

BIOPATTERN

Computational Intelligence for Biopattern Analysis in Support of eHealthcare

BIOPATTERN is a groundbreaking project that integrates key elements of European research to underpin eHealth. The goal is to develop a pan-European, intelligent analysis of a citizen's bioprofile; to make the analysis of this bioprofile remotely accessible to patients and clinicians; and to exploit bioprofile to combat major diseases such as cancer and brain diseases.

Objectives of the project

Today, the ability to produce vast amounts of bio-data has vastly outstripped our ability to sensibly make use of the data for decision making.

A key objective of **BIOPATTERN** is to address the problem of fragmentation in this key area by bringing together key researchers to create a critical mass of specialists to promote the development of computational intelligence methods underpinning e-Healthcare. The idea is to move away from local solutions to local problems and towards European wide solutions to European problems.

The main objectives are:

- Integration - to tackle and reduce fragmentation of existing research capacities in this area
- Virtual Research Institute - to create a new research community
- New opportunities - to identify how bioprofile could be exploited for healthcare, such as disease prevention, diagnosis and treatment
- Roadmap - to identify gaps in knowledge, key challenges and to initiate joint activities to address them.

- Standards - To identify technical and ethical issues on which guidelines and standards should be based with regard to the acquisition, transmission and analysis of a bioprofile
- Societal challenges - To contribute to finding solutions to some of the demanding societal challenges in healthcare.

“BIOPATTERN— basic information which provides clues about underlying clinical evidence for diagnosis and treatment. Often used for diagnosis”

Project Description

BIOPATTERN is a Network of Excellence (NoE) project within the ICT for Health. It integrates key elements of European research to enable Europe to become a world leader in eHealth.

BIOPATTERN proposes to provide novel computational intelligent techniques for biopattern analysis and a pan-European integrated, intelligent analysis of an individual's bioprofile. Information from distributed databases will be made available, securely, over the Internet and bioprofiles analysed using on-line algorithms, libraries and processing facilities.

BIOPATTERN integrates the research efforts of 30 institutions across Europe to tackle and reduce fragmentation in the new field of biopattern and bioprofile

Scenario

We have developed a prototype test bed, the BIOPATTERN Grid, to illustrate the concepts of bioprofiling and how grid computing could be used to support individualisation of healthcare. A scenario is to provide support for early diagnosis and care for dementia. Appropriate biomarkers of dementia are computed continually during health checks and over time represents the subject's bioprofile. For diagnosis, a clinician (anywhere in Europe) supplies the necessary information, an **appropriate set of algorithms is then used to analyse the bioprofile to look for onset of disease. The figure illustrates the life journey of Mike, a fictitious individual, who at 60 is showing the earliest signs of dementia.** Grid provides seamless access to computational resources and the distributed databases in different countries.

analysis. It brings together leading researchers in medical informatics and bioinformatics from academia, the healthcare sector and industry in a new way, harnessing expertise and information to put Europe at the forefront of eHealth.

BIOPATTERN aims to identify how bioprofile could be exploited for individualised healthcare such as disease prevention, diagnosis and treatment. Its ultimate goal is to become a Virtual Research Institute recognised as a world-leading scientific resource.

Expected Results & Impacts

- Identifying how bioprofile could be exploited for healthcare, such as disease prevention, diagnosis and treatment on an individual basis.
- Integration of the research expertise of 30 partners. This would reduce fragmentation of existing research capacities in this area and strengthen European excellence in this field.
- Creation of a new research community. **BIOPATTERN** will provide a dynamic platform for academics, healthcare professionals and industrialists to network in the area of biomedical informatics (medical informatics + bioinformatics) to advance knowledge in biopattern and bioprofile analysis to underpin new generation of eHealth systems.
- Contribution to finding solutions to some of the demanding societal challenges: target clinical areas are cancer and brain diseases.
- Contribution to the development of new standards and guidelines in areas such as acquisition of bio-data, bio-data representation, evaluation and benchmarking techniques and interfaces for biomedical informatics web services and tools.
- Identification of technical, ethical and legal issues and principles on which guidelines and standards should be structured and based with regard to the acquisition, transmission and analysis of a bioprofile.
- Development of commercially exploitable prototype eServices to support early clinical diagnosis and care of subjects at risk of major diseases such as cancer and dementia and brain injury early in life.
- Spreading excellence within and beyond the partners. **BIOPATTERN** will regularly organise workshops, training events to spread excellence and to raise public awareness.
- Using and disseminating knowledge widely and providing SMEs access to new knowledge to increase innovation and competitiveness and by making resources (techniques, software tools, data, reports, best practice etc) accessible to the academic, scientific and industrial communities.

Keywords:

Biomedical informatics,
medical informatics,
bioinformatics,
neuroinformatics,
computational intelligence,
biopattern.



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- Università Degli Studi Di Firenze - Università Degli Studi Di Pisa - Istituto Nazionale Per Lo Studio Cura Dei Tumori, Milano - Università Degli Studi Di Milano - Synapsis S. R. L (IT)
- University of Athens Medical School - Telecommunication Systems Institute - Technological Educational Institute of Crete - University of Crete, Medical Division - Aristotelio Panepistimio Thessalonikis - Hellenic Telecommunications & Telematics Applications Company SA (Forthnet) - Daedalus Informatics Ltd (GR)
- Neoventor Medicinsk Innovation AB - University College Borås (SE)
- Katholieke Universiteit Leuven Research & Development (BE)
- Stichting Katholieke Universiteit (NL)
- Instituto De Desenvolvimento De Novas Tecnologias - (UNINOVA) (PT)
- Ecological University of Bucharest (FI)
- University of Malta (MT)

Timetable: from 01/04 — 12/07

Total cost: € 12.800.000

EC funding: € 6.400.000

Instrument: NoE

Project Identifier:
IST-2002-508803