PROJECT NAME: OIC ONLINE RESEARCH PUBLICATIONS DIRECTORY

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Abstract

The advent of Internet in the 20th century brought about a whole new array of applications in our lives. It has and still is changing the way we live, communicate, buy or sell, seek knowledge and entertain. Today we see hundreds of online academic journals across the globe providing both the means through which academicians can publish scholarly articles in various fields of research and the means through which the published scholarly articles can be accessed and viewed by academicians all over the world at their convenient time. Even though the internet revolution made this possible, it however does not mean the information published in the academic journals is fully accessed by everyone wherever they may be. Majority of the journals require subscription to access the published articles which some people cannot afford yet they really want to learn and enhance the already published scholarly articles for the betterment of mankind. We therefore take this very idea of online academic journals geared by the power of Internet to make sharing of knowledge possible without putting limitation to academicians having to subscribe in order to gain access to the scholarly articles. We call this system of availing and sharing information already published in reputable academic journals The OIC Online Research Publications Directory. In this system, academicians whose countries are member states of OIC (Organization of the Islamic cooperation) and have published their research papers in various online journals can make this information available to others by opening up individual accounts enabling them to post the already published unlimited research papers in this system. Research enthusiasts scattered all over the globe will view all the contents of the respective published papers in various disciplines. This is simply an open access platform serving as a repository for scholarly articles entailing all fields of research and the already published research papers in the respective disciplines posted here from different authors and made available to all academicians in the OIC member states and the world at large.

Chapter 1: Introduction

This document is a specification of the final year project. The project title is OIC Online Research Publications Directory. It gives all the ins and outs of development process from the first step to its final approval presentation. The purpose of this document is to present detailed information to the higher ups (in this case supervisor and teachers), department and other interested individuals.

1.1 Background.

OIC Online Research Publications Directory is an open access platform that acts as a repository for scholarly articles that enables academicians hailing from member states of the Organization of the Islamic Cooperation (OIC) to upload their already published papers in various educational disciplines or fields of research. The system acts as a repository for research publications to be accessed by all academicians. Academicians from OIC member states can create their own accounts easily and upload research papers published in various academic journals especially those that restrict access to papers and make it available to the masses of people willing to advance their knowledge and improve on the research papers published free of charge. As the title suggests, this system is totally based on the Internet.

1.2 Motivation

Our attention was drawn to this area of online academic publications by the following salient rationales which gave us force to study, analyze and try to develop a model system which imitates this very idea and making it simpler, convenient and free.

1.2.1 Open access to scholarly articles

It's widely known that access to particular online academic journals is restricted to specific people especially those who have paid subscription fees to access the publications. This is as witnessed here in IUT, where the administration subscribed to various reputable online academic journals in which students and staff can freely access them. Those that are out of IUT cannot access the journals unless they too, subscribed to them. To eliminate this, we came up with this idea of limitless access to academic information by designing the system that enables academicians in OIC member countries to open up free accounts and post the research papers already published in those restricted online academic journals and avail it to everyone freely.

1.2.2 Expanse of Internet

Vast majority of world's population today, especially in the Muslim world have access to Internet as compared to a few decades ago. Any service which is based on Internet can be availed by people from anywhere in the world. This omnipresence and widespread usage of Internet are the promising forces to the success of our system. Taking into account the vast ways in which research is conducted, Internet is by far the cheapest tool for availing this information to anyone anywhere in the whole world without having to physically be present in any desired destination of the knowledge.

1.2.3 Promote growth and development of OIC member states

It's clear that Open access incorporates local research into all interoperable network of global knowledge. With our system, we believe the OIC as a global organization can use it as a tool which will enable the increases of impact of local research thereby providing new contacts and research partnerships for authors in its member states. This, we hope will result in the eventual removal of professional isolation and will help strengthen OIC economies through developing a strong and independent national science base.

1.3 Problem identification

The challenge is to build such a system that provides open access to scholarly articles by academicians in the respective member states of OIC without forcing them to subscribe in order to gain access to research papers already published elsewhere or be bound by the dimension of time and their geographical locations. The answer to this is a system similar to the actual online publishing journals but only containing research papers already published. More elaborately, the system must provide virtually all fields of research (FoR) in all academic disciplines, all OIC member states each containing already published research papers from the reputable online publishing academic journals and all Universities in the respective OIC member states. Each field of research will be comprised of categories and subcategories. Furthermore, our system provides one unique feature in which when a registered member of our system starts posting his/her publication, the selected FoR will automatically select its related categories and from the selected category, the related subcategories will be populated.

1.4 Objectives

Just like anything done to achieve desired results has its objectives, so is the OIC Online Research Publications Directory system. Below is a list our clearly defined.

- To enable open access to scholarly articles already published in reputable online academic journals among OIC member states.
- To enable free posting of scholarly articles already published in reputable online publishing journals to enhance sharing of knowledge among academicians in OIC member states.
- Eliminate completely the barriers of subscription fees, dimension of time and geographic locations in order gain to access academic information.

Figure-1: Summary of Our objectives

1.5 Scope

The application extent of our system concerns the subject matter of scope. Though our idea is so universal and such powerful that it's applicable to serve the entire globe, we narrowed it down to serve a specific global organization which in this case is the Organization of the Islamic Cooperation (OIC) but at the same time accessible and useful to the entire global academicians. The reason why we are using OIC as a model is that we, the developers of this system are students hailing from member states of the OIC and are studying at Islamic University of technology, IUT which is a subsidiary organ of the OIC whose main reason for its establishment is to contribute in developing the human resources of the member states of the OIC, particularly in the fields of Engineering, Technology and Technical Education.

That clearly indicates we know virtually everything about OIC. To make it more clear it provides us with a clear vision how the vast academic disciplines or Fields of research are categorized and all the various academic institutions of the respective OIC member states. In a nutshell, we are equipped with all information that we need to build a solid, workable system which is very much easy to use.

Chapter 2: Literature review

2.1 Background of Open Access (OA)

"A commitment to scholarly work carries with it a responsibility to circulate that work as widely as possible: this is the access principle. In the digital age, that responsibility includes exploring new publishing technologies and economic models to improve access to scholarly work. Wide circulation adds value to published work; it is a significant aspect of its claim to be knowledge. The right to know and the right to be known are inextricably mixed. Open Access can benefit both" (Willinsky, 2010). Increasingly, this capacity to close the gap between developed and less developed countries through access to information becomes more important for educational, cultural, and scientific development. OA can foster information and knowledge sharing within research, educational, and scientific communities in traditionally economically disadvantaged regions (Canada, 2009). Based on the latest literature, this paper examines academic libraries' initiatives in promoting open access. It will also look at the obstacles and challenges faced in open access with specific reference to developing countries. First of all it would be suitable to appreciate the concept of open access. [1]

2.1.1 Definition of Open Access (OA)

According to BOAI the concept of Open Access refers to "[the] free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself" (BOAI, 2002).

The Guru of Open Access Harnad (2008) has described the characteristics of Open Access. "Information, which is Free, immediate, permanent, full-text, on-Line and accessible". Harnad suggests three main justifications of OA: "to maximize the uptake, usage, applications and impact of the research output of your university; to measure and reward the uptake, usage, applications and impact of the research output of your university (research metrics) and, to collect, manage and showcase a permanent record of the research output and impact of your university".

Peter Suber (2010) describes, "Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions". Suber also states that open access contents are not restricted only to peer-reviewed research articles, they can be in any formats from texts and data to software, audio, video, and multi-media. Although the OA movement focuses on peer-reviewed research articles and their preprints, OA can also apply to non-scholarly content, like music, movies, and novels, even if these are not the focus of

most OA activists (Suber, 2010). Suber's definition is broad, it goes beyond scholarly publications.

2.1.2 Characteristics of Open Access.

- It is free availability of scholarly publication.
- It is free of copyright and licensing restrictions
- Materials are available online or on the internet.
- Material is full text.
- Material can be accessed by anybody from anywhere without any discrimination.
- Material can be freely used by anyone.
- Open Access contents can be in any format from texts and data to software, audio, video, and multi-media, scholarly articles and their preprints.

There are two main approaches to open access: open access publishing, and self-archiving of articles in open access archives. There are different forms of open access archives, including institutional repositories and subject or disciplinary repositories (Morrison, 2006). After understanding the concept of open access it would be interesting to note how this movement came into existence.

2.1.3 Emergence and Development of Open Access

Open access emerged in response to address the problem of escalating cost of scholarly and scientific journals, which had made their access restrictive. Three groups took initiatives towards open access: the Budapest Open Access Initiative (BOAI), Bethesda statement and Berlin Declaration. The Budapest Open Access Initiative (BOAI) took place in 2001, where the term "open access" was coined and the two strategies of Green OA (self-archiving) and Gold OA (open access publishing) were devised (Poynder, 2010).The "golden road" of OA journal publishing is where journals provide OA to their articles (either by charging the author-institution for refereeing/publishing outgoing articles instead of charging the user-institution for accessing incoming articles, or by simply making their online edition free for all). The "green road" of OA self-archiving is where authors provide OA to their own published articles, by making their own e-prints free for all (Harnad, n.d.).

Thus, the main motivations behind OA initiatives were: high subscriptions rates, which were difficult to afford, and the large price discrepancy between individual and institutional subscription rates. Consequently libraries ended up paying huge subscriptions for journals and they were becoming more restrictive. OA provides free, immediate, permanent online access to the full text of research articles for anyone, web-wide. The Open Access (OA) movement gained momentum in 1994 when Stevan Harnad set fire in the academic and

publishing world through The Subversive Proposal, which called authors to deposit their work on internet Fire Transfer Protocol (FTP) servers (Cho, 2008, Gideon, 2008). In 1998 Dr John Willinsky founded the Public Knowledge Project (Public Knowledge Project, 2008), which was an international research initiative promoting publishing alternatives for scholarly journals, conferences, and monographs.

Another initiative was the Bethesda Statement on Open Access Publishing in 2003, which continued to promote a gradual transition to open access publishing within the biochemical community. It stated that "open access will be an essential component of scientific publishing in the future and that works reporting the results of current scientific research should be as openly accessible and freely useable as possible. Libraries and publishers should make every effort to hasten this transition in a fashion that does not disrupt the orderly dissemination of scientific information" (Bethesda Statement on Open Access Publishing, 2003).

In 2003, the Berlin Declaration further emphasized on the Open Access to Knowledge and stated, "Our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form but also increasingly through the open access paradigm via the Internet have to be supported" (Berlin Declaration on OpenAccess, 2003).

Other endeavors shaping the open access initiative are Organization for Economic Co-operation and Development's (OECD) Declaration on Access to Research Data From Public Funding, 2004, as well as the International Federation of Library Associations and Institutions' (IFLA) Statement on Open Access to Scholarly Literature and Research Documentation, 2004 (Christian, 2006).

According to the recent Directory of Open Access Repositories' statistics there are a total of 1943 open access repositories, of which 321 belong to Asia and 48 to Africa. Among these the most active is Japan with 133 open access repositories, followed by India (46), Taiwan (56) and Malaysia (12). Africa South Africa leads with 24 followed by Egypt (6) and Kenya (4). (OpenDOAR, 2011). Currently, there are 6463 journals in the directory (DOAJ a 2011).

The total number of Open Access journals continues to rise. As noted earlier there are now total 6463 journals in the Directory of Open Access Journals of which 2836 journals are searchable at article level and there are almost 600,000 articles. In developing countries, Brazil is on lead with 587 e-journals, followed by India (312), Japan (105), and South Africa (36) (DOAJ b, 2011).

2.1.4 Open Access Benefits

Open Access provides numerous benefits including:

Research and publication: Through open access researchers have wider visibility and usage of their research findings. They have a significantly larger and more diverse audience. Increased exposure to research also increases citation rate. Open Access provides an avenue to connect with a global society more easily and researchers can publish without printing costs.

Teaching staff and students: By putting rich and poor on an equal footing, Open Access provides free articles for teaching and learning.

Benefits to author: OA gives authors a worldwide audience larger than that of any subscription-based journal, no matter how prestigious or popular, and demonstrably increases the visibility and impact of their work (Willinsky, 2010, Suber, 2010).

Benefit to readers: Readers around the globe can have barrier free access to the latest literature and research findings.

Benefit to Society: Society as a whole benefits from an expanded and accelerated research cycle in which research can advance more effectively because researchers have immediate access to all the findings they need.

Journals and publishers: OA makes their articles more visible, discoverable, retrievable, and useful. If a journal is OA, then it can use this superior visibility to attract submissions and advertising, not to mention readers and citations (Suber, 2010).

Funding agencies: OA increases the return on their investment in research, making the results of the funded research more widely available, more discoverable, more retrievable, and more useful. Thus OA provides fairness to taxpayers by providing open access to the results of publicly-funded research (Suber, 2010).

Governments: Government benefit from OA as funders of research and OA also promotes democracy by sharing non-classified government information as widely as possible (Suber, 2010).

Citizens: OA gives them access to peer-reviewed research, which is unavailable in public libraries, and gives them access to the research for which they pay taxes. OA accelerates not only research but the translation of research into new medicines, useful technologies, solved problems, and informed decisions that benefit everyone (Suber, 2010).

Libraries: OA solves the pricing and permission crisis for scholarly journals. OA also serves library interests in other indirect ways. Librarians want to help users find the information

they need, regardless of the budget-enforced limits on the library's own collection. Academic librarians want to help faculties increase their audience and impact, and help the university raise its research profile (Suber, 2010).

Universities: Universities benefit from their researchers' increased impact and increase their visibility. OA reduces their journal expenses and advances their mission to share knowledge.

Benefits to nations: Open access incorporates local research into all interoperable network of global knowledge; increases impact of local research, providing new contacts and research partnerships for authors; removes professional isolation and strengthens economies through developing a strong and independent national science base (Antelman, 2004, Nicholas & Rowlands, 2005, Giarlo, 2005, Canada, 2009, Willinsky, 2010, Suber, 2010).

Thus, open access provides several benefits to researchers, educators, Journals, publishers, funding agencies, government and academic institutions around the world. It is an effective vehicle to information exchange between all countries. Let us now look at these benefits from developing countries' perspective.

2.1.5 Institutional Repositories.

Institutional repositories (IRs) are also known as digital repositories, or open access repositories. There are four types of repository publications: the subject-based repository, the research repository, the national repository system and the institutional repository. IRs are widely seen as the fastest route to open access for the widest range of scholarly and research literature, since they allow authors to publish in their choice of journals while providing the broadened access without pay barriers, the hallmark of open access publishing. It seems to be the best of both worlds scholars retain their ability to publish in the most prestigious journals in their field while simultaneously breaking down barriers to the wide dissemination of their research (Grundmann, 2009). Open Access repositories (or archives) are digital collections that make their contents freely available over the Internet. These digital repositories collect the research output of the members of a university's research community and support the archiving and long-term preservation of the institution's intellectual output (Swan & Chan 2009, C). Mostly institutional repositories are hosted within academic libraries around the world to digitally collect and preserve academic papers and documents in order to make them freely accessible to the students, faculty and the public.

An IR provides numerous benefits to the academic institution, individual authors and libraries. An academic institution benefits by increasing its visibility and prestige; it is a tool to market the institution to attract high quality staff, students and funding; a venue for the

centralization, storage and long term duration of all types of institutional output, it supports learning, teaching; and research to attract a global audience; it is a way of maximizing availability, accessibility, discoverability and functionality of scholarly research outputs at no cost to the user (Johnson, 2002, Pickton & Barwick, 2006, Lyte et al, 2009, Jain, 2010).

