



**IST-FP6-508794
PROTOCURE II**

*Integrating formal methods in the development process of
medical guidelines and protocols*

Specific Targeted Research Project
Information Society Technologies

D8.3 Report on attended meetings

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Dissemination Level		
PU	Public	√
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Contributions:

- **CBO (Lead contractor):**
Responsible for the production of the present document.

The objective of this work package is to maintain close links with the medical informatics community and with the medical community involved in producing, implementing and maintaining guidelines and protocols, in particular the Guidelines International Network (GIN).

As part of the activities of this work package, Protocure II partners attended and presented the project results at several meetings, workshops and conferences.

In this report all meetings are listed in chronologically order.

Publications are not mentioned in this report. See therefore the Periodic Activity Report (PAR). Also the meetings with the advisory board are not mentioned here. See also the PAR.

Symposium on Computerized Guidelines and Protocols (CGP'04)

Name: Symposium on Computerized Guidelines and Protocols
Period: 2004 April 13 –14, Prague, Czech Republic
Type of audience: Computer Science/Medical Informatics/Artificial Intelligence
Type of meeting: Symposium

General impression and themes

Following the success of the first European Workshop on Computerized Guidelines and Protocols held at Leipzig, Germany, in 2000, the Symposium on Computerized Guidelines and Protocols (CGP-2004) was organized to identify use cases for guideline-based applications in healthcare, computerized methods for supporting the guideline development process, and pressing issues and promising approaches for developing usable and maintainable vehicles for guideline delivery. It brought together researchers from different communities to examine cutting-edge approaches to guideline modelling and application development and to consider how different communities can leverage each other's strengths.

Two categories of papers were presented: (1) long (fifteen-page) papers that present mature research results and that review focused topics; and (2) short (five-page) papers that report early results and innovative ideas and that describe practical applications. In the first category we have papers that describe the use of formal and adaptive methods in applying protocols to clinical decision support; that review the representation of guideline goals and present an empirically derived way of categorizing them; that present methods for deriving temporal abstraction and temporal action specification in guidelines; that explore interactive visualizations for medical treatment plans; that discuss the relationship between guidelines and standard terminologies, and that demonstrate improvement in health outcomes and/or cost-effectiveness ratio with guideline compliance. In the second category we have papers that describe contrasting approaches to developing, searching, and evaluating guideline knowledge bases, formal representation and reasoning methods, the possibility of translating from one formalism to another, adapting workflow to implement treatment protocols, and the use of mark-up and data-mining technologies.

The diversity of the topics belies the fact that workers in the field share a number of underlying concerns. The first is representation of medical knowledge embodied in clinical guidelines and protocols. Several papers presented formal, empirical, and hybrid methods for representing such knowledge, especially the temporal aspects of guideline-based data abstractions and recommendations. For computer-supported guidelines and protocols to make a difference in clinical practices, they must be integrated into clinical information and workflow systems. Papers on deployment-driven guideline encoding, integration of standard terminologies, and adaptation of workflow processes speak to these concerns. Finally, the results of deploying computerized guidelines and protocols require evaluation. Evaluation can be done in terms of the correctness of guideline information presented to clinicians and of the effects on clinicians' compliance to guideline-recommended practices, and, ultimately, on quality and cost-effectiveness of patient care.

The symposium was held at the Novotek Hotel, Prague, in the Czech Republic, as part of the International Joint Meeting [EuroMISE 2004](#). A number of organizations, including the University of Economics (Prague), European Centre for Medical Informatics, Statistics and Epidemiology (EuroMISE), Czech Society of Cybernetics and Informatics, Guidelines International Network (G-I-N), the Austrian Society for Artificial Intelligence (ÖGAI), and Health Level 7, endorsed the symposium and encouraged their members to participate.

Interesting papers and talks

In their invited talks Dr. Kitty Rosenbrand from the Dutch Institute for Healthcare Improvement (CBO) (member of Protocure II) and Dr. Gunther Schadow from the Regenstrief Institute, Indiana University School of Medicine discussed the future of guidelines, focussing on frequent updating and implementations tools.

