Integrated System for Patent Application Examination (EXAMBREV)

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Abstract: In this paper we present a patent application examination and evaluation system. This system reduces the time required for the application examination by automatic or semiautomatic verification of the formal aspect of a patent application. The system provides information to the domain experts to speed up the applicant patent and the state of the art comparison process. The expert subsystem provides an automatic tool to evaluate the novelty of the technical solution given by the inventors. Our system will be implemented at the Romanian State Office for Inventions and Trademarks (OSIM) and will also help patent, inventors, experts and other user management. The system will also save postal delivery costs and eliminate the postal delivery delay.

1. INTRODUCTION

Worldwide patent applications are growing at an average rate of 4.7% per year, according to the 2007 edition of the World Intellectual Property Organization (WIPO)'s Patent Report. Patent examination procedure has two stages: formal verification which follows all the formal procedural steps and verify if application are patentable and the evaluation stage which check the grade of novelty and innovation of the patents. To reduce the patent examination time and increase the evaluation quality, despite that the number of the patent application are growing, are two possibilities: increase the number of employments of the State Office for Invention and Trademarks (OSIM) or reduce the amount of work for formal verification and evaluation by using an integrated system.

In this article we present an integrated Patent Examination expert system which communicate with the applicant and help to accomplish the entire procedure and verify the formal correctness of the patent application. This system also looks for the experts and handles the application for evaluation trough a web interface. Our translator unit will be a helping hand for experts to search for similar technical solutions in a wide range of different language patent databases. The system also, helps the management of the OSIM to see in which field to employ new experts in the future.

The outline of the paper is as follows. Section 2 is a review of other existing systems, in section 3 we present our system architecture and describe sub modules and finally we present the results, conclusion and future work in section 4 followed by acknowledgements and references.

2. SIMILAR PATENT EXAMINATION SYSTEMS

2.1 Romanian State Office for Inventions and Trademarks (OSIM)

OSIM is a specialized government body that has exclusive authority in Romania in the field of protection of industrial property. Taking into consideration the special economic importance of the industrial property and the need of a competitive management of information in the field of industrial property, the OSIM has developed a system of services by which offers to the public useful information concerning industrial property, processed by highly competent specialists such as to facilitate correct economic decisions to be taken. It pays special attention to the promotion of the industrial property**.** The paid services of OSIM structured as analysis and synthesis services in the field of industrial property which are offered to the public by the Documentary Search Analysis and Synthesis Division are the following:

- International cooperation in the field of Search Services

- Documentary Search Analysis and Synthesis Services in the Field of Inventions

- Documentary Search Analysis and Synthesis Services in the Field of Trademarks**.**

- Documentary Search Analysis and Synthesis Services in the Field of Industrial Designs

From 2006 OSIM offers the possibility to register on-line to the epoline® system, for the following types of patents:

- filed according to the European Patent Convention (CBE/EPC), through OSIM as the national office

- filed according to the Patent Cooperation Treaty (PCT), through OSIM as reception office

On the OSIM web page there are presented important information about on-line registration for mentioned patent application such as: important announcements, details about the services, information about how to register on-line, software for registration of the patent request at OSIM, recommendations, assistance for client who wants to register

on-line an invention and some details about this page services.

The services offered by the OSIM are grouped in the following categories:

- Services for general information
- Services in the field of invention patents
- Services in the domain of trademark
- Services in the field of models and design
- Editorial and typographical services

2.2 The European Patent Office (EPO)

EPO provides a uniform, coherent application procedure for individual inventors and companies from 38 European countries. It is the executive body of the European Patent Organization and is supervised by the Administrative Council. The main role of the EPO is to grant European patents.

The EPO carries out researches and substantive examinations on a continuously growing number of European patent applications and international applications filed according to the Patent Cooperation Treaty. In the case of European patent applications, the Office gives the option of an accelerated procedure.

The Office examines also oppositions against already granted European patents.

The boards of appeal decide over appeals filed against decisions of the receiving, examining and opposition divisions of the EPO. They also examine alleged breaches of the Rules of Professional Conduct by EPO representatives. The boards of appeal are independent in taking their decisions, being guided only by the provisions of the European Patent Convention.