An IR offers several benefits to authors, such as: increased dissemination and impact of scholarship; enhanced professional visibility due to broader dissemination and increased use of publications; greater security and longer term accessibility of material compared to a personal web site; a central archive of a researcher's work; and possibility of large scale collaborations (Johnson, 2002, Bankier and Perciali, 2008, White, 2009, Lyte et al, 2009, Jain, 2011). An IR provides increased visibility and institutional presence to librarians. Through IR librarians have the opportunity to work hand-in-hand with academia. By virtue of being subject specialists, librarians are ideal to work more closely with faculties to promote the repository. Libraries can benefit by leading the way and providing the skills required to develop and run an effective IR. For example, they can lead in copyright checking, metadata creation, authority control etc, if not championing the entire project (Walters, 2007, Daly & Organ, 2009, Bankier, Foster, & Wiley, 2009, Jain, 2010). IRs are helping libraries reinvent themselves and subject librarians can act as change agents in support of the adoption of IRs. An IR can be beneficial to libraries in numerous ways such as providing opportunities for increased visibility and institutional presence, and working hand-in-hand with academia.

The following figure displays the current repositories around the world.

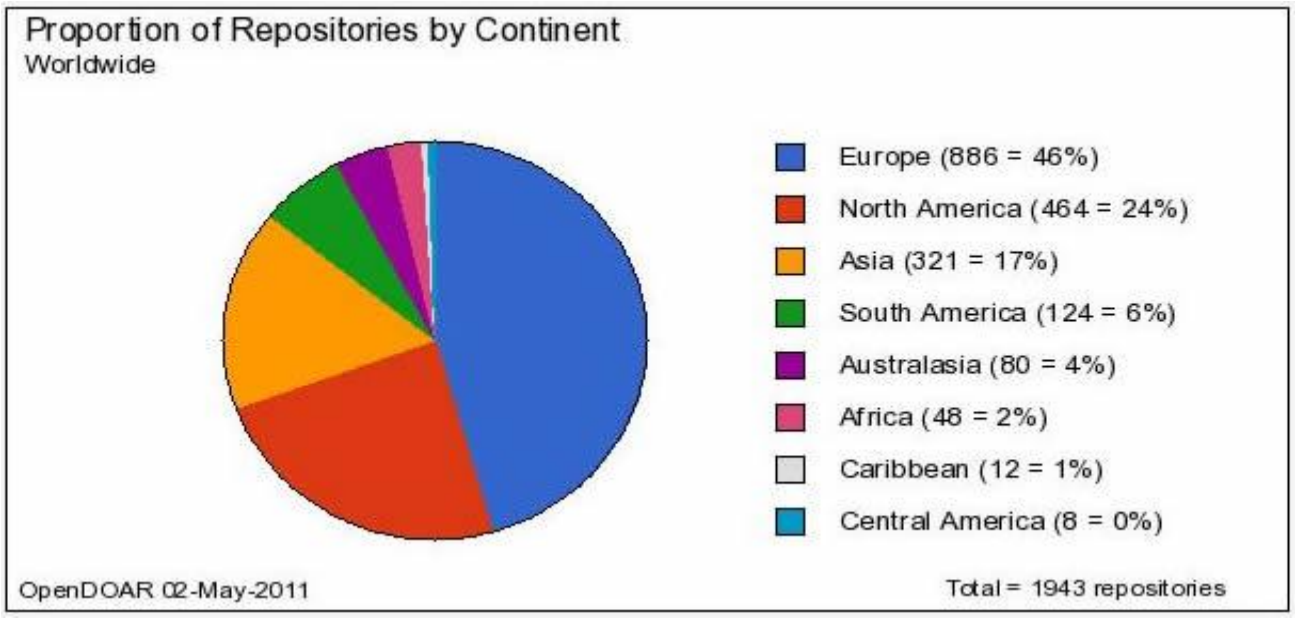

Figure-2: Proportion of Repositories by Continent - Worldwide (Source: OpenDOAR, 2011).

In spite of the increasing interest in institutional repositories by academic institutions and recognition that publisher policies make widespread green open access currently achievable, faculty deposits in institutional repositories remain low (Grundmann, 2009). This reluctance can be attributed to various factors such as misconceptions and a lack of understanding of institutional repositories, copyright issues, publisher policies, lack of incentives, lack of respectability for IR articles, working culture and self-archiving which is a time-consuming and labor-intensive activity.

These obstacles bring in potential challenges and obstacles in setting up the IRs: the cost of setting up and maintenance, generating IR contents, commitment from senior management, copyright management, working culture and policy issues, labor-intensive, benefits not marketed and appreciated adequately and promotional challenges. Despite negativity towards IRs, it remains clear that organizations are more and more realizing both the importance and added value benefits of the central concept behind Institutional Repositories (MIRE, 2009).

To make IRs more wide-spread and successful the roles and responsibilities need to be assumed by different categories of people in different institutions. Librarians need to play a critical role in developing IRs, by understanding faculty needs, simplifying the deposit process and promote IR benefits to faculty, students and other stakeholders and train them. An author's key role is to submit knowledge in the form of research outputs in their institutional repositories. Institutional roles include introducing mandatory policy for submitting research work and formulating other policies for the operational management of IRs.

2.1.6 Open Access Journal Systems/Journal Repositories

Open access journals are another major initiative towards open access: open access can be achieved by launching open access journals or converting existing journals to open access. The best-known open Access software is the Open Journal System. Some open access journals charge a document management fee from authors (Abukutsa-Onyango, 2010). Open Access journals allow access to freely read, download, copy, distribute and print articles and other informational material. They are peer reviewed. Open Access to research journals and literature accelerates research and enriches education and knowledge sharing between more developed countries and less developed countries. Because of constantly rising costs, Open Access journals are more sustainable than non-open access journals. On Open Access, journal costs are likely to drop. Several libraries have launched Open Access journals, for example the University of Toronto's Journal Hosting Service, the Canadian Online Journal of Queer Studies in Education; Clinical & Investigative Medicine is the

official journal of the Canadian Society for Clinical Investigation, the University of Toronto Journal of Undergraduate Life Sciences (JULS) (Stranack, Bird, Devakos, 2008).

Increasingly Open Access is being embraced in developing countries, such as in Latin America, and in particular Brazil, where much of the national research literature is distributed through Open Access journal services. Two such resources are Bioline International, a Brazil-Canada initiative that assists publishers in developing countries, and SciELO (Scientific Electronic Library Online) that is a collaboration of publishers in Latin countries (Abdulrasak, 2009).

Open Access Journal Systems are now well established in developing countries. For example, Bioline International is a collection of over 70 OA journals published in 17 different countries; a Brazil/Canada non-profit initiative, established 1993. MedKnow Publications – a collection of 59 medical journals published on behalf of societies and associations, mainly in India (Abukutsa-Onyango, 2010).

In Africa South Africa, Kenya and Nigeria are taking a lead and action in its efforts to promote Open Access. The African Journal Archive is an integrated full-text electronic journal retrospective repository published in Africa, in the Sciences, Social Sciences and Humanities. It has currently 46 South African journals, which are searchable individually and provides immediate access to the PDF versions of 6 000+ full-text articles (Sabinet, 2011). The total number of Open Access journals continues to rise. As noted earlier there are now total 6463 journals in the Directory of Open Access Journals of which 2836 journals are searchable at article level and there are almost 600,000 articles. In developing countries, Brazil is on lead with 587 e-journals, followed by India (312), Japan (105), and South Africa (36) (DOAJ b, 2011).

In conclusion therefore, we want our system to be an initiative that serves as repository for academic publications enabling the free dissemination of the vast academic articles the Muslim world has accumulated over time and still accumulating in the various fields of research.

Chapter 3: Technical Review

3.1 Requirements Gathering

To build a successful system, we should have all the details regarding requirements of the system. By requirements here we mean the information needed to design the system. Since we are building a system that involves various academic disciplines or FoR. It's clear that we shall have to get all the fields of research and all the fields of research were got from the website of Royal Melbourne Institute of technology. [2].

We also needed the information regarding the OIC member countries and the universities in the respective countries. That information was got from the website on this reference. [3]. The information from the website was not complete and so we had to get information regarding other universities of other OIC member states from Wikipedia. Still, the information regarding the OIC member states and the respective universities is not complete/up-to-date but it at least provides us with the basis on which to design our desired system and bring out the intended objectives as will be shown in the system functionalities later.

Also in the information gathering, we determined who will interact with the system, who will maintain it, in which environment it will run and what are the possible problems of users among others.

Each field of research will be comprised of categories and subcategories. Furthermore, our system will provide a unique feature in which when a registered member of our system starts posting his/her publication, the selected FoR will automatically select its related categories and from the selected category, the related subcategories will be populated. The same unique feature will be employed in populating the universities located in the selected OIC country.

3.2 Use Cases and Diagrams

A use case is a user story explaining how an actor interacts with the system. We use the term actor because the agent who initiates an action can be a student, teacher, administrator or another system. This gives us an overview of the system from the user perspective. The following are the possible use cases:

- Registration for the author
- Author login
- View author profile
- Posting publication

- View posted publication
- View author's own posted publication
- Manage Author publications
- Download full publications
- Edit profile
- Login
- Maintenance
- Delete fake papers

Similarly, the system support for interaction of three kinds of roles namely,

- Public Users
- Authors
- Administrator

In more technical terms it has been shown in UML use case diagram in figure-3.

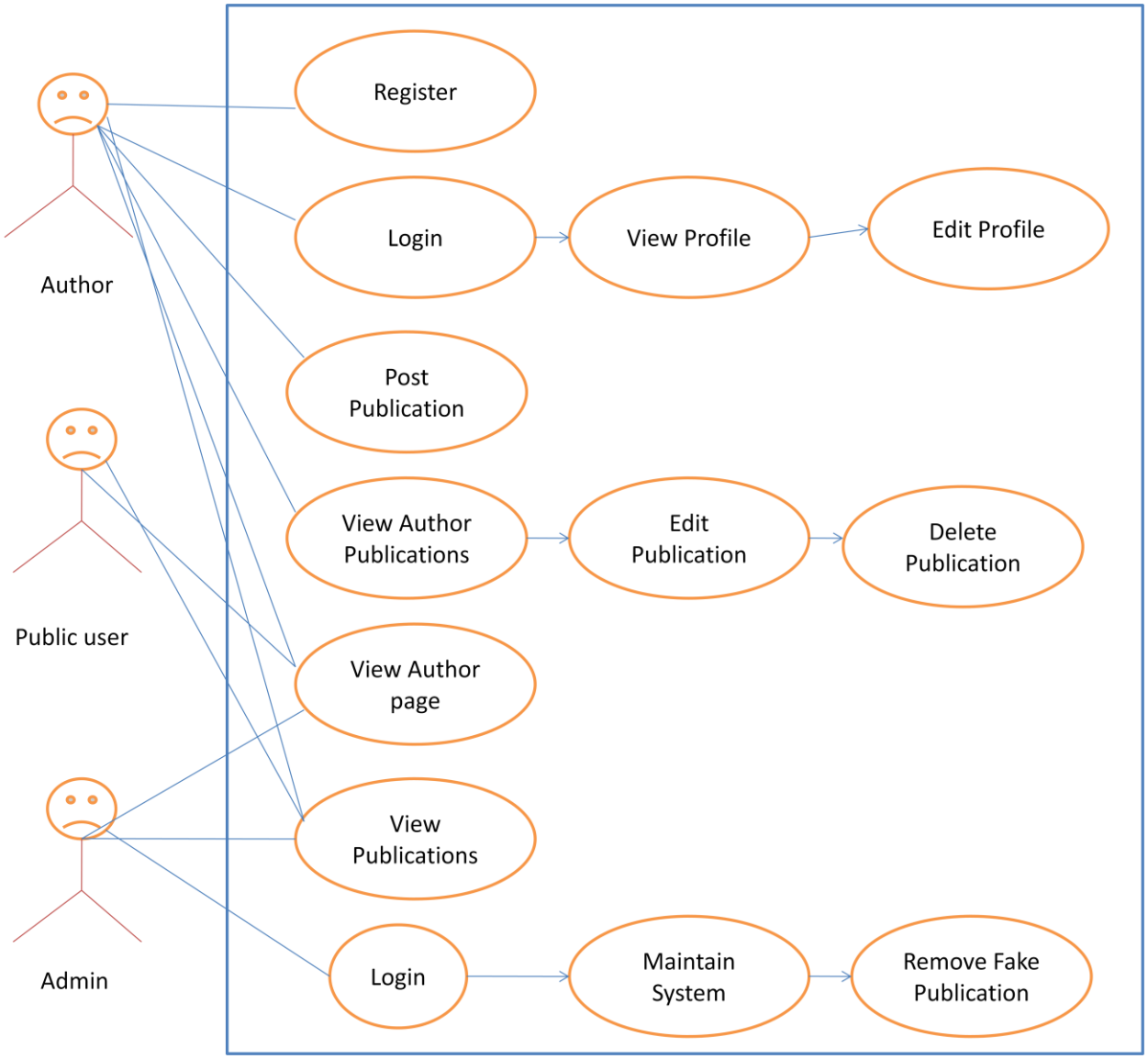

Figure-3: OIC Online Research Publications Directory case diagram

Chapter 4: Tools and Technologies

4.1 Scripting Languages

Scripting languages are class of component programs that are either executed in the client side, by the user web browser or executed by web server in the server-side.

4.1.1 Server side scripting

Server-side scripting is a technique used in website design which involves embedding scripts in an HTML source code which results in a user's (client's) request to the server website being handled by a script running server-side before the server responds to the client's request. These scripts are usually used to provide interactive web sites that interface to databases or other data stores. The scripts can be written in any of a number of server-side scripting languages available and in our system, we employed PHP as the server side scripting language. This is illustrated in the figure below.

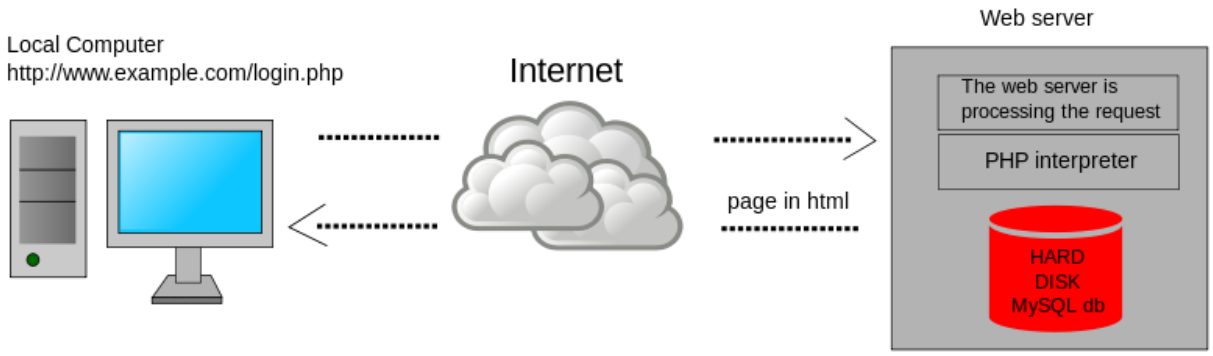

Figure 4.1: Server side scripting

4.1.1.1 PHP

Self-referentially short for PHP: Hypertext Preprocessor is an open source, server-side and HTML embedded scripting language used to create dynamic Web pages. In an HTML document, PHP script (similar syntax to that of Perl or C) is enclosed within special PHP tags. Because PHP is embedded within tags, the author can jump between HTML and PHP (similar to ASP and Cold Fusion) instead of having to rely on heavy amounts of code to output HTML. And, because PHP is executed on the server, the client cannot view the PHP

code. We used PHP Version 5.3.1 which comes as a bundle together with Mysql database in XAMPP version 1.7.3.