Gunther Schadow from the Regenstrief Institute provided a lot of details regarding the possible standardisation of guidelines in the HL7 Reference Information Model.

A panel discussion after this talk came to the conclusion that it is too early in the development process of computerised representations of clinical guidelines and protocols to standardise them.

There were several presentations by members of the Protocure consortium:

Mar Marcos presented the results of Protocure I together with an overview of Protocure II.

Andreas Seyfang described Advanced Temporal Data Abstraction for Guideline Execution.

Peter Votruba presented a poster on Tracing the Formalisation Steps of Textual Guidelines.

Relation to Protocure (reason for attending, possible future collaborations etc.)

The topic of the symposium is very close to the focus of the Protocure project. It was co-organised by a member of the consortium to propagate our ideas and to promote the exchange of knowledge in our field.

Biomedical informatics for enhancing healthcare, research and education (MEDINFO'04)

Name: 11th World Congress of Medical Informatics
Period: 2004 September 7-11, San Francisco CA, USA
Type of audience: Computer Science/Medical Informatics/Artificial Intelligence
Type of meeting: (workshop, conference, etc): conference

General impression and themes

The theme of the MedInfo 2004 was “building high performance health organizations – building informatics for enhancing health care, research, and education”. The main conference consisted of seven tracks - Bioinformatics, Clinical Informatics, Education and Training, Enabling Technologies in Health Care, Human and Organizational Issues, Knowledge Management, and Public Health Informatics. In addition Workshops, Tutorials, and Working Group Meetings from IMIA and AMIA were held.

Interesting papers and talks

In semi-plenary presentations, Wil van der Aalst (TU Eindhoven, The Netherlands) talked about Business Process Management in Healthcare, Heimar F. Marin (Harvard Medical School, USA) about New Frontiers for Nursing and Healthcare Informatics, Dennis Giokas (Canada Health Infoway Inc., Canada) about Canada Health Infoway: Accelerating Development of Electronic Health Information Systems Nationwide, Russ B. Altman (Stanford University Medical Center, USA) about Challenges for Informatics and Medicine in the Post-genome Era, and Pawel Lukowics (University for Health Sciences, Medical Informatics and Technology, Hall in Tirol, Austria) Innovative Interfaces and Technologies for Biomedicine)

Some sessions were devoted to guidelines and protocols the most interesting papers were

- P. Terenziani, S. Montani, A. Bottrighi, Universita' del Piemonte Orientale, Alessandria, M. Torchio, G. Molino, Laboratorio di Informatica Clinica, G. Correndo, - A Context-adaptable Approach to Clinical Guidelines
- S. W. Tu, et al. - Modeling Guidelines for Integration into Clinical Workflow
- T. Ganslandt, T. Frankewitsch, M.L. Mueller, U. Kunze, T. Buerkle, C.F. Krieglstein, and H. Prokosch - Visualization of Clinical Workflows Merging Data from Multiple Information Systems
- P. Votruba, S. Miksch, Vienna University of Technology, and R. Kosara - Facilitating Knowledge Maintenance of Clinical Guidelines and Protocols
- P. Ciccarese, University of Pavia, E. Caffi, L. Boiocchi, S. Quaglini, and M. Stefanelli - A Guideline Management System

Relation to Protocure (reason for attending, possible future collaborations etc.)

A panel discussion about “Requirements for and Work Toward an International Standard for Representing Clinical Guidelines” was organized, the panellists were R.A. Jenders (Cedars-Sinai Medical Center and University of California, Los Angeles, CA, USA), M. Entwistle

(Enigma Publishing, Auckland, New Zealand), K. Harvey (La Trobe University and Therapeutic Guidelines Limited, Melbourne, Victoria, Australia), C. Marshall (New Zealand Guideline Group and Guidelines International Network, Wellington, New Zealand), and R.N. Shiffman (Yale University, New Haven, CT, USA). The topic discussed were guidelines are not executable, but electronically representable/ querable, unit of authoring vs. unit of implementation, decision support system world vs. guideline world and issues for guideline publisher.

From the Protocure team the Delt/A tool was presented.