Publication of the invention is very important to the European patent system. The public can obtain copies of the patent documents from the European Publication Server. The European Patent Register provides details of the status of patent procedures at the EPO. All the EPO's patent documents are available to the public through the free Espacenet service on the internet. The EPO also provides a wide range of other products for searching patent databases.

epoline® is a EPO package of software with on-line services that allows users to create and apply electronically for patents at the Intellectual Property Office and other national and international offices, including the EPO and WIPO (PCT). The epoline® is a high security system based on smart cards.

To join the system, one should make two steps: first, to get an EPO smart card, then to fill in on-line an IPO (Intellectual Property Organisation) enrolment form and send it.

This service has a series of advantages. It is a user-friendly application that helps inventors build their applications and forms with a validation option that helps users to make applications and forms right first time. Security of sending the documents is ensured, there are no postal delivery delays or postage costs. The sender receives an immediate filing receipt after sending the forms.

2.3 The World Intellectual Property Organization (WIPO)

WIPO is a specialized agency of the United Nations. It is dedicated to develop a balanced and accessible international intellectual property system, which rewards creativity, stimulates innovation and contributes to economic development in regard to the public interest.

WIPO was established by the WIPO Convention in 1967 for the protection of intellectual property worldwide by collaboration with other international organizations and cooperation among states. Its headquarters are in Geneva, Switzerland. WIPO considers that intellectual property is essential to the economic, social and cultural growth of all countries. Thus its objective is to promote the effective use and protection of intellectual property (IP) worldwide.

WIPO provides services for the owners and users of intellectual property, such as international registration services, thus a single application has to be filed that is valid in multiple countries. IP classification systems of WIPO are used for registering IP and making it easy to search in IP databases and registries. WIPO's *Arbitration and Mediation Centre* offers resolution services for private parties involved in international intellectual property disputes.

PATENTSCOPE® Search Service is a service that makes possible for users to search in all international patent applications published, starting from the first one that was published in 1978 to nowadays, and has a special part for the latest information and documents available online.

3. SYSTEM ARCHITECTURE

3.1 Overview

Our system architecture is presented in Fig. 1. Mainly the system has two different parts divided in multiple sub modules. First we have the *Interfaces and data preparation module* which manage the patent requests, common users (UCOM), expert users (UEXP), inventors (UINV) and also prepares some initial data for the *Expert system module* (SIEXP). Second, we have the *Expert system module* (SIEXP) which gives the world wide novelty of a technical solution proposed by an inventor.

3.2 Interfaces and data preparation module

The Interfaces and data preparation module consist of four subsystems:

- SS1 - SISTORIC
- SS2 - SICLAS
- SS3 - SICOST
- SS4 - IFS-SIEXP

3.2.1 The SISTORIC subsystem

The SISTORIC (SS-1) subsystem has three main functionalities:

- To manage and store all the information regarding a technical solution proposed by an inventor.
- To add or modify the patent data according to the expert system module decisions
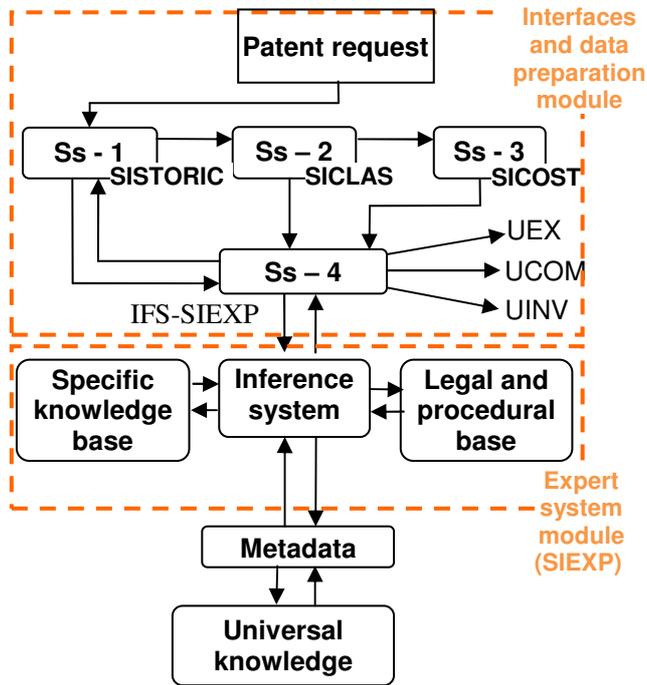- To manage *inventor users* (UINV) data