4.1.2 Client side scripting

Client-side scripting is a class of component program on the web that is executed in the client-side, by the user's web browser, instead of server-side (web server). In our project we have used html (hypertext markup language), JavaScript, jquery and Ajax as our scripting languages. When a request is sent to the server the necessary file are sent to the user's computer on the browser on which they reside. These client-side languages are then executed on the user browser.

4.1.2.1 Html and JavaScript

The user computer downloads the html/JavaScript files on the web browser, reads and then executes the html/JavaScript tags.

We used JavaScript to validate form data before we submitted it to a server (TOMCAT). This saves the server from extra processing. And also we used JavaScript to react to certain events, like hiding certain tags and displaying them when a particular event occurs.

4.1.2.2 Jquery

Jquery is a library of JavaScript Functions. It has many Ajax and JavaScript features that allow you to enhance user experience and semantic coding. We first download a copy of Jquery and then we insert it in our html or php page (preferably within the <head> tag). Then we write functions to tell jquery what to do. Like for example, we used it to generate sliding gallery pictures.

4.1.2.3 Ajax

AJAX is an acronym for Asynchronous JavaScript and XML. AJAX is a technique for creating fast and dynamic web pages. AJAX allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page. Ajax essentially offers a technique for client-side JavaScript to make background server calls and retrieve additional data as needed, updating certain portions of the page without causing full page reloads. We used Ajax to populate the field of research and their related categories and subcategories as well as populating the OIC member states and the Universities in each country. This was all achieved without necessarily reloading the whole

page. This has also played a big role in simplifying the tasks of the user and in providing dynamicity to our project.

4.2 Graphics Design and Editing Tools

For designing user interface, graphic tools were used. There are various graphic tools currently and we have tried to our level best to use these tools. Among the tools we used include:-

4.2.1 Macromedia Fireworks

This is a Microsoft product and usually comes with macromedia Dreamweaver Macromedia Fireworks 8 is the definitive solution for professional web graphics design and production. We used Fireworks to create and edit web graphics and optimize images in a professional environment.

We used it in our project to design logos, editing gallery images and other images that required editing.

4.2.2 Snipping Tool

Snipping Tool is used to capture a screen shot, or snip, of any object on your screen, and then annotate, save, or share the image. It's a free tool that comes with every operating system.

This tool played a big role in capturing the screen shots of our projects, databases, diagrams and other images.

4.2.3 Adobe Dreamweaver CS5

Adobe Dreamweaver is a web design and development application that provides a visual WYSIWYG (What You See Is What You get) editor (colloquially referred to as the Design view) and a code editor with standard features such as syntax highlighting, code completion, and code collapsing as well as more sophisticated features such as real-time syntax checking and code introspection for generating code hints to assist the user in writing code. The Design view facilitates rapid layout design and code generation as it allows users to quickly create and manipulate the layout of HTML elements. We employed version CS5 in developing and editing our system.

4.3 Database Used

In our project we used a server based database known as Mysql. This comes together with PHP in XAMPP as explained earlier. We used XAMPP because we did not need to separate the server from the database which makes it easier to handle.
A database server refers to the back-end system of database application using client/server architecture. This back-end performs tasks such as data analysis, storage, data manipulation, archiving, and other non-user specific tasks.

4.4 Platform and Web Browsers

Windows 7 platform was what we used in designing our system. Also, during website development, a page might load perfectly in one browser and fail in another. In this regard, we decided to test our project in different browsers to check whether it's being supported by them. We used the following in our system:-

- Mozilla Firefox
- Internet explorer
- Google chrome
- Safari

Chapter 5: Database Design

This section requires a full attention on its own. A very professional knack is needed to design this part. There are various database designs being deployed in many web based systems but the one we selected is relational database and Mysql as the relational database management system in which data is stored in relations or tables.

The first step in designing database is to identify independent entities in the system. Then categorize whether it is strong or weak entity. Secondly, we determine the list of the attributes. Among the attributes we determine which attribute uniquely identify an entity to use it as primary key. Now the crucial part of the design process is determining the relationships among entities. The four possible relationships are one-to-one, one-to-many, many-to-one and many-to-many.

5.1 The Entity Relational (E-R) Diagram

To meaningfully represent what we just discussed we use entity relationship diagram (ERD). ERD is a collection of symbols and notations which convey some meaning. Before we show our ERD we will introduce the basic notations which are:

Entity is represented by a rectangle.

Attribute by an ellipsis.

Relationships by a diamond shaped symbol connecting two entities.

Figure-5.1 shows the ERD for our system.

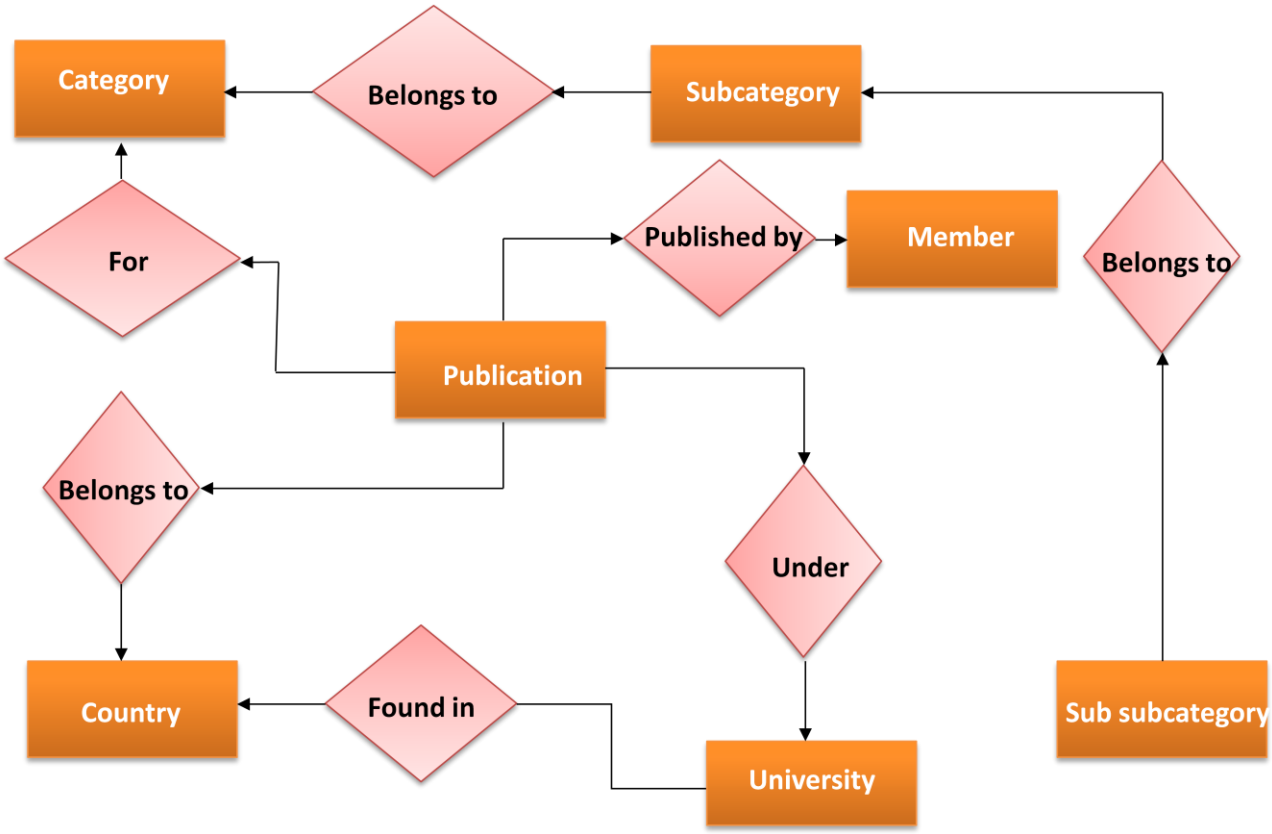

Figure-5.1: OIC Online Research Publications Directory E-R Diagram

5.2 Relational schemas

Below are the relational schemas of our database form all the tables and field names.

Categories = (**id**, category)

Subcategories = (**id**, category_id, subcategory)

Subsubcategories = (**id**, subsubcategory, subcategory_id, category_id)

Country = (**id**, country)

Universities = (**id**, country_id, university)

Members = (**id**, first_name, last_name, email, username, password, sign_up_date)

Admin = (name, password)

Publications = (**id**, publication_cat, publication_subcat, publication_subsubcat, user_country, user_university, publication_title, publication_date, publication_journal, publication_abstract, link, docs, posting_date, publisher_name, publisher_email)

5.3 SQL Code

Structured Query Language is the tool to create database, tables and populate with data. As we saw relational schema, based on that we have pretty much good idea how our tables in database would look like. We can't give all DML queries that we used because it will grow our discussion here larger. So here are the queries that used to create tables with relationships.

5.4 Snapshots from Mysql Database

To have a practical look at database we have taken some snapshots of Mysql in action and are very eager to make it a part of this document. Up until now, it's clear to you what tables are there in our database. This will also provide an overview of the data in database.

