The Artificial Intelligence Electronic Almanac

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Abstract - The Artificial Intelligence Electronic Almanac project has the aim to ensure free, legal, regulated copy righted access to high quality, checked and developed technical informatics materials for a wide range of users and target groups from the topic of artificial intelligence.

I. INTRODUCTION

The Artificial Intelligence Electronic Almanac is a project running through the Social Renewal Operative Program in Hungary which offers grants for development of teaching materials and contents with special regards to mathematical, natural science, technical and informatics training. The project is supported by the European Union, co-financed by the European Social Fund. The project started at June 2010., and the almanac will be ready to use at October 2011. The free access will be guarantied till 2014. for all users.

The realization includes a survey with the aim of mapping the needs of the target groups, the informatics network design, incrementing implementation (digitalization and multimedia development), as well as control in co-operation with the target groups, further, continuous thematic, expert and reader updates.

When realizing the project the aim is that through technological operation we create, operate, and maintain the necessary digitalization environment and the experimental version of the product, as well as the server containing the developed materials. The technological activities are the responsibility of the Panem Ltd. The technological backup and the experimental environment are provided by the Budapest University of Technology and Economics. Teaching materials, research presentations, informative and community building materials are prepared by content development activities to a form that is ready for digitalization, and these materials offer more than just the materials of textbooks to be digitalized. Content development is the responsibility of the university partners (Budapest University of Technology and Economics, Óbuda University, Semmelweis University). Logistics ensures efficient project management, communication (which is the responsibility of each partner), as well as the purchase national or international copy rights (which is the responsibility of Panem Ltd.).

Quality control is applied throughout the development phase as the partially finished product has limited user experience but even that is than included in further development. The final product is subject to an independent proof reading check, and finally, the finished product will be checked independently and randomly as part of the maintenance strategy.

II. REASONS FOR THE PROPOSED PROJECT

The project product has the aim to ensure free, legal, regulated copy righted access to high quality, checked and developed technical informatics materials for a wide range of users and target groups. It is vital to make sure that the users may than test these and become convinced of the importance of learning supported by high-quality materials. It must be ensured that the products are packaged in electronic packaging that will increase its value, portraying on the one hand the research results and interests, while on the other hand, creating an ever greater cohesion among the various target groups in terms of information exchange, making new contacts, keeping in touch). Further aims of the project are:

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- Introducing international, well-known learning materials to a wide range of users (this is the Russels' book)
- Development of learning materials in modules
- Inclusion of current mathematical, natural science, technical and informatics research results into the learning materials and trainings
- Representation of off-line contents on-line
- Creating on-line access of traditional knowledge and information-based fields of science
- Further development of own interfaces serving contents associated with the above-mentioned development of research materials
- Transition from printed contents to digital contents.

A. The projects' aims, target groups and domains of impact

The aim of the project is to portray the outstanding results of artificial intelligence so that those interested in informatics can have access to valuable help aiding their own professional development. It is vital that the presentation of artificial intelligence will make young informatics-oriented people consider artificial intelligence as a possible professional orientation for them. Also for teachers who make a significant pedagogical contribution to the professional development of college and university students studying informatics, as well as of PhD students as a backdrop to their research, further, working professionals, and finally, for non-IT and interdisciplinary scholars for whom this is a (at least partially) comprehensible accessible source of information.

By connecting to the internet the aim is the creation of an expandable information system based on electronic learning material called Electronic Almanac uploaded on a public ally accessible (HIK) server. The professional spine of this learning material is one of the most well-known textbooks in the field of artificial intelligence translated into Hungarian [1] accompanied by an acclaimed Hungarian university course book in the field of neural networks [2], both enhanced with multimedia materials. This is further expanded with a system of knowledge included in Hungarian education, with useful tools for students and teachers alike, an overview of study possibilities within Hungary, a trove of national research results, and a collection of sources and information that may prove useful for the readers.

III. PLANNED ACTIVITIES AND PARTICIPANTS

The Electronic Almanac proposed in this project offers a unique possibility to make knowledge related to artificial intelligence readily available to a wide range of readers, mainly due to its professional actuality, thematic versatility, and free online accessibility.

A. Project manager and partners, their connection to the partner and absorbability

The project manager is the Budapest University of Technology and Economics (BME), Department of Measuring Technology and Information Systems. The Intelligent Systems Group also dealing with the project has its core competences in the field of intelligent systems, as well as the basic and applied research of these.