Fig. 1. EXAMBREV system architecture

According to *Romanian State office for Inventions and Trademarks* we had to deal with three types of patents:

- EPC (European Patent Convention)

- PCT (Patent Cooperation Treaty)

- Romanian national patent

We have implemented since now the management system for the Romanian national patent type. The application is accessible from web through a web browser and makes possible to online deposit a patent request. All the patent application data is stored in a MySQL relational database management system. We must also register the UINV for all patent requests.

The database tables for patent application data are presented in Fig. 2. The data for a patent application is stored in eleven tables as following: Brevet, Solicitant, Documente, Mandatar, Judet, Participa, Stadiu, Prioritati, Clasificare, Inventator, Functionar.

The Brevet table contains information about the registration number of the patent application (Bid), the application registration date (data_primirii), the deposit date (data_depozit), the missing part registration date (data_primirii2), the new deposition date (data_depzit2), the missing part withdrawal date (data primirii3), the associated deposition date (data_depozit3), applicant identifier (Sid), reference to another application (nr_cerere) – if exist, the figure number to be published in the abstract (nr_figurii), attorney identifier (Mid), priorities identifier (Stid), instant

publishing option (publicare_de_urgenta), documentation report option (intocmirea_unui_raport), application examination within 18 months from deposition date (termen 18 luni) and classification status (mentinere_clasificare).
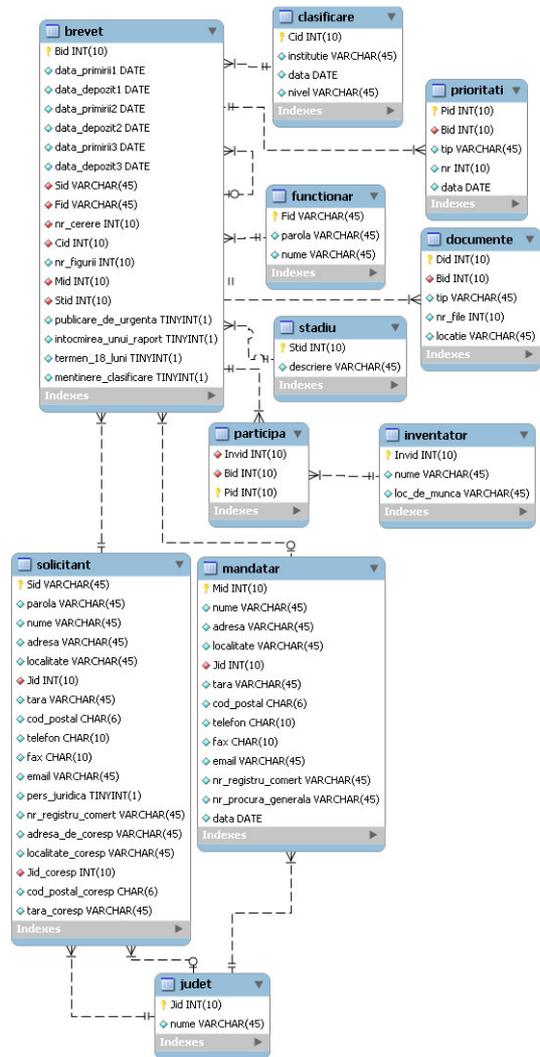

Fig. 2. Database tables for patent application data

The Solicitant table contains information about the applicant identifier (Sid), name (nume), address (adresa), city, (localitate), district identifier (judet), country (tara), postal code (cod_postal), phone number (telefon), fax number (fax), email address (email), company identifier (pers_juridica), company registration number (nr_registru_comert), corespondence adress (adresa coresp), correspondence city (localitate_coresp), correspondence district identifier (Jid_coresp), correspondence postal code (cod_postal_coresp), correspondence country (tara_coresp).