5.4.1 Categories Table

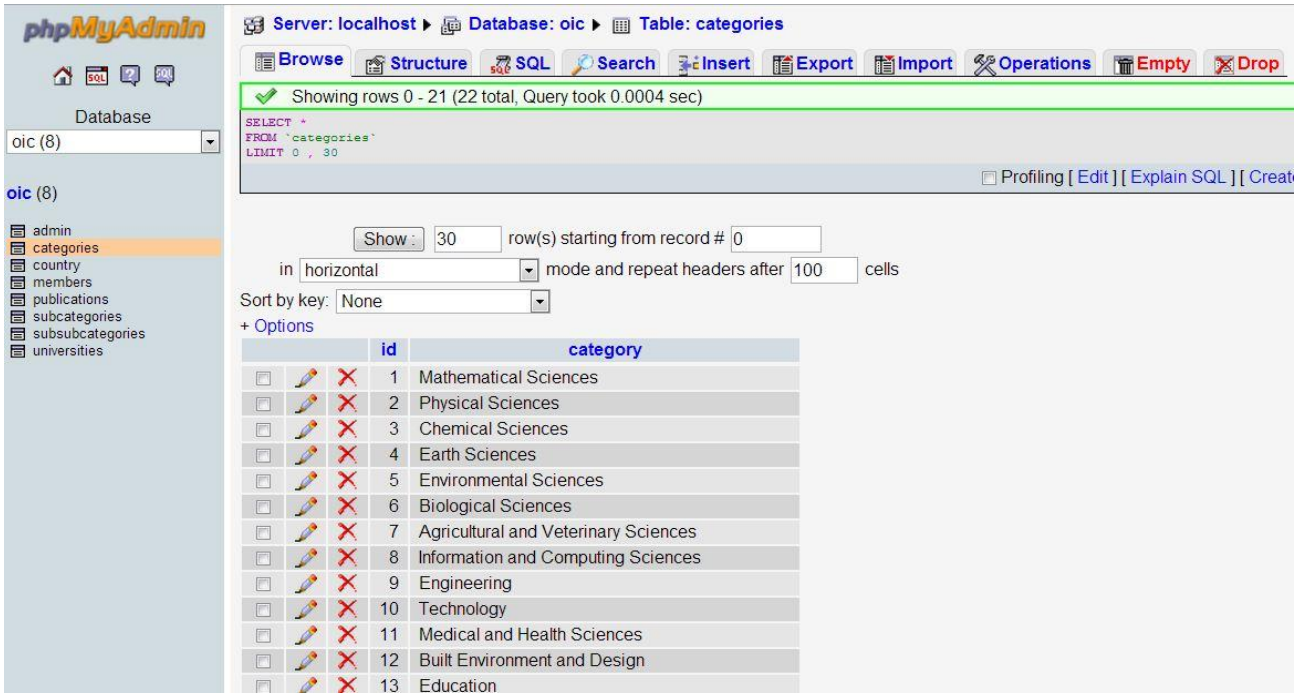

Figure-5.2: Categories table with view of some populated data

5.4.2 Subcategories Table

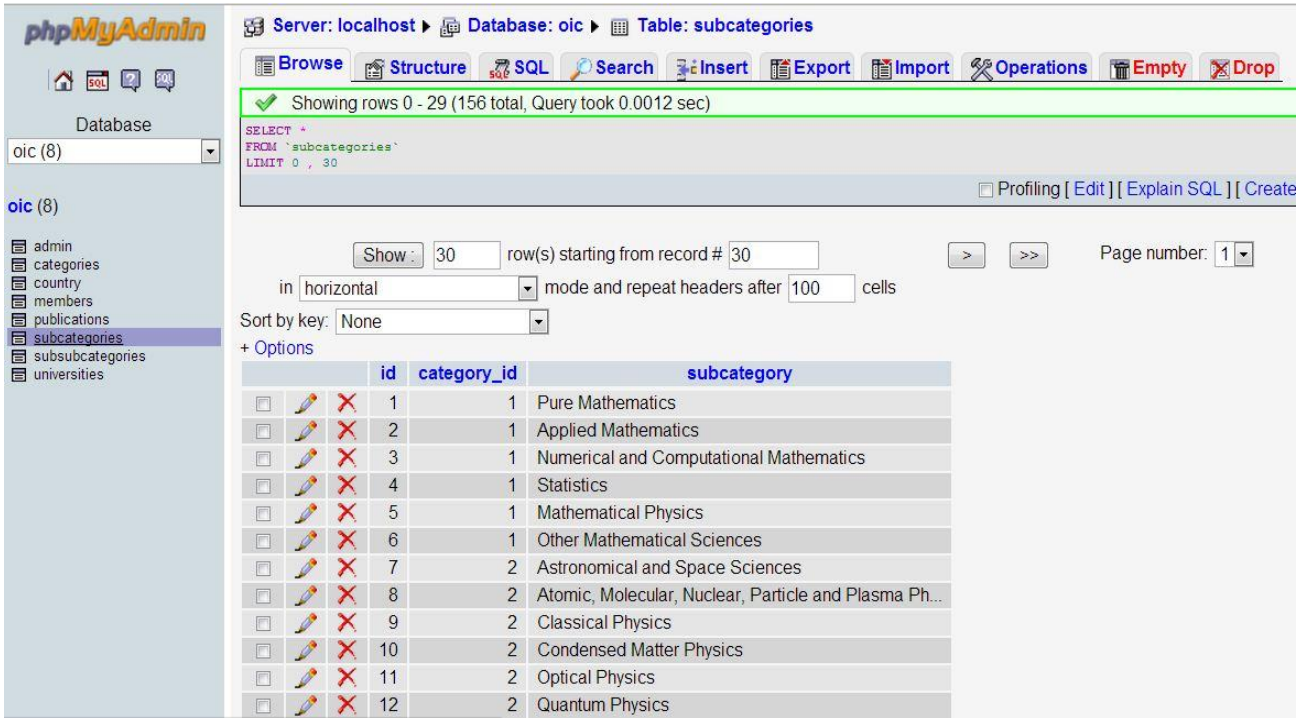

Figure-5.3: Subcategories table with view of some populated data

5.4.4 Subsubcategories Table

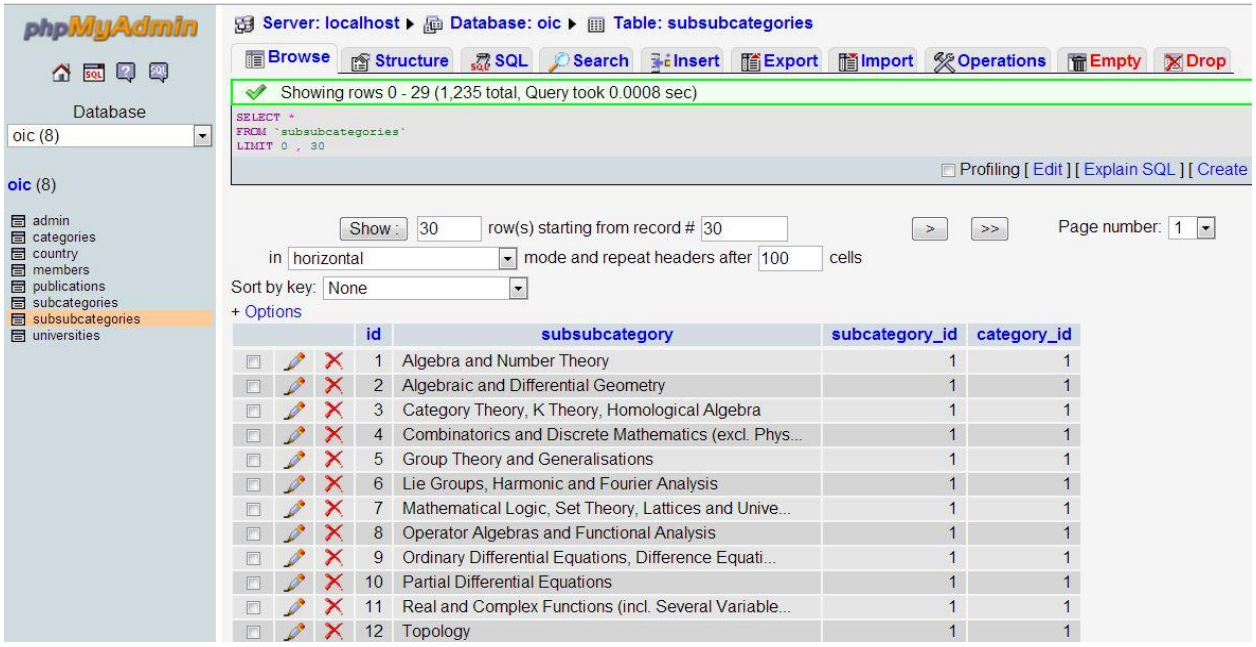

Figure-5.4: Subsubcategories table with view of some populated data

5.4.5 Country Table

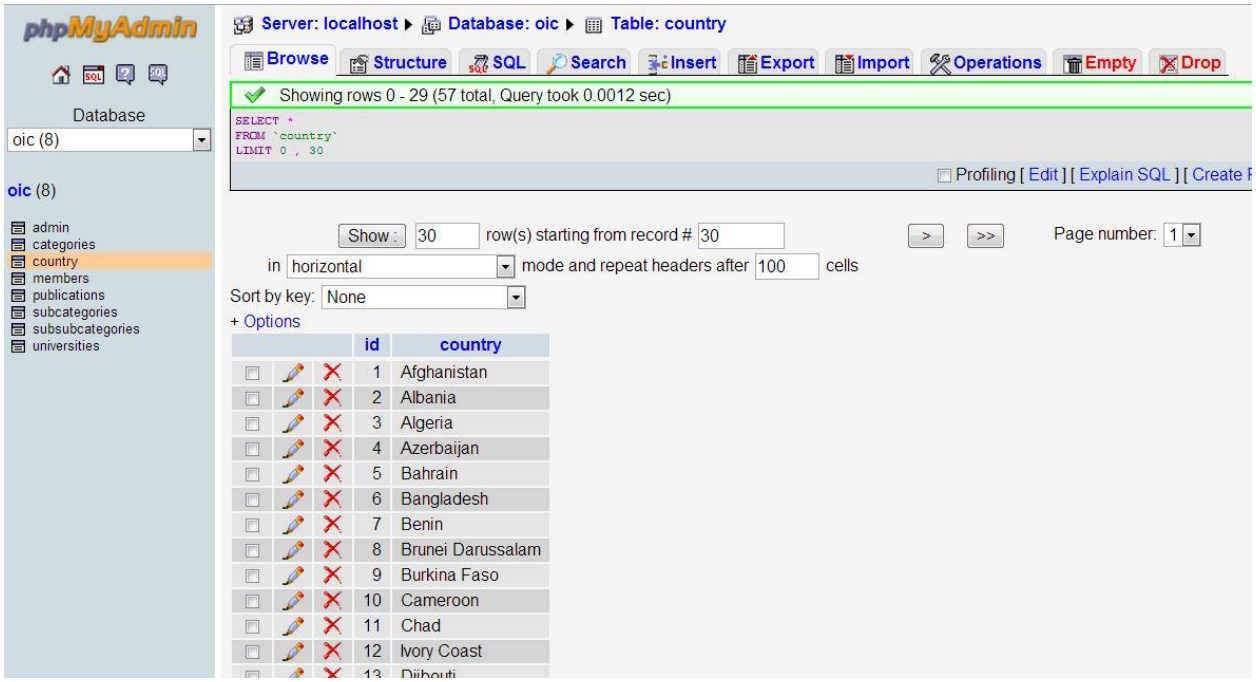

Figure-5.5: Country table with view of some populated data

5.4.6 Universities Table

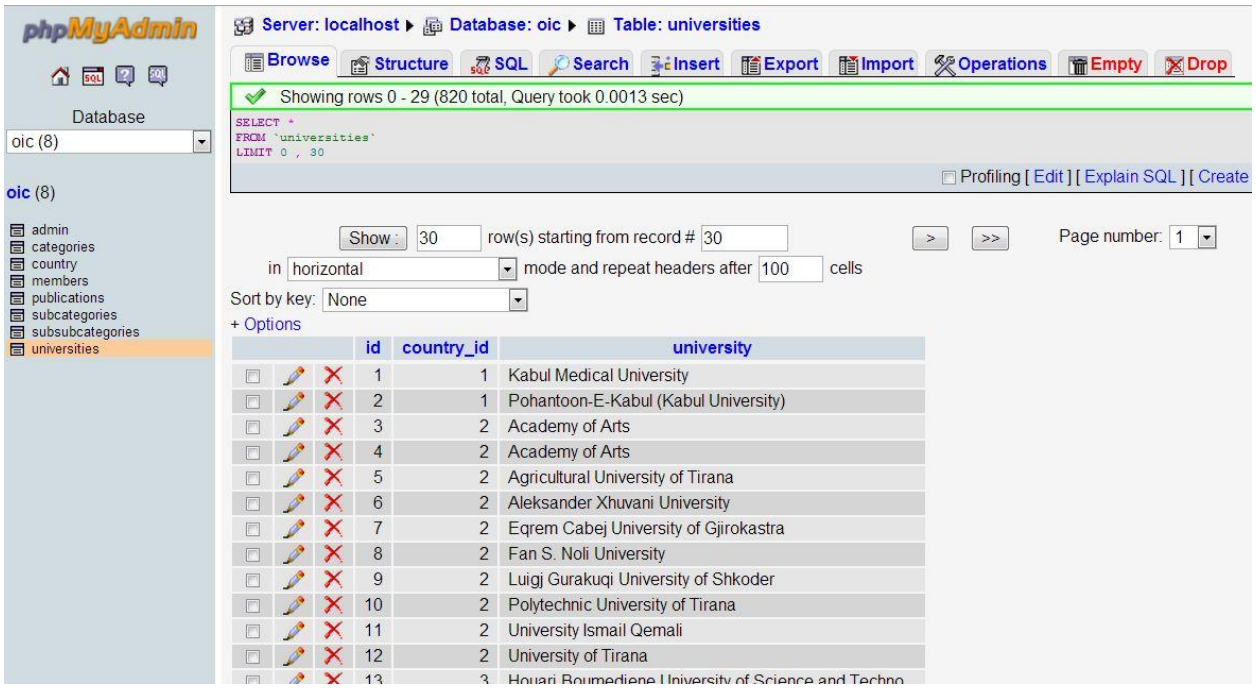

Figure-5.6: Universities table with view of some populated data

5.4.7 Members Table

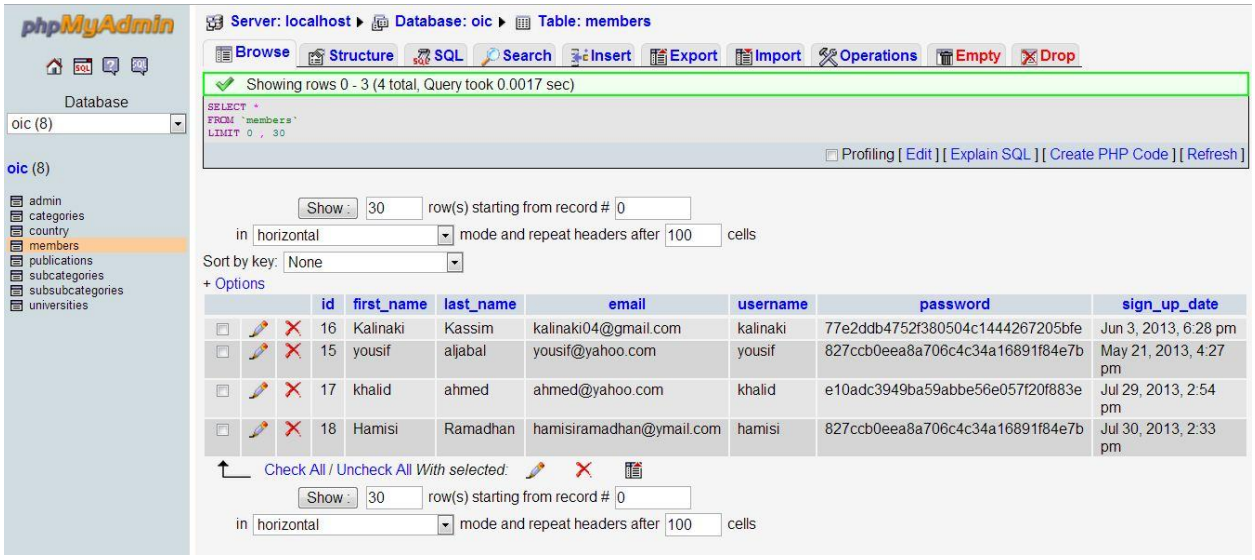

Figure-5.7: Members table with view of some populated data

5.4.8 Admin Table

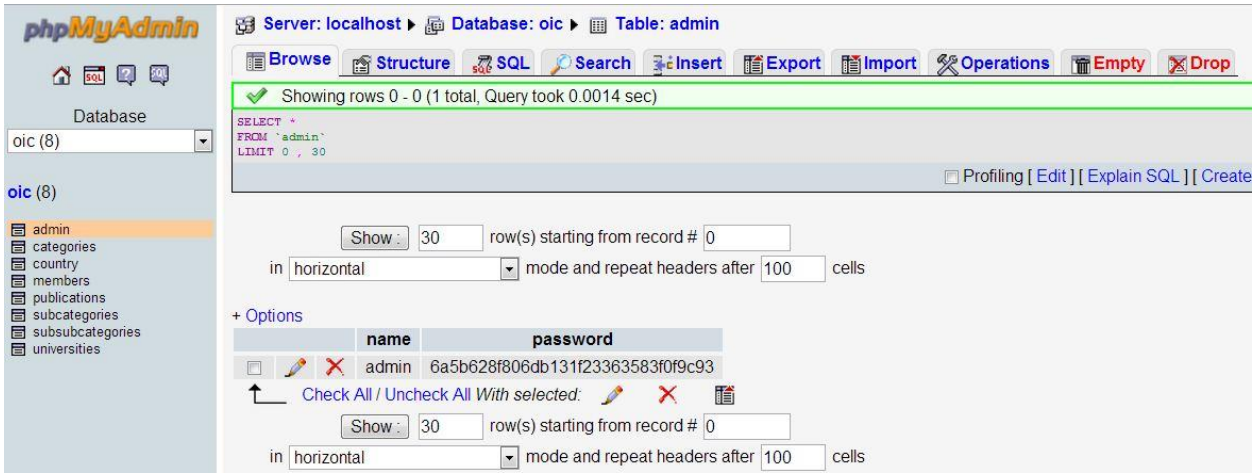

Figure-5.8: Admin table showing admin details

5.4.9 Publications Table

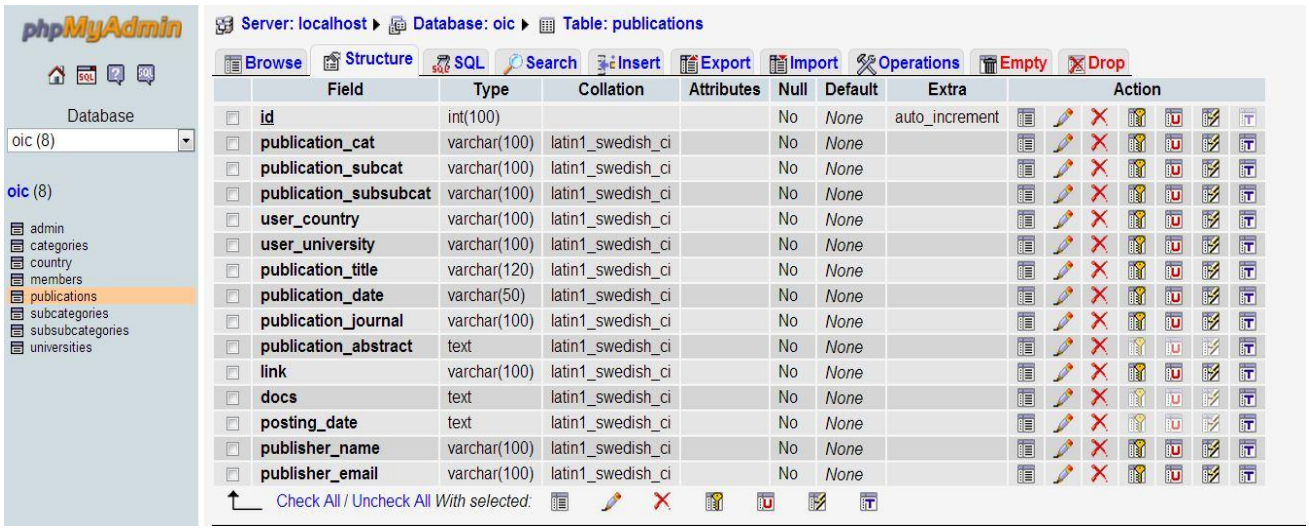

Figure-5.9: Publications table structure

5.4.9.1 Publications Table With Data

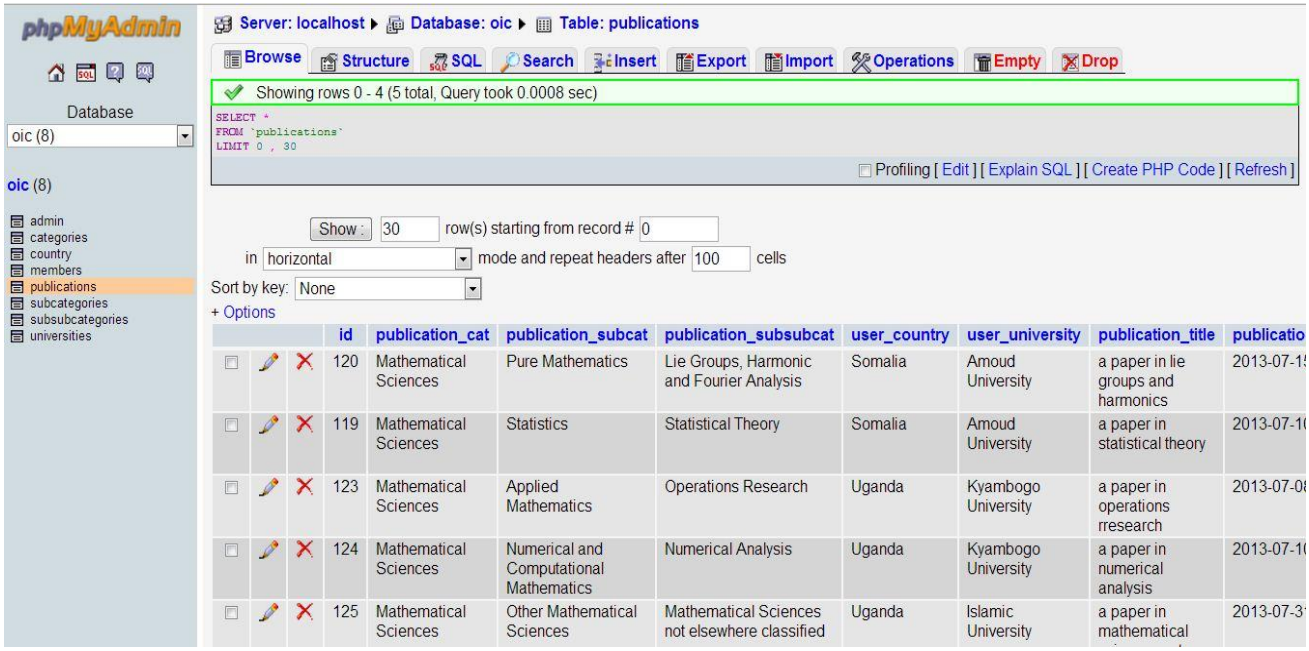

Figure-5.10: Publications Table with some populated data

Chapter 6: System Functionalities

To have a closer look to the system, we must shed some light on its functionalities. System functionalities are services available to the three kinds of users mentioned earlier i.e. Public users, Authors and the Administrator. By reading this chapter one can easily have an idea of the site without visiting it. Our system is composed of three modules according to how various actors interact with it. The 3 modules are: Public user module, Author Module and the Administrator module. We shall get to details of each as we progress.

6.1 Public User Module.

Just like any web based system has an area viewed by everybody, so does the OIC Online Research Publications Directory system. The public user module is divided into 4 major sub sections i.e. the Fields of Research section, the OIC countries section, Individual publications page, Individual author's page, the subscription section and the search section. This is as indicated in the snapshot shown in the figure below.

Figure-6.1: Home page of OIC Online Research Publications Directory

6.1.1 OIC Countries Section

This is a section of the home page that shows all the member states of the OIC. Each member state shown is actually a link that takes a visitor to all Fields of Research, categories and subcategories of the publications posted in the system for only that country. Each FoR has a corresponding number of publications posted under it and the same applies to the categories and subcategories that fall under that particular FoR. When a visitor clicks on a particular country, the page that comes up is divided into 2 sections; One section is located on the left which contains all fields of research with corresponding numbers of publications under it and these fields of research are also links to the corresponding categories falling under each FoR. The other section is located on the right side which shows all the publications posted in that country according to the time in descending order but irrespective of the field of research. So if a visitor wants a specific publications in a specific FoR, then he'll click on the left for the desired FoR. To illustrate this, we'll take an example of Afghanistan as a country with its snapshot shown in the figure below.