Project partners are the Panem Ltd. Publisher, Óbuda University and the Semmelweis University.

The Panem Publisher is an acclaimed publisher in the Hungarian book market due to its publishing activities in the fields of informatics, economics, and textbooks related to learning and teaching. The primary aim of the publisher is to introduce and establish acclaimed foreign editions in Hungarian suitable for the use in Hungarian higher education, as well as introduce Hungarian books to the international book market.

Within Óbuda University, John von Neumann Faculty of Informatics (NIK) the Institute of Intelligent Engineering Systems (IMRI) was founded in 2003. The aim of this institute is work in the fields of interdisciplinary engineering applied informatics, computer modeling, intelligent computation and applied computer sciences.

Semmelweis University (SE) is one of the most acclaimed universities in the country. It has three tasks: education, research and medical attendance. The section responsible for the project is the General Medical Faculty, Development and Training Institute of Medical Informatics (Általános Orvostudományi Kar Egészségügyi Informatikai Fejlesztő és Továbbképző Intézete). Apart from the education of students of organizing commerce they also carry out the education of medical informatics for general physicians and dentists, further, medical informatics for students of pharmacy.

B. *Professional content and aim of project*

The professional aim of the project is to present artificial intelligence as one of the basic fields of technical informatics but also serve and to draw attention of curious target groups to this field. The tool of this realization is the professionally well-defined, high-quality Electronic Almanac, which we are planning to expand and update regularly.

The typical short term goals are serving the training needs of both teachers and students (guided learning, knowledge enhancing exercises, preparations for exams, material for vocational training, etc). The long term goals include a creating a social network group around the almanac and a repository freely accessible (source of ideas, cross referencing scientific relationships, continually updated events calendar, professional forums, etc).

C. *Expected results and impacts of the project*

The project outcome is the electronic almanac, public, accessible, suitably documented and introduced in several forums. The starting point are the two digitalized multimedia illustrated textbooks, further containing teaching, training, literature, research news materials. The knowledge base of the Almanac may be useful regarding specific realization of industrial projects (source of information, expert base, Q&A, "best practice"-type case studies, etc). The almanac provides a whole different perspective of obtaining information in the field of artificial intelligence for the listed target groups. Instead of passive reading there are interactive contents which novel services that are enabled by current technical advancements. With the realization of the Almanac these services appear in a professionally controlled environment so that they ensure a popular and high-quality alternative to traditional materials.

D. *Presentation of the preparation, execution, operational limits and maintenance of the project*

As there is a great degree of similarity between the activities of the project and the consortium's (universities, publisher) routine activities, the hardware and software devices necessary for the realization of the project are available for the entire length of duration. The conceptual questions of the learning material development are decided by the leading lecturers of the participating partners, while the details are worked out by paid student work. Technological steps are the responsibility of the expert publisher using conceptually guided paid labor.

The information content of the Almanac is continuously maintained. This will happen on three levels. In the case of basic electronic materials, as the majority of them are stored locally (HIK server) maintenance mainly means the correction of indicated errors and updating addresses of internet references. This will take the development of a service that automatically scans almanac's materials stored as backup on the BME's server. The differences will be stored as a material to be uploaded to the HIK server, as it is also regularly updated. The next step is the regular updating of the learning and teaching materials. The expansion of the learning materials (expansion of subject materials, exam tasks, practice tasks, interesting works, e.g. works created for student conferences, diploma works, etc) takes place approximately every six months. The natural time for updates coincides with the end of the exam periods. The updating of additional scientific information also happens every six months. The mode of updating is the same as previously described. The backup system is refreshed on the BME server. The third refresh level is that of the 'social' contents based on the active interests of the audience (GYIK, new links, literatures, tasks, etc) in a selected and edited form to be embedded in the Almanac DocBook format "Who-knows-what" (Ki-mit-tud) component. This refreshing is also planned in a two-month interval and technology of that is the same as with the other parts.

Considering that (1) the learning and research material presented by the Almanac is the organic part of the map of competences of the tenderer, and (2), the transfer to online learning material is in the interest of the tenderer (the target groups are made up to a large degree of the tenderer's students), and finally (3), the tenderer maintains similar informatics devices on a routine basis which are similar to those requested in the tender (educational server, research group server, etc.), the personnel and object conditions of the maintenance of the project are given even from the initial phase of the preparation phase of the tender. Thus there is no need for additional devices, there is no additional financial or HR load included.