The Mandatar table stores data about the attorney, namely the attorney identifier (Mid), name (nume), address (adresa), city, (localitate), district identifier (judet), country (tara), postal code (cod_postal), phone number (telefon), fax number (fax), email address (email), company identifier (pers_juridica), company registration number (nr_registru_comert), mandate number (nr_procura) and date (data).

The Participa table is a correspondence table wich fix the inventors for a patent application. It stores the following information: inventor identifier (Invid) and patent identifier (Bid).

The Stadiu table contains information about the patent application status. An application can be in one of the fallowing status: registered, formally verified, admitted and rejected.

The Inventator table contains information about the inventors of a patent application. The fields for this table are: inventor identifier (Invid), inventor name (nume), workplace (loc_de_munca).

The Functionar table stores the OSIM employers using employer identifier (Fid) and name (nume). This table will be extended to store contact address, email, phone number, place and date of birth, personal numeric code, function, department and other personal information for the employers according to OSIM needs.

Prioritati table stores information about the priority level of a patent application. It consists of a priority identifier (Pid), a patent identifier (Bid), priority type (tip), deposit number (nr) and deposition date (data).

The Documente table contains all the attachments of a patent application, and the corresponding page numbers. The fields are: document identifier (Did), patent identifier (Bid), document type (tip), page number (nr_file) and location (locatie). All the attachments are loaded and stored in Portable Document Format (pdf).

The Judet table contains all the districts of Romania, including the capital Bucharest. All districts have a district identifier (Jid) and the correspondent district name (nume). This helps in filling the application with the address fields, and also makes easier the registration process for UEXP and UINV.

Clasificare table stores the information about the classification status of secret patent applications (for example in the military domain). It has a classification identifier (Cid), the institute who makes the classification (institutie), classification level (nivel) and the classification date (data).

3.2.2 The SICLAS subsystem

The SICLAS (SS-2) subsystem has two main functions: It guides the inventor to assign the International Patent Classification (IPC) code to the patent application. And the patent application title and the keywords are translated from Romanian to English and used to assign the IPC code and to search in databases.

The International Patent Classification, which is commonly referred to as IPC, is a hierarchical classification system, comprising sections, classes, subclasses and groups (main groups and subgroups), used to classify and retrieve patent documents. It also serves as an instrument for orderly arrangement of patent documents, a basis for selective dissemination of information and a basis for investigating the state of the art in given fields of technology.

In our system we provide a semiautomatic IPC code assign to the applicant patent. It is semiautomatic because the assign are supervised by the author. The IPC suffer often changes at the subgroups level. That's why the latest version of the XML format codes is automatic downloaded periodically from the WIPO's webpage. We developed an XML parser Java application to fill and update our database tables presented in Fig 2.
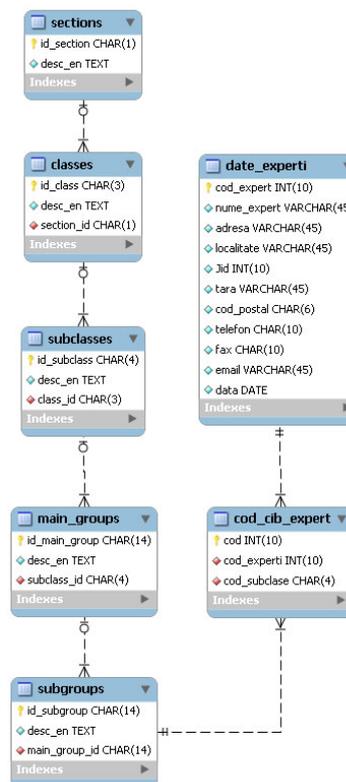

Fig. 2. Database tables for IPC codes and UEXP data storage

We have five tables in a hierarchical structure: sections, classes, subclasses, main groups and subgroups. For subgroups table we have a subgroup identifier (id_subgroup), an English language description (desc_en) and a foreign key to link to main groups table (main_group_id). Similarly for the main groups table we have a main group identifier (id_main_group), an English language description (desc_en) and the subclass_id foreign key to link to the subclass table.