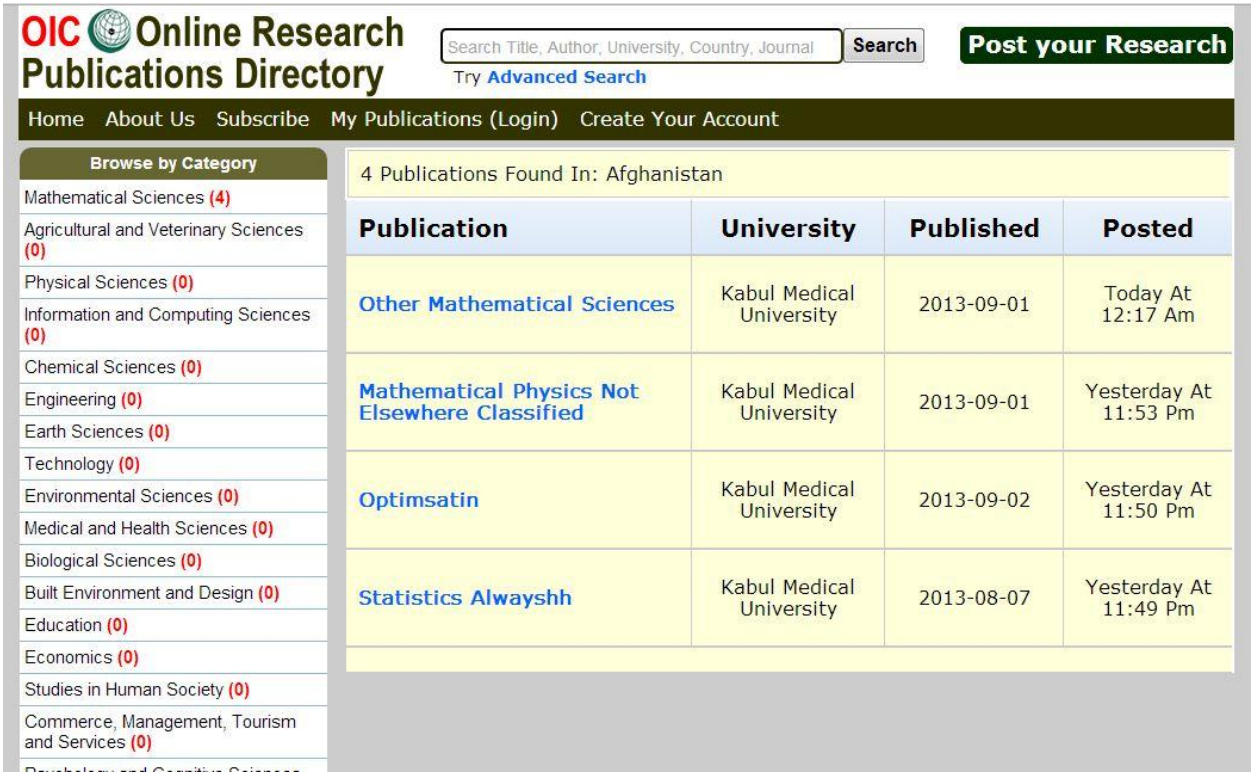

Figure-6.2: Publications posted in Afghanistan.

When a visitor clicks one field of research, say, Mathematical sciences, only publications posted in mathematical sciences will be shown in the right section. But since mathematical sciences has its own categories, the publications in the right section will be all from

mathematical sciences posted in descending order of time but irrespective of the category. In case a user wants a specific category, he'll have to click on the desired category on the left. This is as illustrated in the snapshot shown in the figure below.

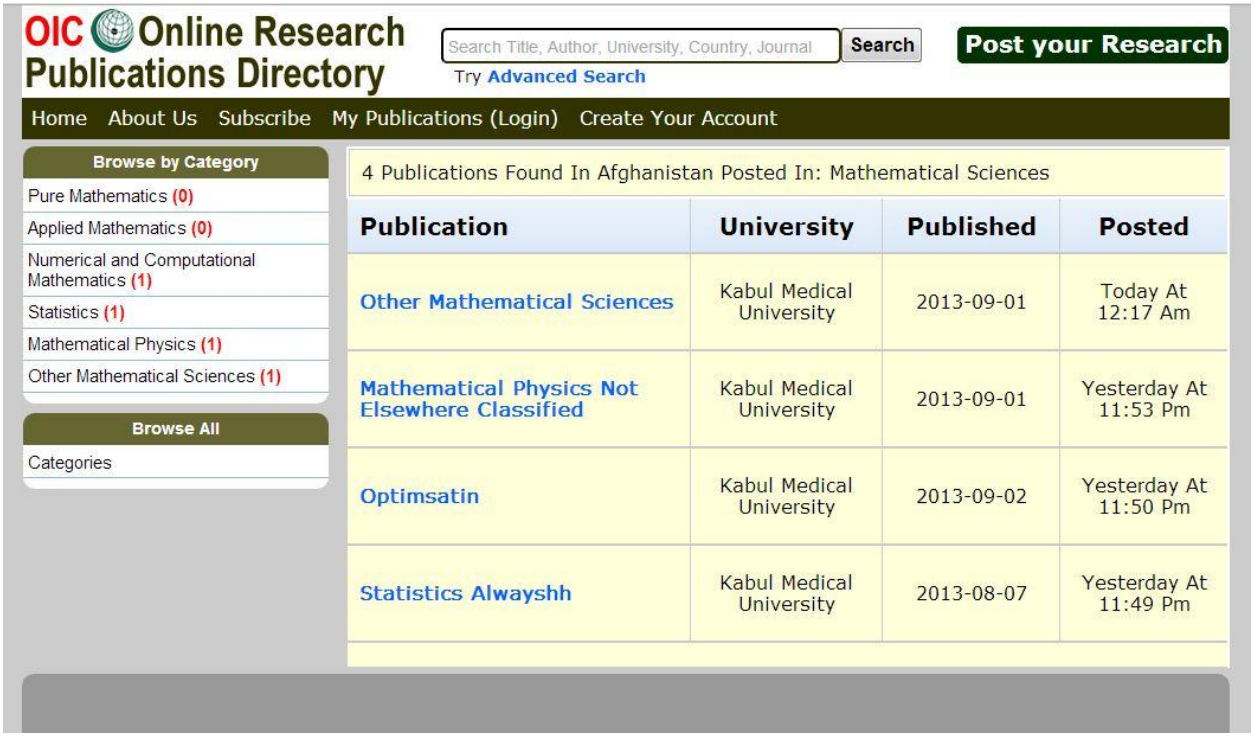

Figure-6.3: Publications belonging to Categories of Mathematical sciences posted in Afghanistan

The same scenario happens when a visitor clicks on a desired category where the publications belonging to subcategories of that particular category will be displayed. Assuming the visitor clicks Numerical And Computational Mathematics as his desired category, the page that he is redirected to will contain on the left side, the subcategories of Numerical And Computational Mathematics with the corresponding number of publications in each subcategory and on the right, the publications published in pure mathematics in descending order of time but irrespective of the subcategories. This is illustrated in the snapshot shown in the figure below

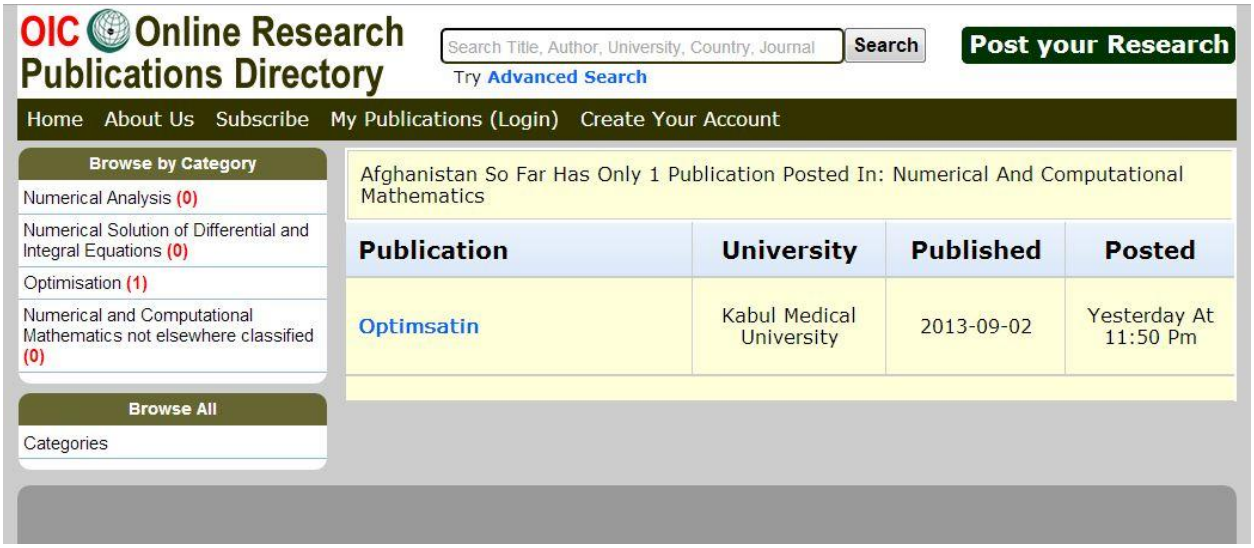

Figure-6.4: Publications belonging to subcategories of Numerical and Computational Mathematics posted in Afghanistan

Finally, when a visitor clicks on a particular subcategory, only publications of that subcategory will be shown on the right side in descending order of time in which each was posted and on the left side, a link to browse all the publications is made available. This is as indicated in the snapshot shown in the figure below. We assume the visitor click on the subcategory of Optimisation.

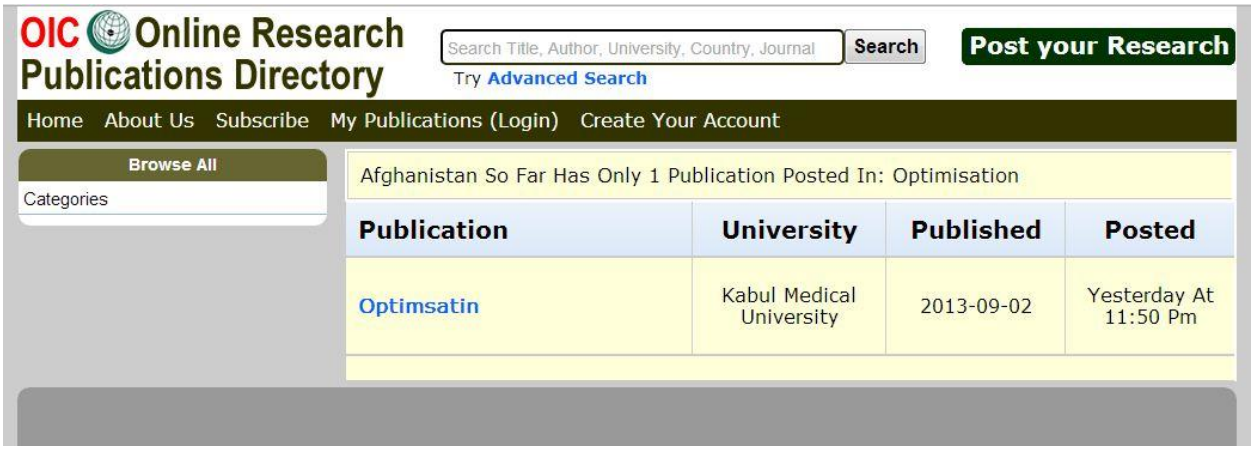

Figure-6.5: Publications belonging to subcategory of Optimization posted in Afghanistan

6.1.2 Fields of Research Section

This is a section of the home page located on the left side showing the various fields of research. Each FoR is a link to the corresponding categories belonging to that specific FoR. When a visitor, clicks on any FoR, the page that he is redirected to is divided into two sections: The right section contains all the categories of that field of research with corresponding number of publications posted regardless of the country. The left section contains the publications posted under that field of research in descending order of the time in which each publication is posted but irrespective of the categories and the countries from which each has been posted. This is illustrated in the snapshot shown in the figure below. We assume the visitor clicked Mathematical sciences as a field of research.