IV. PROFESSIONAL ESSENCE AND CONTENTS OF THE PROJECT

The professional essence of the project is the presentation of artificial intelligence as one of the major fields of informatics education. The representation has to serve the various levels of interests and IT expertise, and the interests of the

target groups are taken into consideration. The realization tool centers around a professionally well-defined, high-quality material of the Electronic Almanac that will later be expanded and regularly actualized.

The basic activities of the realization includes mapping the target groups' needs, informatics network design, incremental implementation (digitalization of multimedia development) as well as control with partial co-operation of target groups, further, regular thematic and expert actualization.

The main indicator of the result is the number of adapted and prepared modular learning materials and the number of students (and other users) using these informatics products.

A. Analysis of the expert field

The informatics tool described in the tender has the aim to find a constructive answer within a rapidly developing and changing informatics paradigm regarding how to present the topic of artificial intelligence and its latest research results most efficiently first to an expert audience, then to wider audience.

Currently the artificial information intelligent system is not the main goal of the informatics development, but only one of the tools. However interesting it may seem to create machines that imitate human behavior, this is not the primary aim of today's IT. Much rather, the aim is to create informatics services created to support various individual and group activities and by this, alleviate the physical, economic and cognitive load on the human user.

B. The content

The aim of this project is to create an Electronic Almanac introducing artificial intelligence to a wide range of audience, possibly raising interest of young people who are looking for a challenging field of informatics. The primary goal is not to create an e-learning tool with topics that are readily convertible credit points, nor a thematic lexicon, but an almanac-like collection of knowledge with various subjects to be regularly updated and refreshed.

The focal points of the Almanac are two digitalized multimedia textbooks in the field of artificial intelligence. The textbooks are the following:

- Artificial Intelligence: A Modern Approach [1]
- Neurális hálózatok, [2]

The core of the proposed system are the mentioned books along with the electronic, multimedia materials and annotated versions, further, the necessary rights for proper visualization of the electronic content (for the duration of the project Prentice Hall Publisher has agreed to the presentation of the translated material in turn for a fee).

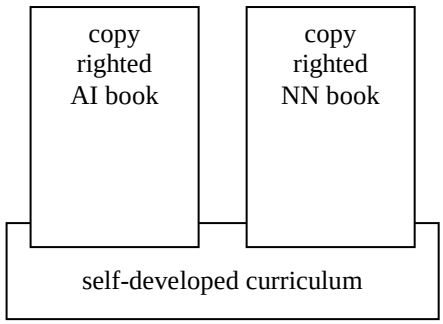

Fig 1: Module components of the learning material

C. Conceptual structure of the solution

The project is planning for the creation of two digitalized learning materials and electronically enriched module units, as previously described. Figure 1 presents the relationship of free copy right parts and parts that have been developed by us.

The concept of the results will be tracked from the point of view of a user. When sitting down to the book-like Almanac (Figure 2.), they can choose from the "Artificial Intelligence" e-book, the "Neural Networks" e-book, i.e. self-study, further information (GYIK), "Ki-mit-tud" (Who-knows-what) manual aiding creating connections between electronic components. All three components are amply illustrated with cross references, the "Neural Network" book can also be reached from the chapter dealing with neural network of the book "Artificial Intelligence". The underlined words, typical products, famous projects, i.e. experts are amply illustrated and stored either locally, or are available on the web. Certain references of concepts, products or experts will link the user to further references at the Artificial Intelligence social network portal, providing insight into discussions, fresh news, miscellanea and other features not coded in the general material. The underlying idea is that users interested in similar topics will find it easy to get in contact with each other or with the monitoring expert team.

The gist of the general interest provides the continuously maintained GYÍK system. Access

rights and discussion rights are gained by logging into the social network portal.

