach but they will attract and engage the attention of rehabilitation professionals, educate them about the possibilities of this new technology and train them in its use. In this way, **ALLADIN** triggers a process by which the clinical users will drive the refinement of the technology.

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- Budapest University of Technology and Economics (HU)
- Univerza v Ljubljani, Fakulteta za Elektrotehniko (SI)
- Zenon SA, Robotics and Informatics (EL)
- Cardiff University (UK)
- Multitel ASBL (BE)
- The Provost Fellows and Scholars of the College of the Holy and Undivided Trinity of Queen Elizabeth near Dublin (IE)
- Országos Orvosi Rehabilitációs Intézet (HU)
- Scuola superiore di studi universitari e di perfezionamento Sant'Anna (IT)
- Università Campus Bio-Medico (IT)

Timetable: from 01/04 – to 12/06

Total cost: € 4.030.347

EC funding: € 3.300.000

Instrument: STREP

Project Identifier:

IST-2002-507424

Keywords:

Biomedical sensors, electronic health record, decision support systems, ontology, speech