The panel discussion (see above) and the fruitful discussion with the attendees were very useful and necessary to assess the value of the Protocure theme

European Conference on Logics in Artificial Intelligence (JELIA'04)

Name: European Conference on Logics in Artificial Intelligence
Period: 2004 September 27-30, Lisbon, Portugal
Type of audience: Mainly AI researchers both theoreticians and practitioners
Type of meeting: Biennial Conference

General impression and themes

The conference brought together theoretical studies concerning multi-agent systems, nonmonotonic reasoning, uncertainty, complexity issues, belief revision, etc, etc with applications and numerous system descriptions and demonstrations.

Interesting papers and talks

In "Representing and Reasoning with Preferences", Francesca Rossi shows how two formalisms for representing preferences, namely soft constraints and CP nets may be combined. Furthermore, aggregation of preferences in multi-agent systems is discussed and semantics is introduced.

An interesting application is "Towards a Logical Analysis of Biochemical Pathways" by Patrick Doherty, Steve Kertes, Martin Magnusson, and Andrzej Szalas. They discuss the problem of reasoning about models of biochemical pathways which are often incomplete, e.g., reactions may be missing and only some products are observed. By generating hypothesis they can explain the observations about the functional and physical interactions. An oral presentation was given to show work done for Protocure II.

Relation to Protocure (reason for attending, possible future collaborations etc.)

For researchers in logics for AI, it is interesting to see how logics have been applied to verification of medical guidelines. For us it is interesting to see new developments in this area which can contribute to further research.

Empirically Successful Classical Automated Reasoning (ESCAR'05)

Name: Empirically Successful Classical Automated Reasoning

Period: 2005 July 22-26, Tallinn, Estonia
Type of audience: Practitioners and researchers interested in working automated reasoning systems
Type of meeting: Annual Workshop

General impression and themes

The main theme of this workshop is the demonstration of automated reasoning tools used in practice. The general impression was that automated reasoning is starting to become more feasible the last few years.

Interesting papers and talks

Most talks consisted of applications. Several tools were presented such as

- MiniSAT: undisputed winner of satisfiability competitions in the last year
- MPTP: Applying automated reasoning techniques to mathematical problems formulated in the Mizar language
- LogiWeb: support of authoring, storing, distributing, indexing, checking, and rendering of 'Logiweb pages' for reasoning about programs.

An oral presentation was given to show work done for Protocure II.

Relation to Protocure (reason for attending, possible future collaborations etc.)

Presenting Protocure work and investigating the state of the art automated reasoning tools, methods and theories.

10th Conference on Artificial Intelligence in Medicine (AIME'05)

Name: 10th Conference on Artificial Intelligence in Medicine
Period: 2005 July 23-27 Aberdeen, Scotland
Type of audience: Computer scientists (Artificial Intelligence) and interested physicians
Type of meeting: Conference

General impression and themes

The AIME conference provides a unique opportunity to present and improve the international state of the art of Artificial Intelligence in medicine from both a research and an applications perspective. For this purpose, the AIME conference includes invited lectures, contributed papers, system demonstrations, a doctoral consortium, tutorials, and workshops.

The papers and the sessions have been organized according to the following themes: (1) Temporal Representation and Reasoning, (2) Decision Support Systems, (3) Clinical Guidelines and Protocols, (4) Ontology and Terminology, (5) Case-Based Reasoning, Signal Interpretation, Visual Mining, (6) Computer Vision and Imaging, (7) Knowledge Management, and (8) Machine Learning, Knowledge Discovery and Data Mining. These themes reflect the current interests of researchers in AI in medicine.

This year's conference had an outstanding number of submissions leading to highest-quality publications.

Interesting papers and talks

Two invited speakers gave talks on two challenging topics in AIME. Frank van Harmelen (Vrije Universiteit Amsterdam, The Netherlands) spoke on ontology mapping and presented different approaches to ontology-mapping, covering linguistic, statistical and logical methods. Paul Lukowicz (University for Health Sciences, Medical Informatics and Technology, Hall in Tirol, Austria) introduced the topic of context-aware wearable systems with the focus on human computer interaction, and illustrated different ways forward within that research area.