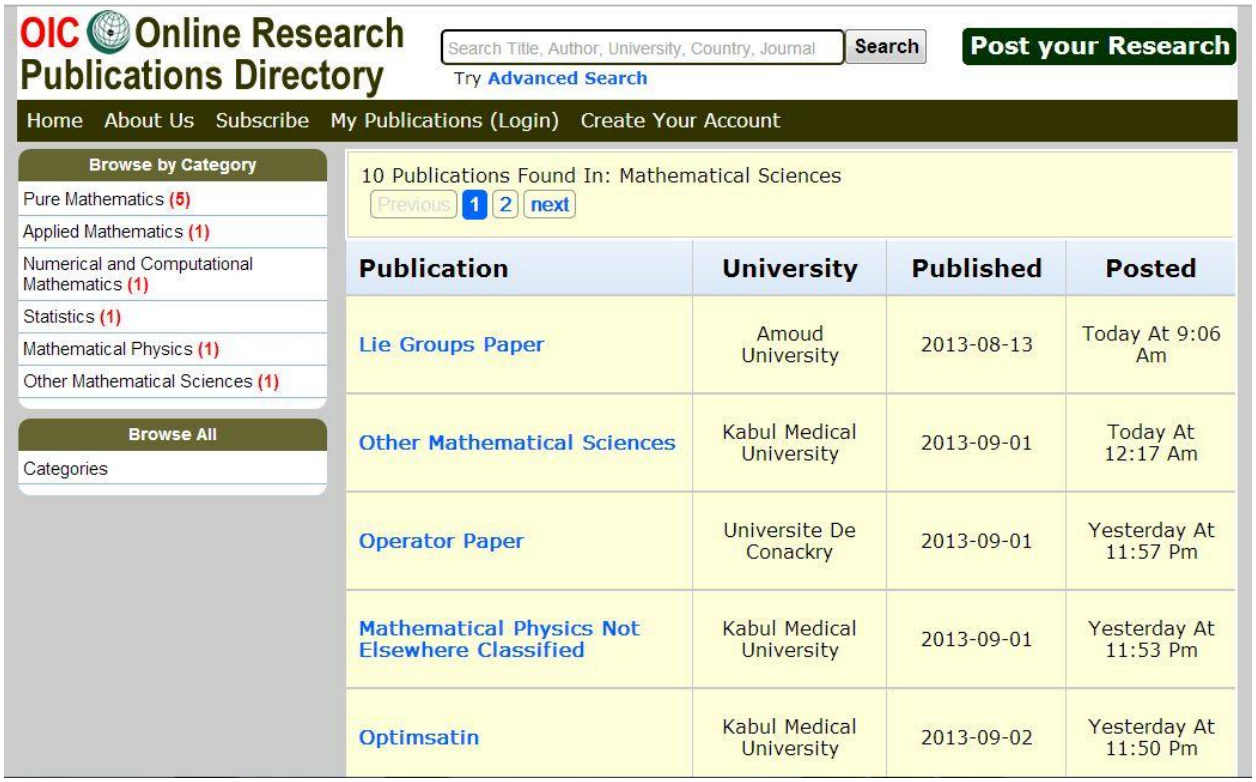

Figure-6.6: Publications belonging to the category of mathematical sciences.

When a visitor clicks on his desired category, say, Pure mathematics, he is redirected to a page that is divided into two sections: the left side which contains subcategories of Pure mathematics and the corresponding number of publications in each subcategories. The right side contains all the publications in pure mathematics in descending order of time in which they were posted but irrespective of the subcategories of pure mathematics. This is illustrated in the snapshot shown in the figure below.

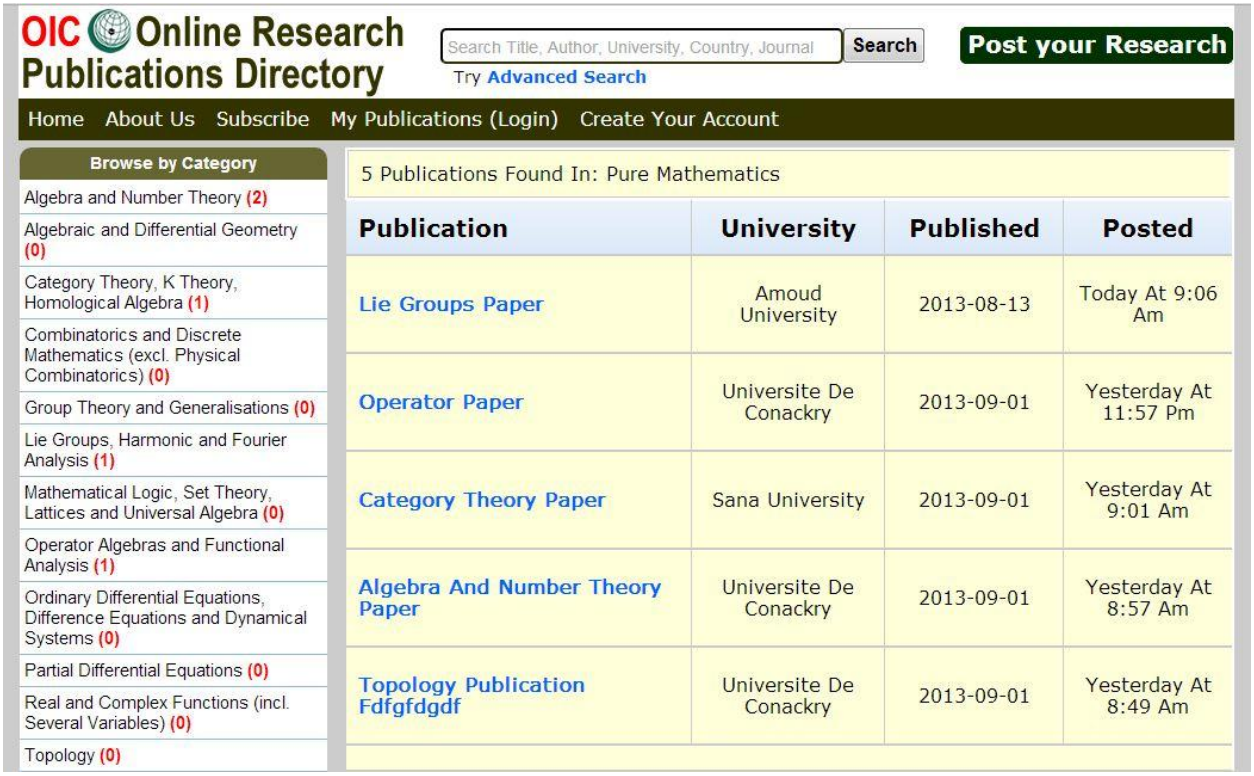

Figure-6.7: Publications belonging to the subcategory of pure mathematics.

When a visitor clicks on any subcategory, say, Algebra And Number Theory, he is redirected to a page that will show him only publications posted in that subcategory as well as a link on the left that can direct him to all publications posted in the system. This is illustrated in the snapshot shown in the figure below.

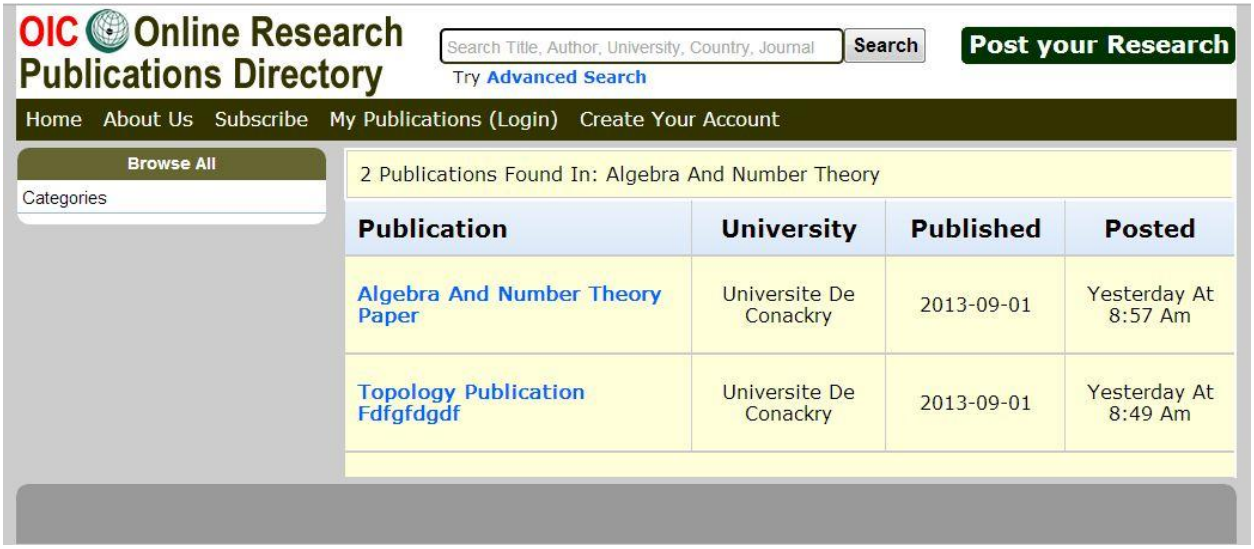

Figure-6.8: Publications belonging to subcategory of Algebra And Number Theory.

6.1.3 Individual Publications Page

When a visitor clicks on the desired publication that has been posted in this system, he is redirected to a page that will contain all the information about that particular publication. The page is standard and it contains the following information about that publication:

- The Title of the publication.
- The abstract of that publication.
- A link to download the full publication.
- The contact information of the author including his name, email, his country and university in which he published his research.
- The journal in which he published his research, the date of publishing and the link to that journal.
- The time in which it was posted in this system.
- The link to the author's page containing all the publications he has posted in this system.

Assuming the visitor was interested in the paper: "Numerical Solution of System of Generalized Abel Integral Equation Using Legendre Multiwavelet", this is how the page containing that paper looks like.

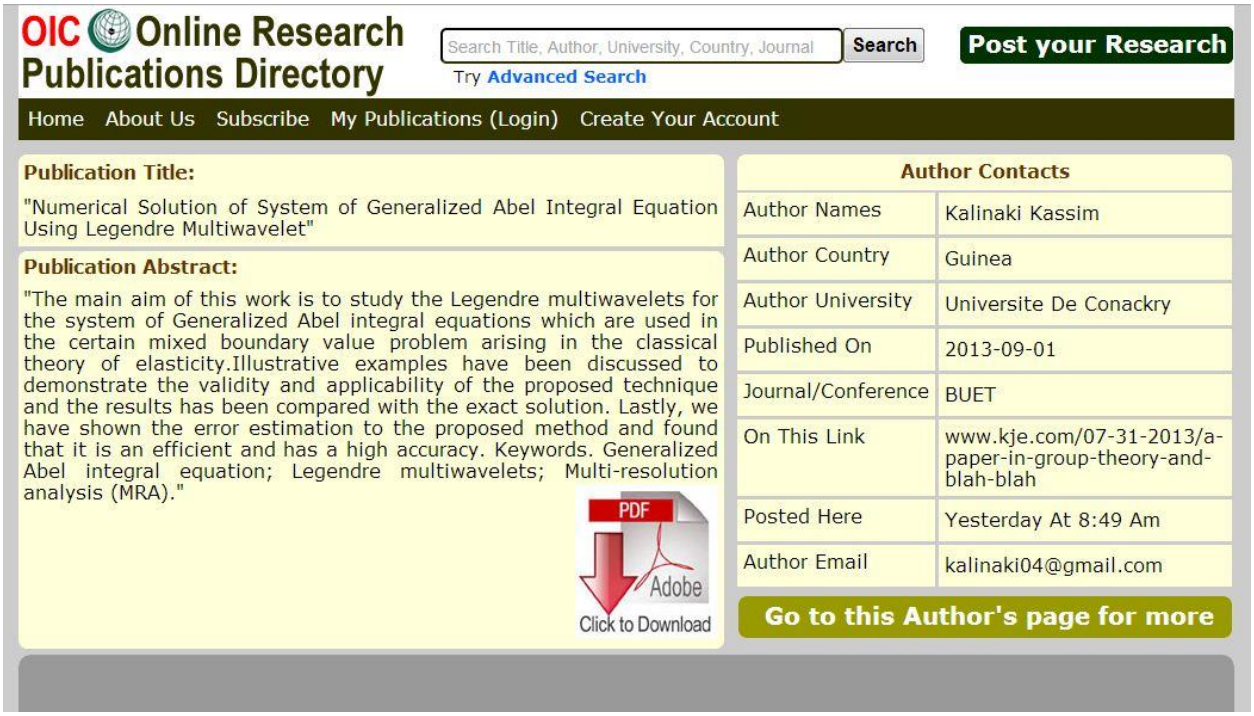

Figure-6.9: Sample of an individual page for a particular publication

6.1.4 Individual Author's Page

Assuming the visitor just viewed the above publication and got interested in seeing all the publications that particular author publishes and has posted them in this system, he can click on the link below the contacts details which reads: "Go to this Author's page for more" which redirects him to another standard page which contains all the publications that particular Author has posted in this system. Below is a snapshot of the above author's page containing his posted publications.

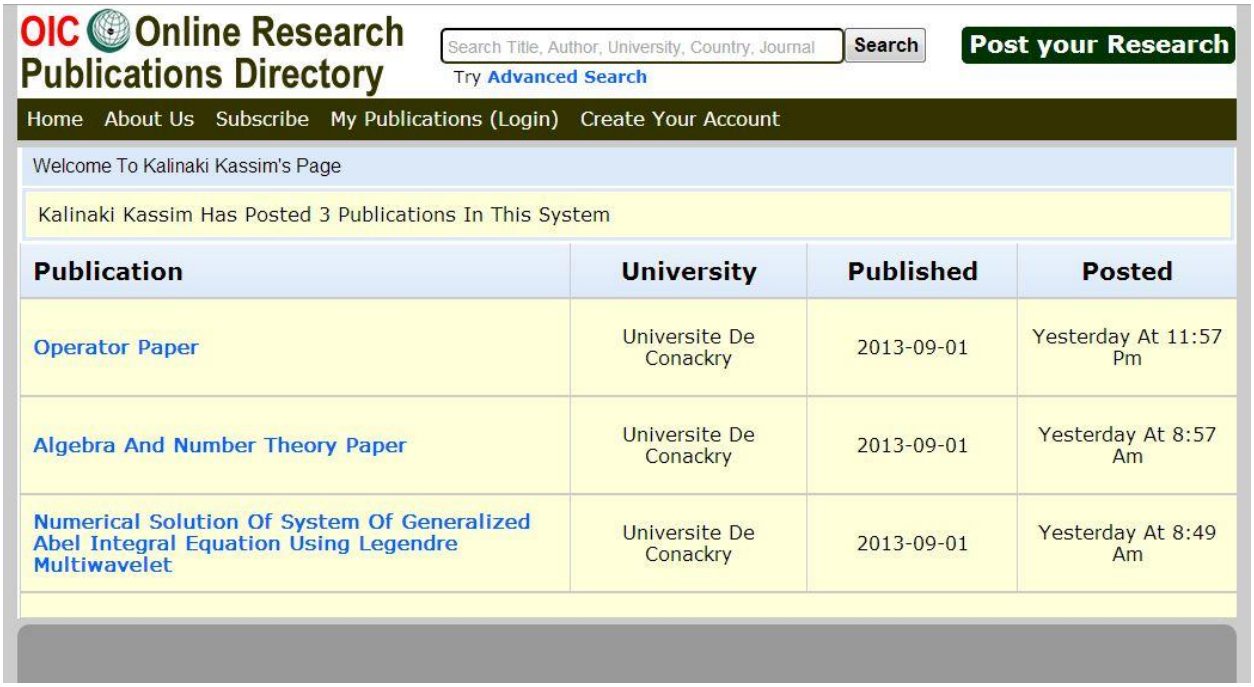

Figure-6.10: Sample of individual Author's page

6.1.5 The Subscription Section

This a feature that will be implemented in future in which members can subscribe by email to the fields of research of their choices. We hope to use Google feedburner which is free and very easy to integrate in our system. When s user subscribes to fields of research, categories or subcategories, he gets notified by email about any publications posted in that particular FoR, category or subcategory. This will be clear when implemented in future.