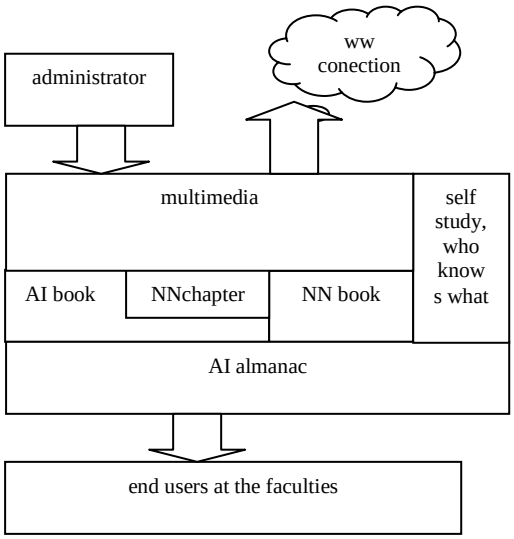

Fig. 2: Conceptual structure of the solution

A vital aspect of the Almanac is the valuable pedagogical input of the consortium partners gained through years of educational and research experience. This appears in the Almanac in the form of (tests, exam tasks and their solutions, practice exercises, demos, typical misconceptions, a list of national experts and their contact information, list of subjects taught at higher education facilities, interesting domestic research results, list of companies associated with artificial intelligence methods both with the country and with Hungarian interests, etc.).

V. CONCLUSION

This project is the results of a successful tender to the Social Renewal Operative Program in Hungary which offers grants for development of teaching materials and contents with special regards to mathematical, natural science, technical and informatics training. In various forms it is financed by the European Union. The goal of the project is to create a multifunctional Electronic Almanac that centers around two digitalized multimedia textbooks in the field of Artificial Intelligence. What the participants of the project set out to do was to create a tool that will serve as a learning material, an elaborate source of resources and information on various levels of informatics expertise – ranging from the highly professional user to the user who is simply interested in the topic. It is especially designed with regard to young people who have not yet clearly defined what fields of informatics they wish to be more involved with, to make them interested in artificial intelligence. It must be pointed out that legal issues such as copy right or free access to online materials have been sorted out. The authors hope that the finished tool will be made available to the public by 2012., thus enriching the scope of available expert online material.

A. System architecture of the solution

All components of the Almanac including the material of the digitalized books (along with the cross references and multimedia illustrations) are in DocBook form, and located on the HIK server of the Kempelen Farkas Digital Collection of Textbooks (HIK Kempelen Farkas Digitális Tankönyvtár server (http://www.tankonyvtar.hu/), as required by the tender. The materials stemming from educational experience are fused into the Almanac's chapters. The social network portal is operated on the server of the consortium leader (http://home.mit.bme.hu/) with the use of social network technologies that offer much more then the possibilities of the DocBook (social network content share, making contacts, e-learning, etc.). The relationship between the two systems is solved by cross references, so the user may reach all available information simply setting out from the two digitalized textbooks.

REFERENCES

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2. Electronic Commerce and Artificial Intelligence. E-commerce has developed stron gly in recent years, in 2018 China's online retail market scale. continues to expand, the online retail sales reached 9 trillion yuan, Among them, online retail sales of.Â Electronic Commerce(EC) refers to the use of the Internet and modern communication technology for. any form of business operation management or information exchange. The core of E-commerce is. What is Artificial Intelligence (AI): The intelligence demonstrated by machines is known as Artificial Intelligence. Know AI History, Types, Careers and how it works?Â Artificial Intelligence has grown to be very popular in todayâ€™s world. It is the simulation of natural intelligence in machines that are programmed to learn and mimic the actions of humans. â€œIn recent years, artificial intelligence, or AI, has gained a surge in attention from policy makers, universities, researchers, corporations, media, and the public. Driven by advances in big data and computing power, breakthroughs in AI research and technology seem to happen almost daily. Expectations, but also fears, are mounting about the transformational power of AI to change society. In this whirlwind of attention and development, terms are getting confused. â€œartificial intelligence,â€ â€œmachine learning,â€ and â€œdata scienceâ€ are often used interchangeably, yet they are not the same. AI is o Artificial Intelligence Artificial intelligence (AI) is the field within computer science that seeks to explain and to emulate, through mechanical or computational processes, some or all aspects of human intelligence.Â In the 1940s and 1950s, the first large, electronic, digital computers were designed to perform numerical calculations set up by a human programmer. The computers did so by completing a series of clearly defined steps, or algorithms. Programmers wrote algorithmic software that precisely specified both the problem and how to solve it. Machine learninganddata mining. v. t. e. Artificial intelligence (AI) is intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals, which involves consciousness and emotionality. The distinction between the former and the latter categories is often revealed by the acronym chosen. 'Strong' AI is usually labelled as AGI (Artificial General Intelligence) while attempts to emulate 'natural' intelligence have been called ABI (Artificial Biological Intelligence)