Jim Hunter presented tests of a precursor version of the Asbru interpreter on data from intensive care.

There were three talks given by members of the consortium: "Formalising medical quality indicators to improve guidelines", "Design Patterns for Modelling Medical Guidelines", and "Ontology-Driven Extraction of linguistic patterns for modelling clinical guidelines". In addition, there was a poster on MHB and one on previous work on patterns in guidelines, and a talk on using information extraction on clinical guidelines, presented by TUW.

There were two sessions devoted to Clinical Guidelines and Protocols

- *Christian Fuchsberger, Jim Hunter, Paul McCue* - Testing Asbru Guidelines and Protocols for Neonatal Intensive Care
- *Liliane Pellegrin, Nathalie Bonnardel, Francois Antonini, Jacques Albanese, Claude Martin, Herve Chaudet* - EORCA : A Collaborative Activities Representation for Building Guidelines from Field Observations
- *Radu Serban, Annette ten Teije, Mar Marcos, Cristina Polo, Kitty Rosenbrand, Joyce van Croonenborg, Jolanda Wittenberg* - Design Patterns for Modelling Medical Guidelines
- *Monika Moser, Silvia Miksch* - Improving Clinical Guideline Implementation through Prototypical Design Patterns
- *Brigitte Seroussi, Jacques Bouaud, Jean-Jacques Vieillot* - Automatic Derivation of a Decision Tree to Represent Guideline-based Therapeutic Strategies for the Management of Chronic Diseases
- *Stefania Montani, Paolo Terenziani, Alessio Bottrighi* - Exploiting Decision Theory for Supporting Therapy Selection in Computerized Clinical Guidelines
- *Diego Sona, Paolo Avesani, Robert Moskovitch* - Helping Physicians to Organize Guidelines within Conceptual Hierarchies
- *Andreas Seyfang, Silvia Miksch, Cristina Polo Conde, Jolanda Wittenberg, Mar Marcos, Kitty Rosenbrand* - MHB - A Many-Headed Bridge between Informal and Formal Guideline Representations

- *Paolo Terenziani, Stefania Montani, Alessio Bottrighi, Gianpaolo Molino, Mauro Torchio* - Clinical Guidelines Adaptation: Managing Authoring and Versioning Issues
- *Mor Peleg, Rory Steele, Richard Thomson, Vivek Patkar, Tony Rose, John Fox* - Open-Source Publishing of Medical Knowledge for Creation of Computer-Interpretable Guidelines
- *Arjen Hommersom, Peter Lucas, Patrick van Bommel, Theo van der Weide* - A History-based Algebra for Quality-checking Medical Guidelines
- *Ohad Young, Yuval Shahar* -The Spock System: Developing a Runtime Application Engine for Hybrid-Asbru Guidelines
- *Kirsty Bradbrook, Graham Winstanley, David Glasspool, John Fox, Richard Griffiths* - AI Planning Technology as a Component of Computerised Clinical Practice Guidelines
- *Katharina Kaiser, Cem Akkaya, Silvia Miksch* - Gaining Process Information from Clinical Practice Guidelines Using Information Extraction
- *Radu Serban, Annette ten Teije, Frank van Harmelen, Mar Marcos, Cristina Polo-Conde* - Ontology-Driven Extraction of Linguistic Patterns for Modelling Clinical Guidelines
- *Marjolein van Gendt, Annette ten Teije, Radu Serban, Frank van Harmelen* - Formalising Medical Quality Indicators to Improve Guidelines

Relation to Protocure (reason for attending, possible future collaborations etc.)

Two of the tracks were Clinical Guidelines and Protocols and Ontology and Terminology. Numerous of the other papers touched the field of clinical guidelines. The conference is the main forum where researchers from Artificial Intelligence and Medicine meet.

17th Belgian-Dutch Conference on Artificial Intelligence (BNAIC'05)

Name: Belgium-Netherlands AI Conference
 Period: 2004 October 21-22, Groningen, Netherlands
 Type of audience: Dutch and Belgian AI researchers
 Type of meeting: Annual Conference

General impression and themes

Important subjects on this conference included machine learning and multi-agents systems systems. Other activities included pattern recognition, cognition, logic, ontologies, negotiation and planning.

