MEDINFO 2007
HISA Ltd Australia
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European Biomedical Informatics Gateway

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Abstract

In 2004, the European Network of Excellence INFOBIOMED (http://infobiomed.org) (IST-507585) was set to consolidate a stable and lasting European network with BMI as an essential discipline for the future of healthcare through the work carried out in the four pilots in which the 17 European partners participated. INFOBIOMED had six work packages one of which was Dissemination & Communication that coordinated all the information policy of the NoE both to the scientific community and to other stakeholders. The objective of this paper is to describe the development and implementation of the INFOBIOMED Gateway, a repository for compiling, organizing and disseminating the latests news about Biomedical Informatics, mainly in Europe but also in the rest of the world.

Keywords:
bioinformatics, medical informatics, biomedical informatics, repository, INFOBIOMED

Introduction

The EU's sixth framework program that is about to finish (2002-2006) has had as one of its main priorities life sciences, genomics and biotechnology for health. In February 2003, the EU BIOINFOMED project (http://bioinfomed.isciii.es/) "Prospective Analysis of the Relationships and Synergy Between Medical Informatics and Bioinformatics" [1, 2] ended with the publication of a White Paper [3]. The document detailed 18 research lines identified and prioritized to help consolidate the integration of the genetic information in the field of public health through the application of the Information and communication technologies. It analysed in detail all synergies that take place between two well established disciplines, Bioinformatics (BI) and Medical Informatics (MI

The Network of Excellence (NoE) INFOBIOMED [4-8] titled "Structuring European Biomedical Informatics to Support Individualised Healthcare" is funded by the Information Society Directorate-General of the European Commission within the VI Framework Programme for Research and Technological Development. The Network is composed of 17 research groups from 9 different European countries. Its main objective is to establish a stable and lasting European network in BMI. With this objective in mind they designed 4 pilots in which collaborative work between heterogeneous (MI, BI, BMI, Health care) research groups is essential.

The network is divided into six work packages (WP): Coordination, Dissemination and communication; Training and Mobility; Data Interoperability & management; Methods, technologies & tools and Pilot applications. Under the umbrella of this work package some communication materials such as newsletters, web page, brochure, oral communications, posters, etc have been developed to disseminate the work carried out in the network. However, dissemination is a still a challenge when it is necessary to keep the community updated about the wide spectrum of possibilities available through the Internet. Lots of resources are necessary for this task.

The great variety of resources available, the heterogeneity, the geographic distribution of the different research groups and the large number of publications indexed in pubmed prompted the development of a tool that specifically gathers together all materials produced in the world about BMI.

Materials and methods

New Biomedical data is mainly reported through journals and conference proceedings. These publications do not present a structured pattern which would make possible the use of data mining or knowledge discovery techniques and tools to include in an automatic manner this new information into ontologies. It is also important to take into account the increasing number of publications with biomedical information. This makes it very difficult for human curators to extract all the information. Some companies are trying to tackle this problem, in particular IBM is working on the development of a Semantic Web for Life Sciences. The idea is to use lexico-syntactic patterns to find biomedical relations in the internet. [10]

The BIOINFOMED Study compiled a resources guide that listed a large number of biomedical information resources grouped into the following categories: Standards in BI, BMI and MI, Scientific Societies and Working Groups, Journals in BMI, Congresses in BMI, Groups and Projects,

Papers in BMI, Books in BMI, Training programs in BMI and Links in BMI.

One of the main objectives of the INFOBIOMED project is to keep the guide updated, as an essential tool for classifying, organizing and disseminating the ever increasing number of research projects, groups and articles about BMI. With that objective in mind basic aspects such as searches and storage of the information included in the guide has been notably improved. These processes are now more efficient that the traditional list of links in html web page, that had to be edited by hand.

Informatics specialists built for INFOBIOMED the "Biomedical Informatics Gateway", a database designed with SQL server and implemented with PHP so that it could grow indefinitely. It can be updated from any computer through a secure access protected by a user id and a password. The INFOBIOMED webpage is hosted in the servers of one of the partners, which is also the coordinator of the project, the "*Fundació IMIM"* (FIMIM), in Barcelona, Spain. Data capture in the data base can be done from any computer with an internet connection from the restricted area of the website. However most of the loading and filtering of the contents of the Gateway is done by the ISCIII. For this purpose and for preserving gathered data a secure access interface has been implemented.

Once the user has been validated, the user accesses the main administration screen, organized into four sections: *Events and Announcements, Training, Repository and Links.* Each section includes its own fields which will later be seen in the Gateway. For example, the fields included in the section *Events and Announcements* are table ID, that is the primary key, title, which also is the hyperlink to a webpage, date the event takes place, location, country, status (it shows if the entry has any information and whether it has been filtered by an authorised user), insert Date, last Updated, user that has updated the contents and Topics/ Entities. This is the only field that can be edited by the user through a pop up window. It provides information about the user that is validating the data, the title of the event which corresponds with the hyperlink to its web site, the dates and the location of the event. The filtering of the events is done by clicking on the boxes that characterise them and places them in their place in the Gateway.

The hierarchy of the resources was developed following two organizing criteria: topics & entities. There are 19 topics, 18 of which coincide with the 18 research lines initially identified and a general topic titled "Initiatives integrating several Research Lines".

The loading data in the Gateway can only be done by a authorised user but the information can be proposed for entry by any of project partners or any other stakeholder interested in their information appearing on the web. The filtering of the data captured by an authorised user taking into account the topics and entities is what determines whether or not the information will appear in the database and under what topic.

Results

The INFOBIOMED Gateway (http://infobiomed.org) is a free access tool for the compilation, storage and retrieval of biomedical informatics information. This is structured in a database and it is regularly updated. Queries are simple and direct through a web interface and are divided into two categories: topics and entities. The tool was developed with the idea of disseminating all activities carried out in the field of BMI to the scientific community in a filtered and organised manner. The topics coincide with the 18 lines identified in the BIOINFOMED project with the addition of another general line: *Initiatives integrating several Research Lines.* Through this we can retrieve all the information included in those entries in the database that involve several research lines simultaneously.

The interface of the Gateway resembles a chess board in which the topics are in the row and the entities are in the columns. There are different ways to make the queries: i) free-text query, there is a box for free text queries that opens a popup window with the results of the query if there are any; ii) query by topics: if you click over any of the 19 titles of the columns, you will get a new window that will show all the entities related to the subject, such as standards, congresses, working groups; iii) query by entities: it is possible to visualize all Congresses in all the topics if we click on the column titled "Congresses" and iv) individual queries: each of the squares makes an individual query for the chosen topic and entity. All queries are visualised by hyperlinks that take directly to the website to which they refer.

Conclusions

One of the main objectives of the NoE is to provide the bases for a stable and durable European structure in the field of BMI. The dissemination to the scientific community and other stakeholders of the objectives, work methodology and results help achieve this goal. This is usually done through the traditional channels but it has now also found in the Internet a way of globalising its discoveries and communicating information.

The easy access and the low cost of the infrastructures help publish and disseminate making it easier to share research results and all new information. However, with the increasing amount of information published, storing, organizing and disseminating all the available biomedical information are the new challenges faced by our society.

The INFOBIOMED Gateway is a tool that tackles this challenge and meets all the criteria: free and easy access through the Internet, updated information and specific to one field: Biomedical Informatics. It is a point of reference, just like the website, for finding the latest news about the 19 lines of research that were identified and detailed in the agenda developed by the BIONFOMED project and that are now part of the INFOBIOMED project.