

INTERDISCIPLINARY GLOSSARY — PARTICLE ACCELERATORS AND MEDICINE

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Abstract

A general concept of a new interdisciplinary glossary, which includes particle accelerator terminology used in medicine, as well as relevant medical concepts, are presented. Its structure and usage rules are described. An example, illustrating the quickly searching technique of relevant information in this Glossary, is considered. A website address, where one can get an access to the Glossary, is specified. Glossary can be refined and supplemented.

INTRODUCTION

Number of fields of science as well as its applications are founded and evolved swiftly today. It results in new concepts, professional terminology, which can significantly complicate an understanding and information perception by specialists in the interdisciplinary fields. In particular this situation takes place in the case of specialist cooperation from medicine and particle accelerator fields. Particle accelerators, in that case, are effectively used for disease diagnostics and therapy.

Special problems appear when students and post-graduates study special medicine and particle accelerator courses at Universities, in which rather difficult, and often impossible, to teach courses simultaneously on physics and medicine at the highest level [1].

Interdisciplinary Glossary was made up with the aim of improving the knowledge in the field of particle accelerators and medicine. We hope that Interdisciplinary Glossary will be useful for students, technologists, scientists & users of key facilities.

GLOSSARY STRUCTURE

High-tech nuclear medicine centres are built up for the provision of high quality medical diagnostics and therapy in Russia today, where experts in various scientific fields and application areas work together with doctors.

Interdisciplinary Glossary, which includes a set of hard and electronic copies as well as database of Glossary and contains terminology and explanation in genetics, biology, radio-biology, radiochemistry, radiation safety, radio-pharmaceutical, oncology, information technology, particle accelerators, physical methods and means of radiation for medical imaging, is required to provide communication between all members on issues concerning common activity in the field of application of methods and tools for nuclear medicine and radiation therapy for cancer diagnostics and treatment.

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In particular, particle accelerators are used for radioactive isotope production as well as radio-diagnostics and oncological diseases therapy, sterilization of medical instruments and transplant tissues.

Particle accelerators for medicine are classified into linear and cyclic on the one hand and into electron and proton/ion on the other hand. Generally, electron linear and cyclic accelerators are used for radiotherapy, whereas proton and ion accelerators are mainly used for nuclear medicine purposes [2, 3]. It is well known that different types of ionizing radiation (photons, electrons, protons, ions, neutrons, π -mesons) are used in radiation therapy. The type and energy of ionizing radiation in complex treatment are determined by a stage and malignant neoplasm prevalence [4].

Interdisciplinary Glossary includes about 1000 terms and explanations, namely:

- 180 on particle accelerators,
- 200 on oncology,
- 200 on computing,

and other terms and explanations that concern radio-biology, radiochemistry, radiation safety, radio-pharmaceutical etc.

Glossary content has been edited by experts of the corresponding fields of knowledge. Glossary content is sorted by subject and alphabet.

Glossary is based on relational database management system (DBMS) MySQL platform. Operation principle of the DBMS MySQL is similar to any other DBMS operation principle that uses SQL as the command language for creating/deleting databases, tables, replenishing the tables with a data, sampling data [5].

phpMyAdmin was installed for easy data management. phpMyAdmin is a LAMP (Linux, Apache, MySQL, and PHP) application specifically written for administering MySQL servers. phpMyAdmin has tools for visual table creation, and also allows one to create, modify and delete tables by means of the SQL toolkit.

Flowchart of the developed application is shown in Fig. 1.

An *administrator* interface consists of:

- category management that allows one to create, delete, and modify Glossary categories/subcategories;
- article management that allows one to create, delete, and edit articles included in all Glossary categories/subcategories;
- user management that allows one to assign/remove user rights to certain categories.