Interesting papers and talks

Bart Verheij argues in his presentation and his paper "Dialectical argumentation with argumentation schemes: an approach to legal logic" that in many realistic cases, such as in in the legal field, reasoning is domain-knowledge and as a consequence needs to be modelled for a specific domain. In this paper, he proposes the use of argumentation schemes as the main tool for analysis and introduces a methodology for the investigation of such argumentation schemes. This method consists of the determination of relevant types of sentences, the argumentation schemes, exceptions blocking the use of argumentation

schemes and the condition for the use of the argumentation schemes. Such argumentation schemes might prove themselves worthwhile in the medical domain as well.

An oral presentation was given to show work done for Protocure II.

Relation to Protocure (reason for attending, possible future collaborations etc.)

BNAIC is the main Dutch/Belgian AI conference.

11th Conference of the Spanish Association for Artificial Intelligence (CAEPIA'05)

Name: 11th Conference of the Spanish Association for Artificial Intelligence
Period: 2005 November 16-18, Santiago de Compostela, Spain
Type of audience: Computer Science and Artificial Intelligence (AI) researchers.
Type of meeting: Conference

General impression and themes

The Spanish Association for Artificial Intelligence (AEPIA), created in 1983, has contributed to guiding and gathering the Spanish researchers on AI for more than 20 years. The AEPIA is a member of the European Co-ordinating Committee for Artificial Intelligence (ECCAI) and founder member of IBERAMIA, the Iberoamerican Conference on Artificial Intelligence. The association also supports several national and international events with high interest for the members (CAEPIA, TTIA, etc.).

The AEPIA organises the conference of the association, the CAEPIA, every two years. The goal of the CAEPIA conferences is to create the necessary conditions for the dissemination of research work, to strengthen the relationships among the Spanish AI research groups, to facilitate the interaction between novice researchers and consolidated groups, and to help in the dissemination of new developments to society. To achieve these goals, the conference is held in combination with workshops, panel discussions and tutorials.

Interesting papers and talks

In the 2005 CAEPIA edition, there were invited talks by internationally renowned researchers: Prof. Stephen Muggleton, from the Imperial College London (UK); Prof. Gerhard Brewka, from Leipzig University (Germany); Dr. Peter Lucas, from the Radboud University (Netherlands); and Prof. Vicente Botti, from the Polytechnic University of Valencia (Spain).

In the conference there were sessions dedicated to AI applications; Machine Learning and Data Mining; Evolutionary Computing; AI foundations; real-time AI; Intelligent Interfaces and Natural Language Processing; Ontologies, Semantic Web and Knowledge Engineering; Planning, Scheduling and Optimisation; Approximate Reasoning and Bayesian Reasoning; and Case-based Reasoning.

Within the AI applications and Knowledge Engineering tracks there were two presentations given by members of the consortium. The topics of the presentations were "Assessment of

MHB: an intermediate language for the representation of medical guidelines” and “A business process model of evidence-based guideline development”.

Relation to Protocure (reason for attending, possible future collaborations etc.)

The CAEPIA conference is the main forum where Spanish researchers belonging to the AI community meet. The participation in the CAEPIA is therefore crucial to disseminate AI results at a national level.

3rd Guidelines International Network Conference (GIN'05)

Name: 3rd Guidelines International Network Conference 2005
Period: 2005 December 5-7, Lyon, France
Type of audience: Guideline developers
Type of meeting: Annual Conference

General impression and themes

The theme of the 3rd GIN conference was ‘Evidence in context’. In plenary sessions, workshops and poster presentations the development, adaptation and implementation of clinical practice guidelines was object of study.

Interesting papers and talks

Development of a computerized guideline implementability appraisal system. S. Codisch, G. Michel, A Hsiao, RN Schifman. Distributed appraisal of guideline implementability is facilitated by a web-based system based on the GLIA instrument. Analysis of large data sets to prioritize controversial items for group discussion and the generation of a concise report to guideline authors are particularly useful features of the computerized system.