6.1.6 The Search Area

This is a feature that enables visitors to search their own desired publications in this system. We have made the search algorithm so versatile in a way that one may search the system with very many parameters. The visitor can search by the following:-

- Author name
- Author university
- Journal/conference
- Country
- Key word in title

- Email.

Assuming the visitor searched by Author name, say Kassim, the below snapshot will be shown.

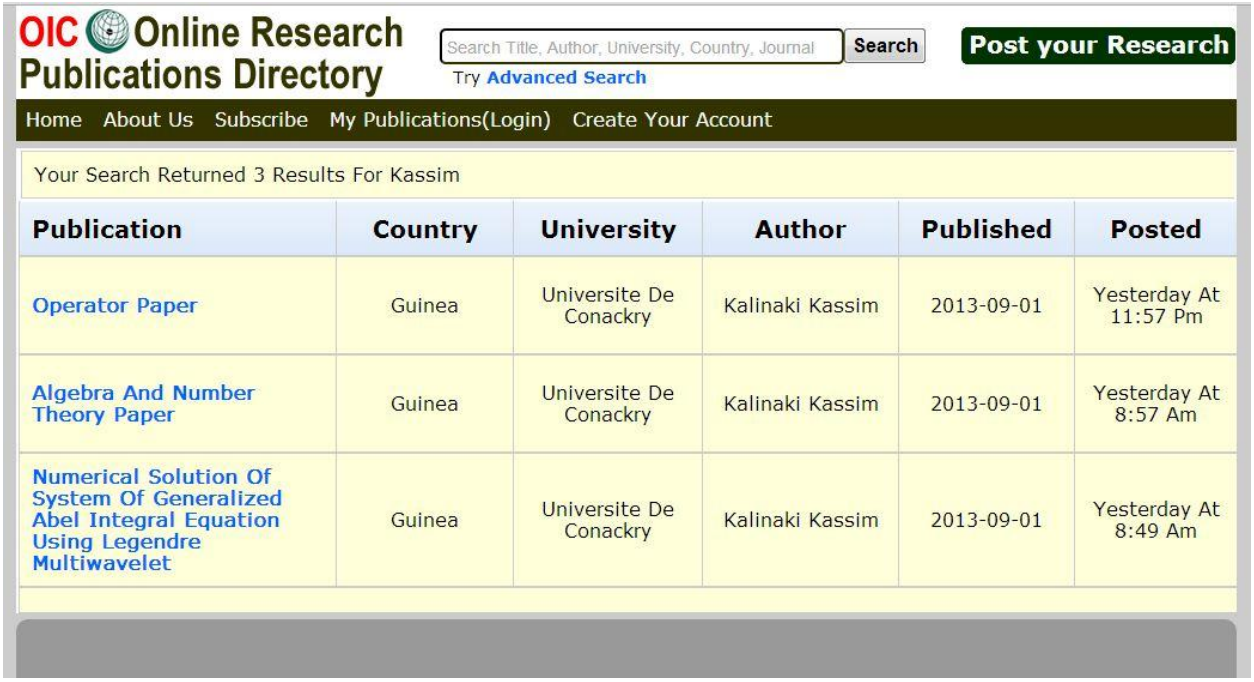

Figure-6.11: Sample of search results for the keyword 'kassim'

6.1.6 The Advanced Search area

We understand how specific some visitors may want to be when searching our system for the desired content. So, the advanced search option will enable the user to specify exactly what he/she wants to search for in our system. This, together with the search mechanism explained above, we are sure we will better serve the needs of virtually everyone who wishes to search our system. The advanced search option enables the user to search a specific publication according to the Field of research, category, subcategory, country, university and the date in which it was published. Assuming the user wanted to search publications which belong to the Mathematical sciences field of research, pure mathematics category, Algebra and Number Theory subcategory posted in Guinea at Universite de Conackry. The snapshot below will show the results from that search

Figure-6.12: Sample of search results for the advanced search option

6.2 Author Module

This is a module that contains the restricted pages that can only be accessed by the registered members of this system. Inclusive in this module are the member registration and member login pages accessed by everyone. The restricted pages include the individual profile pages and the posting page for posting publications.

6.2.1 Member Registration

This is an interface for the author interested in creating his own account in this system so as to post his/her published papers in this system. It's simple and less information about the author is needed. When registering, only one username is allowed in our system and incase a person supplies a username that exists in the system, he/she will be told to supply another. All fields must be filled in order for the account to be created. Below is a snapshot of the member registration page.

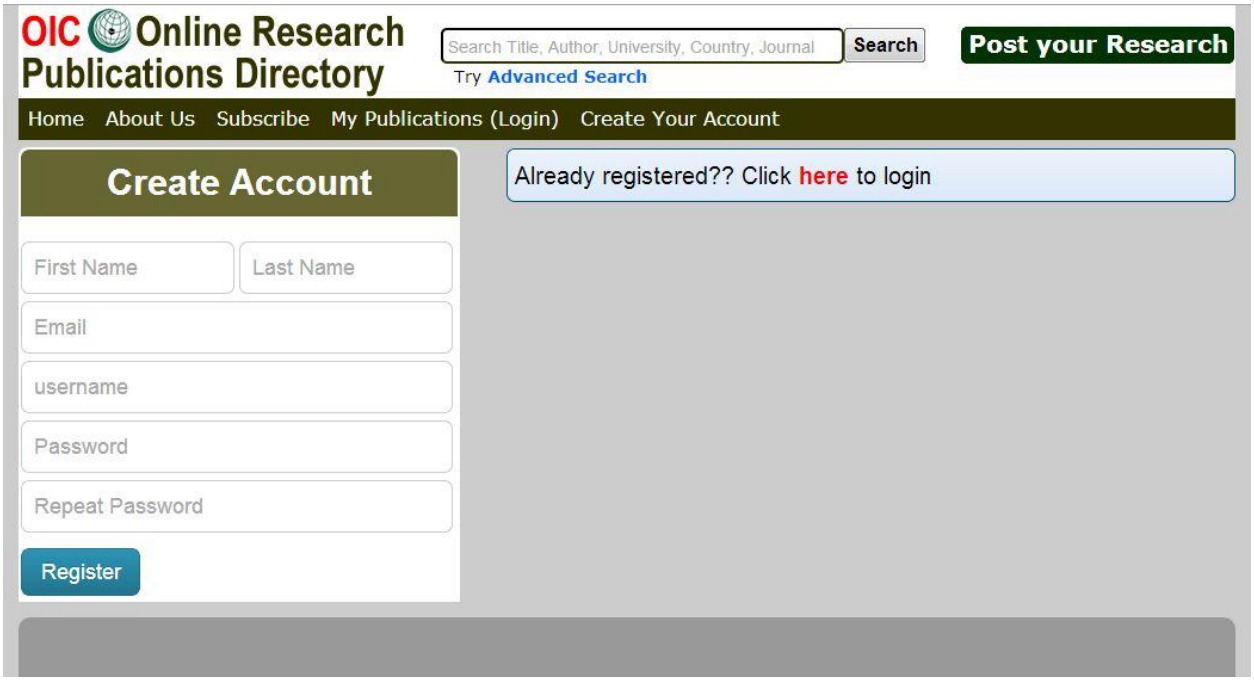

Figure-6.13: Snapshot of registration form for new members.

6.2.2 Member Login

Upon successful registration, the members are redirected to this page in order that they supply their username and password so as to access their profiles. In case they forgot their passwords, an option is available for them to reclaim their passwords by supplying the email address given when registering. The login page is simple and is shown in the snapshot below.

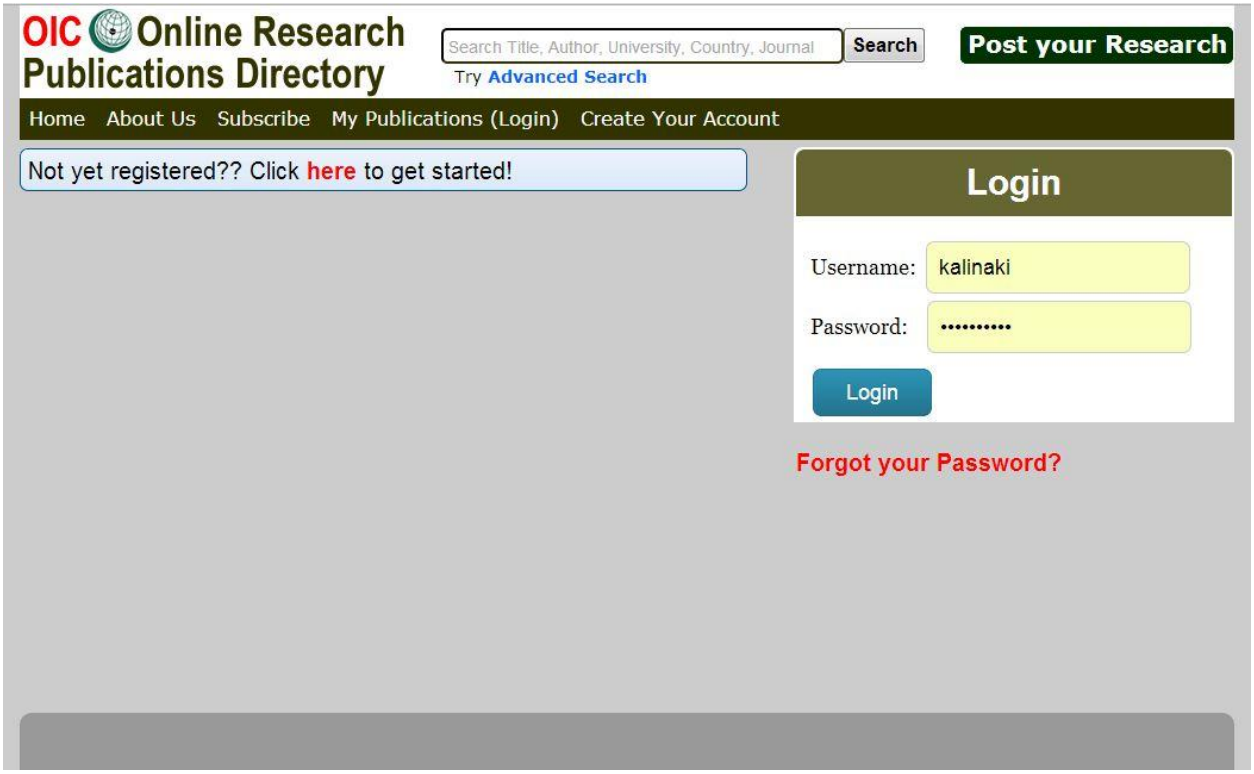

Figure-6.14: Snapshot of login page for registered members.

6.2.3 Individual Profile Page

Once the member successfully logs in the system, he is redirected to a secure page which is his profile page. Once there, the member can view his registration details, edit his details, change his password and view his posted publications. Also, his username will appear on the menu inside the brackets close to 'My publications' and will remain there for any pages he wishes to go to for as long as he is logged in. to provide some security, if he forgets to logout after using the system, the system automatically will calculate the duration in which the account will be idle which in this case was limited to 30 minutes beyond which the user will require his username and password to access the profile page or post/delete a publication. He however can view other pages because they do not require login details. On his profile page, he can also delete the posted publications. If he is a new member, of course he'll have no publications. The snapshot below shows the profile page of a registered user (Yousif) who has already posted his 2 publications in this system.

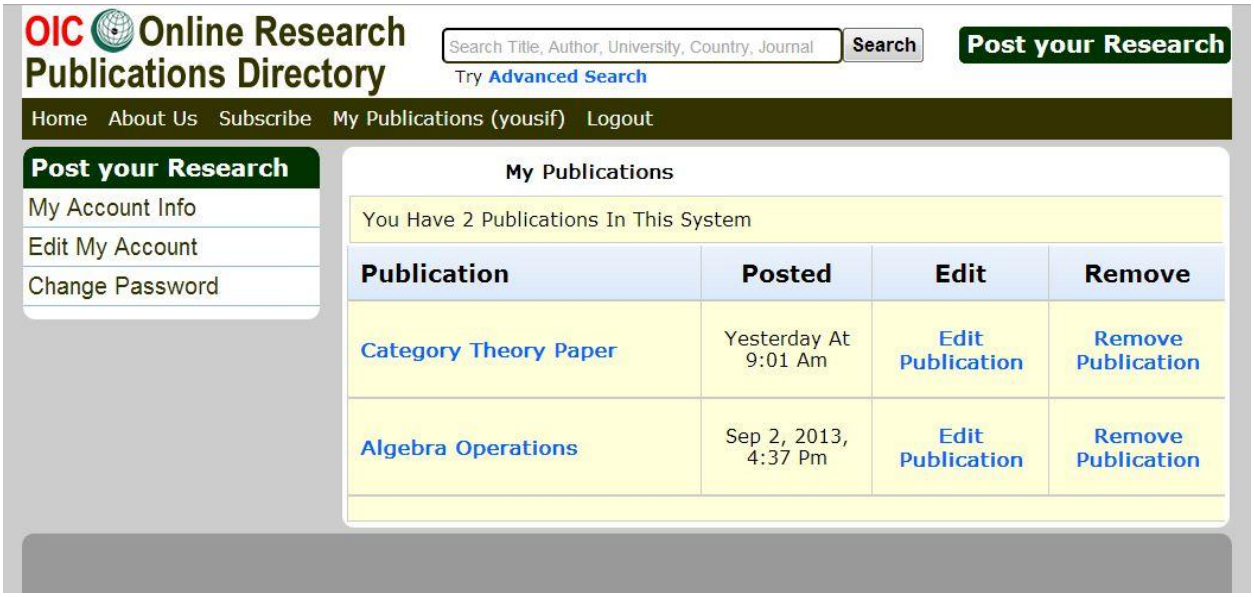

Figure-6.15: Snapshot of a profile page for a registered member (Yousif).

6.2.4 Page for Posting a Publication

One of the tasks a registered member can do is to post his publication. If he is logged in, he can click on the tab that reads "Post your Research" wherever he finds it. This is because only logged in members can post their publications. Once there, the below snapshot shows the page for submitting his publication to be accepted in this system. Below are the requirements for a successful publication posting:-

- The member must select the Field of research in which the publication belongs
- Depending on the selected FoR, the corresponding categories will be populated from which he must select one that belongs to his publication.
- Depending on the selected category, corresponding subcategories will be populated from which he must select one that belongs to his publication.
- He must select his country
- Depending on the selected country, the corresponding universities are populated from which he must select his university.
- He must supply the title of his publication.
- He must select the date on which his research was published.
- He must supply the name of the journal or conference in which he published/presented his paper.
- He must provide the link to that publication from the supplied journal/conference.
- He must supply the abstract of his publication.