A *moderator* interface consists of:

- category management that allows one to create, delete, and modify Glossary categories/subcategories, which is assigned with administrator rights;

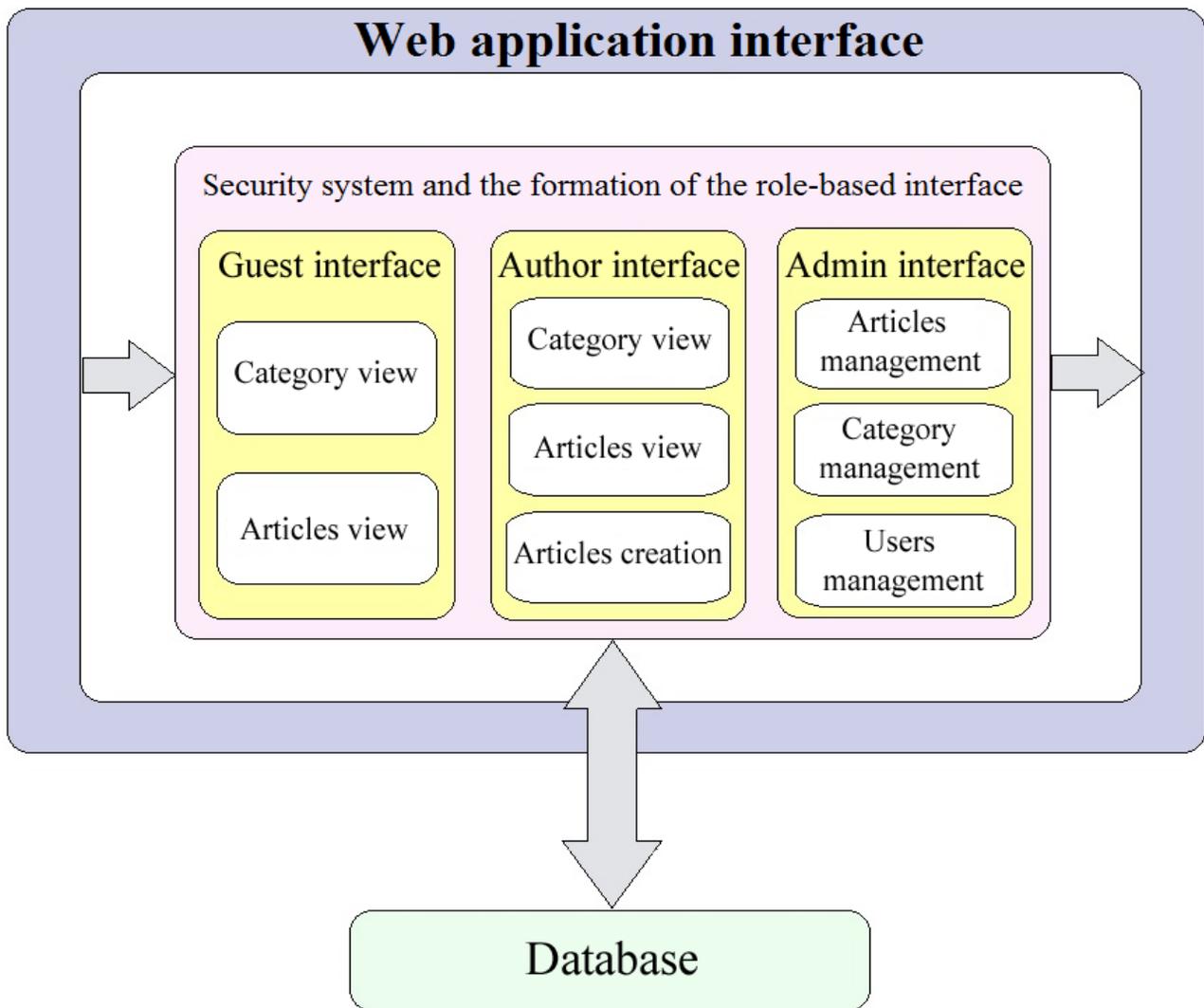


Figure 1: Web-application structure.

- article management that allows one to create, delete and edit articles included in Glossary category/subcategory, to which the moderator has access.

An author interface allows an author to add and edit his articles. A guest interface allows a guest to view articles of all existing categories.

CONCLUSION

Modern trends in technologies, the availability of information technologies and task complexity force researchers to involve other specialists in different fields of science into investigations.

In order to provide interdisciplinary interactions, printed reference books, that contain terms of a special field of knowledge, are usually used [6, 7]. However, it takes a lot of time to find required information in that case.

Multimedia interdisciplinary Glossary on nuclear medicine and radiation therapy, which was developed in NRNU MEPhI and based on information technology, allows one to overcome such difficulties. Finally, Glossary

allows one to get the modern scientific and technological information effectively.

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