Computer implementation of guidelines. Sharon Smart, Ian Purves. The production of guidance appropriately considers the production process and its quality but rarely has a target implementation in mind. The authors intended through demonstration and discussion to highlight the following issues: for guideline developers about representation of their narrative in form that enables implementation; for implementers about successful knowledge management programmes and the role of computers within them.

An oral presentation was given to show the Protocure II work: Integrating formal methods in the development process of clinical guidelines and protocols.

Relation to Protocure (reason for attending, possible future collaborations etc.)

For the tools and techniques developed in the Protocure II project the guideline developers are the customers or end-users.

13rd International SPIN Workshop "Model Checking Software"

Name: 13rd International SPIN Workshop "Model Checking Software"

Period: 2006 March 30 - April 1, Vienna, Austria
Type of audience: Computer science, formal methods
Type of meeting: Annual Conference

General impression and themes

The SPIN Workshop in Vienna, Austria was held in March/April 2006 as a satellite event of ETAPS 2006 conference. The symposium covered a wide range of topics from model checking of software research area, including directed model checking, markovian systems, distributed model checking, advanced handling of data aspects, industrial applications, assume-guarantee paradigm, partial order reduction and various model checking tools. SPIN is a forum for practitioners and researchers interested in state space-based techniques for the validation and analysis of software and hardware systems, including communication protocols. Techniques based on explicit representations of state spaces, as implemented in the SPIN model checker or other tools, or techniques based on combination of explicit representations with other representations, is the focus of this workshop. SPIN has proven to be particularly suitable to analyse concurrent asynchronous systems. The workshop aims to encourage interactions and exchanges of ideas with all related areas in software engineering.

Relation to Protocure (reason for attending, possible future collaborations etc.)

By giving talk on the SPIN workshop we were able share our ideas with researchers in this field and hear their opinion about our work. In particular, because SPIN is the forum on state of the art automatic verification techniques we apply for the verification of medical guidelines. Altogether it was very exciting time for us joining the SPIN workshop and other ETAPS 2006 conferences as well.

Workshop of on Foundations of Clinical Terminologies and Classifications, FCTC 2006

Name: Workshop of on Foundations of Clinical Terminologies and Classifications
Period: 2006 April 6-8, Timisoara, Romania
Type of audience: Medical Informatics researchers and medical doctors
Type of meeting: Workshop

General impression and themes

The workshop was held as a satellite workshop within the EFMI (European Federation of Medical Informatics) and RSMI (Romanian Society of Medical Informatics) Special Topic Conference "Integrating Biomedical Information: From e-Cell to e-Patient", 6-8 April 2006.

The topic of this Medical Informatics Conference was centered on solutions for integration of clinical data and unification of clinical encoding standards.

The real challenge in medical data gathering (particularly when information is divided into small fragments, often unconnected, and stored according to various conventions) is to make

full use of this information, and to integrate it within a coherent, globally useable and universally understandable framework.

The conference is concerned about defining the right steps to reach this needed integration of medical information, in support of medical decisions and processes.

Interesting papers and talks

The general orientation of the workshop discussions was towards standards for encoding medical knowledge, as well as for NLP techniques for acquiring and organizing this knowledge. Concrete case studies are considered very interesting, and from this perspective, the experiments we did for searching linguistic patterns by using classifications from existing medical vocabularies were considered very interesting.

- K. Denecke, I. Kohlhof, J. Bernauer:

"Use Of Multiaxial Indexing for Information Extraction From Medical Texts"

This paper represented the closest approach to our own method of acquiring medical knowledge from medical texts. The authors propose to determine a semantic representation of medical narratives (essentially, reports of diagnostic imaging and surgical procedures).

Their method is based on a multiaxial nomenclature (Wingert Nomenclature - WNC) and language engineering technologies: a concept-based morpheme lexicon and an indexing algorithm for noun phrases.

Transformation rules for mapping syntactic information to semantic roles are used for the semantic representation of meanings of prepositional phrases.

The correctness of the representation depends on the complexity of sentences, the accuracy of mapping to concepts of the nomenclature as well as the semantic content of the processed sentences.