The subclass table has the same fields: the subclass identifier (id_subclass), the descriptor (desc_en) and the correspondent foreign key to the classes table (class_id). The classes table contains the foreign key to sections table (section_id) and the usual class identifier (class_id) and descriptor (desc_en). Finally the sections table in the top of hierarchy contains the section identifier (id_section) and the English language descriptor (desc_en).

For further development we want to introduce also the German, French and Romanian language descriptors for each section, class, subclass, main group and subgroup from the IPC. We have developed for this a translation unit which uses the Google Translate engine. This unit is used to translate the

patent title and keywords which are used to assign the IPC code to the patent application.

The translated keywords are used to assign the IPC code by searching from the deepest level (subgroup) to highest level (sections) in the database. The results are ordered by two quantity criteria. The first quantity criteria are the occurrence of the higher level of classification. The second criteria are the number of keyword found in a code path. Every IPC code has assigned descriptors at every level from general to specific and these descriptors forms a set of words. The name of this words set are the code path.

The applicant must approve the ICP code at every level. If he change the proposed code at a level all the proposed code are changed taking the changes as mandatory and eliminating all results that do not contain that variant.

After the applicant approves the IPC code at subgroup level too, the code is transmitted to the SICOST subsystem.

3.2.3 The SICOST subsystem

The SICOST (SS-3) subsystem is responsible for Expert user (UEXP) data management. We have to deal with UEXP registration. This subsystem also takes the IPC code given to a patent application by SS-2, choose the specialist UEXP for this domain and send them the information to point out, if exist, the similar technical solutions.

The database tables for UEXP management are presented in Fig. 2 together with the IPC code tables.

The UEXP data are stored in date_experti table. This table contain information about expert user identifier (Cod_expert), expert name (nume), address (adresa), city (localitate), district identifier (Jid), country (tara), postal code (cod_postal), phone number (telefon), fax number (fax), email (email), hire date (data).

The cod_cib_expert table makes the connection within the expert users and the subgroups of IPC codes. In this way every UEXP has attached his domain of competence.

3.2.4 The IFS-SIEXP subsystem

The IFS-SIEXP (SS-4) subsystem is the special interface for the SIEXP module. It makes data transfer between the Interfaces and data preparation module and Expert system module. It also communicates with UEXP, UCOM and UINV via a Web interface. This is the login point to the Web application for registered users.

3.3 Expert system module

The SIEXP subsystem is the expert system for assisting inventions examination.

This subsystem stores knowledge about legal procedures of a patent registration and examination in the Legal and procedural base module; specific knowledge about patent database in Specific knowledge base module; and other information prepared by Interfaces and data preparation module.

The SIEXP subsystem is under development.

4. RESULTS, CONCLUSIONS AND FUTURE WORK

We designed and partially developed a J2EE based integrated system for patent examination. The system will help OSIM to offer online patent registration possibility for all three patent tipes discussed (EPC, PCT and Romanian national patent type). The system also helps OSIM patent evaluator experts management and patent management.

The main results obtained are the UCOM, UEXP, UINV and patent application registration interfaces. The interfaces were developed considering Java Server Faces technology.

Also we have to mention the IPC code XML parser Java application which uploads our database with the latest IPC version from WIPO website. We used MySQL Community Server relational database management system.

Finally we developed the translator unit which uses Google Translate engine to translate patent application title and keywords. We also want to translate to Romanian using this module the IPC sections classes, subclasses, groups and subgroups descriptions. We also want to introduce the French and German language descriptors in our databases.

For the application development we have used NetBeans IDE.

As future work we can mention the SIEXP module development, and whole system testing.

5. ACKNOWLEDGEMENTS

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WEB:

EPO webpage: http://www.epo.org/

OSIM webpage: http://www.osim.ro/

WIPO webpage: http://www.wipo.int/

Legal information:

IMPLEMENTING REGULATIONS TO THE PATENT LAW NO. 64/1991, as republished in Official Gazette Of Romania, Part I, No. 456/18.VI.2008

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