- He must upload his full research paper in pdf format.

Once all the above requirements are met, he can post his publication in the system for others to view.

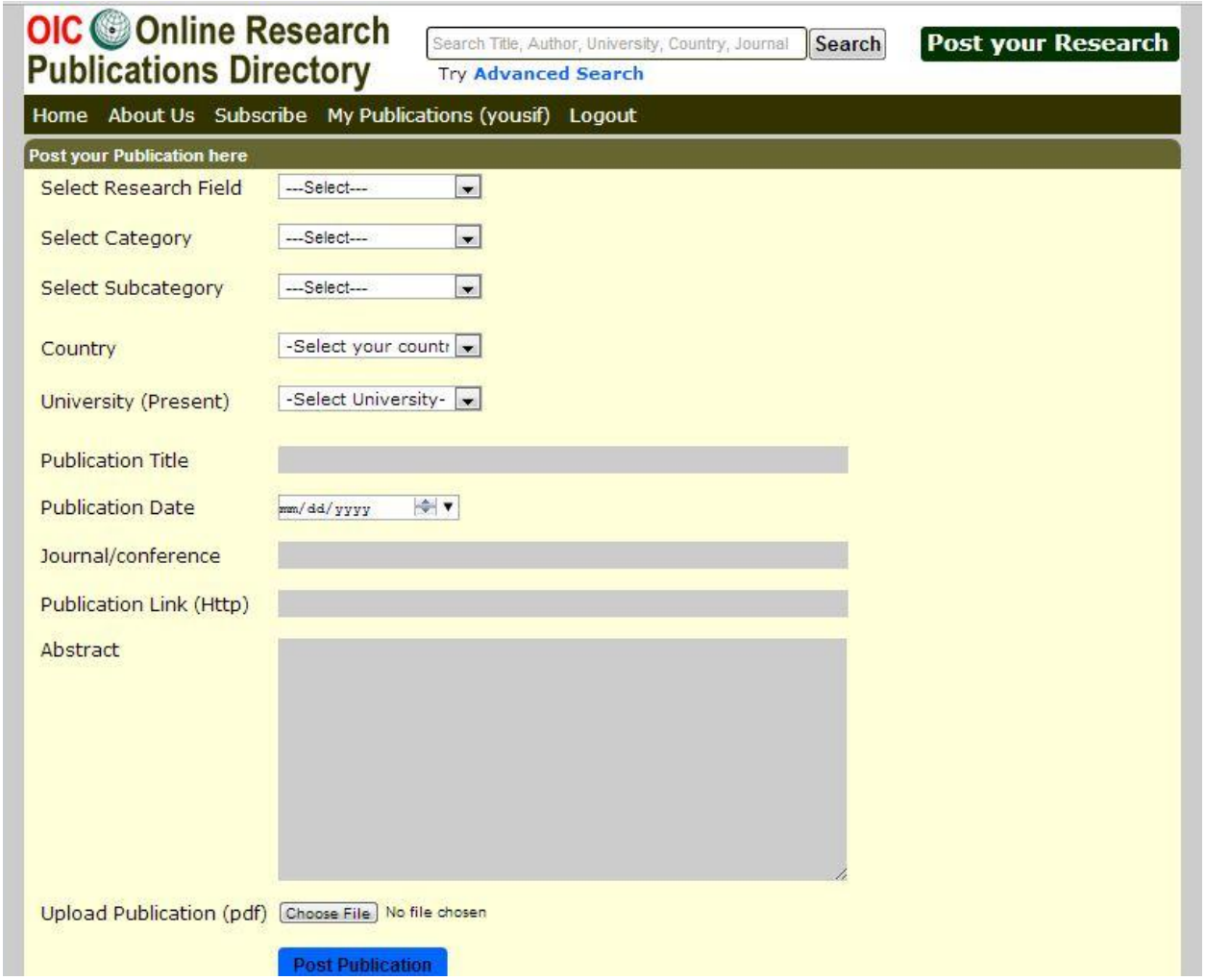

Figure-6.16: Snapshot of page for posting a publication by a registered member (Yousif).

6.2.5 Updating a Posted Publication

As indicated in the profile, the publications posted in the system can be updated or edited for reasons such as an error in writing the title, wrong publication date, among others. Any update of a publication in this system renders the post as being new and for this reason, the updated publication will appear latest according to the time it was updated.

6.2.6 Deleting a Posted Publication

As designers of this system, we have to imagine the user may after sometime want to remove a particular publication from this system. So this feature becomes handy and once the publication has been deleted, the deletion process cannot be undone.

6.3 Administrator Module

This module entails the tasks that an administrator can perform in this system. The admin module has the admin login to enable him access the restricted admin pages. Below are the tasks the admin can do in the system:-

- View all members who have opened up the accounts with all their details such as names, emails, signup dates, username.
- View all the publications with details posted by each individual member.
- Delete fake publications (with fake publication links)
- Maintain the system.

6.3.1 Administrator Home Page

Upon logging in of the administrator, he is redirected to a secure admin page from where he can take full control of the members and their publications. Below is a snapshot of the admin home page.

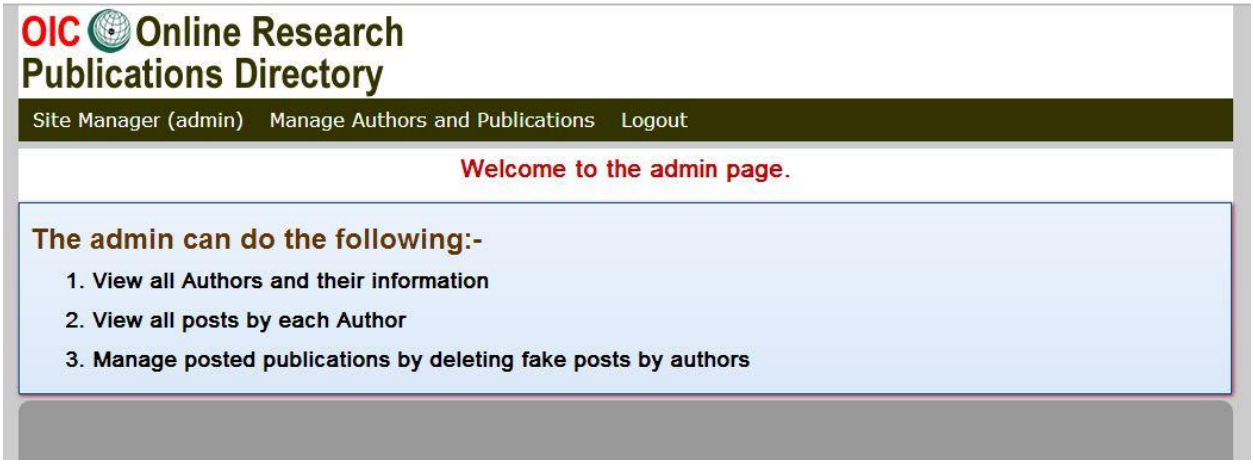

Figure-6.17: Administrator home page snapshot.

6.3.2 View Authors and Their Info

Once in the administrator's page, appearing on the menu is location that reads: "Manage Authors and Publications". When the admin clicks there, he is redirected to another secure page that shows all the Authors who have registered in the system with their information. The information about the authors includes the following:-

- Author full names.
- Author emails
- Number of authors who have registered.
- Author signup dates
- Author usernames and
- A link to individual authors publications

Below is a snapshot of the above discussed page.

Figure-6.18: registered members information snapshot

6.3.3 Manage Author Publications

The admin can view all publications posted by each registered member. As indicated the above snapshot of the authors' info, the admin can view publications posted by each author by clicking, on the link that reads: "View publications". Is say he (admin) chooses to view publications for Khalid Ahmed, then once he clicks on the link that corresponds to him (Khalid), he is redirected to another secure standard page about Khalid's publications from where he can view each of Khalid's publications and if it appears to him that the links provided by Khalid for his publications are fake (upon verifications), he can delete that post from the system.

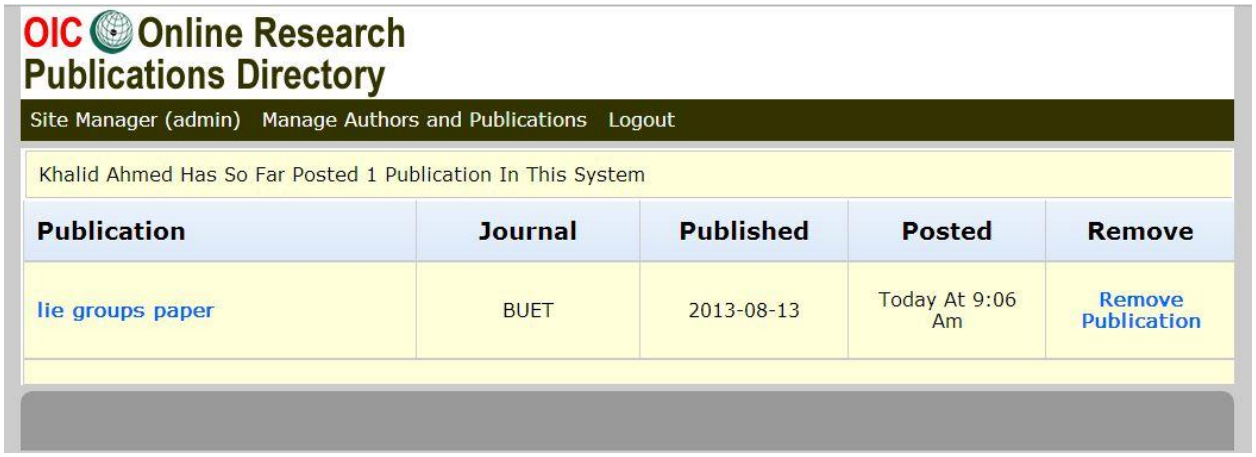

Figure-6.19: a View by the admin of Khalid's publications.

Chapter 7: Future Planning

It's an old saying that "*Rome was not built in a day"*. The same way we had a lot on our mind but to do everything great requires time and resources. Therefore, we do have future targets. By analyzing the current and future technological trends especially in web development, we determine our targets. We in this chapter tackle one by one.

7.1 Instant verification of posted publications

Currently, when a user posts his publication, it automatically can be viewed by everyone regardless of whether the publication information is correct or not. In this case, the admin can log into the admin page and view those publications and incase one is found to have fake info, he can delete from there. In order to prevent fake papers (ones with untrue publication links) from being viewed by everyone, we shall in future, introduce an interface where the admin will approve each paper before it appears to the public for viewing.

7.2 Responsive website

In order to cope up with the changing web technologies, we want to make our system a more responsive one in which it can quickly adjust its self to all devices with varying resolutions. Among the devices include the palm notes, notebooks, mobile phones, tablets, phablets and smart phones. This would make it easier to visit our system by people with varying screen sizes.

7.3 Email subscriptions

At the moment, the subscription page is not active because we are working on local host. But in future when the system is up, we shall integrate the subscription page in which members can subscribe by email to the fields of research of their choices. We hope to use Google feedburner which is free and very easy to integrate in our system. When a user subscribes to fields of research, categories or subcategories, he gets notified by email about any publications posted in that particular FoR, category or subcategory. This will be clear when implemented in future.

7.4 Comments on Publications

We plan to integrate the comment feature for each posted publication. In this feature, visitors can comment on the publication posted by any of the registered members. This we hope will allow more interactions between the author and the people interested in his research areas.

7.5 Adding social networking tools to the website

We clearly understand how social networking has impacted on us regarding how we learn. With this in mind, we plan to integrate social networking elements like facebook and twitter where a visitor can share a publication with his/her friends. This we believe will enable the free sharing of knowledge which is the sole aim of our system.

Chapter 8: Conclusion

The purpose of technology is to make human life easier and productive. We have technology but it requires engineering to use it to solve various human problems. Our little effort is the reflection of this thinking. In a short span of time we did something that can revolutionalize access to scholarly articles especially in the Muslim world. This we believe will Promote growth and development of OIC member states because open access incorporates local research into all interoperable network of global knowledge. With our system, we believe the OIC as a global organization can use it as a tool which will enable the increases of impact of local research thereby providing new contacts and research. As we mentioned in our future planning, there are many technologies which we can use for our system to serve the purpose in the best way possible.

References

[1]. Promoting Open Access to Research in Academic Libraries. Available at: http://www.webpages.uidaho.edu/~mbolin/jain.htm

[2]. Royal Melbourne Institute of technology (RMIT) fields of research. Available at: http://mams.rmit.edu.au/e69xalouook4.pdf.

[3]. OIC member countries and the universities database. Available at: http://www.sesric.org/databases-research-inst.php

Appendix

Here are the SQL codes for the database that we created for the OIC Online Research Publications Directory.

Tables

```
--
-- Create schema oic
--
CREATE DATABASE IF NOT EXISTS oic;
USE oic;



--
-- Definition of table `members`
--
DROP TABLE IF EXISTS `members`;
CREATE TABLE `members` (
`id` int(100) NOT NULL auto_increment,
`first_name` varchar(25) NOT NULL,
`last_name` varchar(25) NOT NULL,
`first_name` varchar(25) NOT NULL,
`email` varchar(100) NOT NULL,
`username` varchar(15) NOT NULL,
`password` varchar(100) NOT NULL,
`sign_up_date` varchar(50) NOT NULL,

PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;



--
-- Definition of table `categories`
--
DROP TABLE IF EXISTS `categories`;
CREATE TABLE `categories` (
`id` int(100) NOT NULL auto_increment,
`category` varchar(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
--
-- Definition of table `subcategories`
--
DROP TABLE IF EXISTS `subcategories`;
CREATE TABLE `subcategories` (
`id` int(100) NOT NULL auto_increment,
`category_id` int(100) NOT NULL,
`subcategory` varchar(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;



--
-- Definition of table `subsubcategories`
--
DROP TABLE IF EXISTS `subsubcategories`;
CREATE TABLE `subsubcategories` (
`id` int(100) NOT NULL auto_increment,
`subsubcategory` varchar(100) NOT NULL,
`subcategory_id` int(100) NOT NULL,
`category_id` int(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;



--
-- Definition of table `country`
--
DROP TABLE IF EXISTS `country`;
CREATE TABLE `country` (
`id` int(100) NOT NULL auto_increment,
`country` varchar(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
--
-- Definition of table `universities`
--
DROP TABLE IF EXISTS `universities`;
CREATE TABLE `universities` (
`id` int(100) NOT NULL auto_increment,
`country_id` int(100) NOT NULL,
`university` varchar(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;



--
-- Definition of table `publications`
--
DROP TABLE IF EXISTS `publications`;
CREATE TABLE `publications` (
`id` int(100) NOT NULL auto_increment,
`publication_cat` varchar(100) NOT NULL,
`publication_subcat` varchar(100) NOT NULL,
`publication_subsubcat` varchar(100) NOT NULL,
`user_country` varchar(100) NOT NULL,
`user_university` varchar(100) NOT NULL,
`publication_title` varchar(120) NOT NULL,
`publication_date` varchar(50) NOT NULL,
`publication_journal` varchar(100) NOT NULL,
`publication_abstract` text NOT NULL,
`link` varchar(100) NOT NULL,
`docs` text NOT NULL,
`posting_date` text NOT NULL,
`publisher_name` varchar(100) NOT NULL,
`publisher_email` varchar(100) NOT NULL,
PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;



--
-- Definition of table `admin`
--
DROP TABLE IF EXISTS `admin`;
CREATE TABLE `admin` (
`name` varchar(10) NOT NULL auto_increment,
`password ` varchar(100) NOT NULL,
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```