- R. Cornet

"Clinical Terminology in Practical Use for Recording and Researching Reasons for Admission in Intensive Care"

Coming from the group of Prof. Arie Hasmann, this research area is familiar to the VU research group. They use a formal ontology (DICE) specified using description logic, to reason about the reasons for admission in intensive care, and argue that by combining OWL and RDF a larger category of DL (Description Logic) inferences can be made, not only for automated classification, but also for instance checking and for grouping patients.

- P. Kolesa, P. Preckova

"Effective Creation of Czech Biomedical Ontologies"

A text mining approach to building ontologies, by relying on mapping between terms in a corpus of medical texts and classes of concepts in a medical vocabulary.

VUA contributed a paper titled: "Formalization of medical guidelines exploiting medical thesauri" and gave an oral presentation in the workshop.

Our work for linguistic patterns to support medical guideline development fitted very well within the topic of the workshop, which was concerned with using different medical vocabularies.

Relation to Protocure (reason for attending, possible future collaborations etc.)

The research community targeted consisted of computer scientists working in semantic mark-up, linguistics, and Medical Informatics, as well as medical doctors concerned with terminology standards and involved in clinical knowledge integration and electronic patient record.

This community can provide best practice in working with medical terminologies, which became an important aspect in Protocure II.

3rd IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI 2006)

Name: 3rd IFIP Conference on Artificial Intelligence Applications and Innovations

Period: 2006 June 7-9, Athens, Greece

Type of audience: Artificial Intelligence Researchers, Engineers and Practitioners

Type of meeting: Working Conference

General impression and themes

The conference attracted submissions from more than 20 countries, and 90 contributions were selected. The main goal of the conference was to disseminate Artificial Intelligence applications that provide solutions to real life problems, and to provide insight on how AI can be implemented in industrial applications.

Interesting papers and talks

There were 8 Special Sessions dedicated to specific AI applications, of which 2 dedicated to medical applications: Computational Intelligence in Medical Imaging and Intelligent Analysis of Medical and Biological Data.

Our presentation on "Incremental Guideline Formalization with Tool Support" has been presented as part of the "Ontologies and Knowledge Representation" session, chaired by Max Bramer.

A few papers addressed topics relevant for the Protocure project:

"On the Idea of Using Nature-Inspired Metaphors to Improve Software Testing" – Francesca Vieira, Francisco Martins, Rafael Silva, Ronaldo Menezes, Marcio Braga. The paper proposes a Genetic Algorithms approach to evolving a population of test cases which are used to prioritize test cases used in automated testing.

“Knowledge Modelling Using the UML Profile” – Mohd Abdullah, Richard Paige, Ian Benest, Chris Kimble. This paper discusses the conceptual modelling of knowledge intensive medical application in the context of model-driven knowledge engineering. They use an UML knowledge modelling profile to produce an executable implementation of a Clinical Practice Guideline.

Relation to Protocure (reason for attending, possible future collaborations etc.)

The tool-supported experiments (with Stepper and DELTa) in the Protocure II project for establishing most frequently encountered knowledge components and transformation rules in the guideline development contribute to a growing suite of products concerning the application of AI in medical research.

In the near future:

17th European Conference on Artificial Intelligence 2006

Name: European Conference on Artificial Intelligence
Period: 2006 August 30 – September 1, Riva del Garda, Italy
Type of audience: Computer Science (Artificial Intelligence)
Type of meeting: Conference

Collocated with:

Name: AI Techniques in Healthcare: Evidence-based Guidelines and Protocols
Period: August 29, 2006
Type of audience: Computer Science (Artificial Intelligence) and interested physicians
Type of meeting: Workshop

General impression and themes

Within the wide spectrum of field in AI, the representation of clinical guidelines is part of knowledge representation. Medicine is one of the important fields of application for AI.

Interesting papers and talks

We will give a talk about the intermediate presentation MHB and present a poster about the Asbru interpreter. Both were developed during the Protocure project. In the workshop preceding the conference, we will present the Asbru interpreter and the semantics of Asbru time-annotations.

Relation to Protocure (reason for attending, possible future collaborations etc.)

This is the biggest and most prestigious conference for AI in Europe. Presenting our work to such a large audience increases it's visibility.