

Application of RFID & Artificial Intelligence in E-Learning

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Abstract: *Radio Frequency Identification (RFID) is a new generation of Auto Identification and Data collection technology which helps to automate business processes and Allows identification of large number of tagged objects like books, using radio waves. RFID Based Library Management system (LMS) would allow fast transaction flow for the library and will prove immediate and long-term benefits to library in traceability and security. The proposed System is based on UHF RFI readers, supported with antennas at gate and transaction sections, and library cards containing RFID-transponders which are able to electronically store information that can be read / written even without the physical contact with the help of radio medium. This paper presents the experiments conducted to set up RFID based LMS. & Artificial intelligence (AI) in e-learning has becoming the most challenging area Artificial intelligence (AI) supported e-learning systems on different kinds of courses and report advantages of artificial intelligent in education area. It seems that the future of education will generally depend on important, multidisciplinary research areas like artificial intelligence-learning software and the approach the role of Information and Communication Technology (ICT) is increasingly visible and has many applications in our routine*

Keywords: RFID, Library Management, e-learning, Artificial intelligence, Computer education, Intelligent software system

1. Introduction

RFID (Radio Frequency Identification) is the latest technology to be used in library theft detection systems. Unlike EM (Electro-Mechanical) and RF (Radio Frequency) systems, which have been used in libraries for decades, RFID-based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling? The libraries across the globe started to use RFID to speed up the self check in/out, to control the theft and to ease the inventory control in library. The barcode technology is slowly getting replaced by the RFID technology. The RFID tag does not have to be visible for detection. It can be read even when it is embedded in an item, such as in the cardboard cover of a book or in the packaging of a product. It can also store data such as stack number, accession number, book number, author information etc., but barcode is limited to just an identification number.

RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment (i. e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems) and distance from the item is not a critical factor except in the case of extra-wide exit gates. The corridors at the building exit (s) can be as wide as four feet because the tags can be read at a distance of up to two feet by each of two parallel exit sensors.

RFID in Library and Information Centre

A library is a collection of information, sources, resources, books, and services, and the structure in which it is housed. Apart from books many libraries are now also repositories and access points for maps, prints, or other documents on

various storage media such as microform (microfilm/microfiche), audio tapes, CDs, LPs, cassettes, videotapes, and DVDs. Libraries have materials arranged in a specified order according to a library classification system, so that items may be located quickly and collections may be browsed Efficiently

The following are the tasks to be performed in the library.

- 1) Circulation: handling user accounts and issuing/returning and shelving of materials.
- 2) Collection, development, order materials, maintain materials' budgets.
- 3) Technical Services work behind the scenes cataloguing and processing new materials and de accessioning weeded materials. Basic tasks in library management include the planning of acquisitions of materials,

Basic tasks in library management include the planning of acquisitions of materials, arranging the acquired materials according to the library classification, preservation of materials the de accessioning of materials, patron borrowing of materials, and developing and administering library computer systems. Among these, the proposed system will automate the following tasks using RFID technology,

- 1) To remove manual book keeping of records
- 2) Traceability of books and library members as they move
- 3) Improved utilization of resources like manpower, infrastructure etc.
- 4) Less time consumption as line of sight and manual interaction are not needed for RFID-tag reading.
- 5) To provide 2 meters read range antennas
- 6) To minimize the manual intervention
- 7) To minimize the manual errors
- 8) To provide the long lasting labels
- 9) To provide fast searching of books

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Interdisciplinary relevance

The present study is to see the working condition and also the nature of accessing the internet in this RFID Technologies and Information technology era.

Review of Research and Development in the Subject:

The study is very useful to know the use of library in the college and RFID Implementation in the library at the International level & National level.

Significance of the study:

The importance of the study is to know the RFID and its implementation in the college and presently the e-user are very much fast and quick in the access of library resources as well as internet sources and services.

Objectives:

- 1) To understand the use of modern RFID technologies in digital Libraries.
- 2) To know different types of technology involved in the Digital library activities.
- 3) LIS professionals will be in a better position to understand the current status of Information Technology
- 4) To understand the perceptions of Internet technology by students and teaching faculty of colleges
- 5) To understand the availability of infrastructure in the College Digital libraries.
- 6) To help to understand the implementation of RFID tools for providing effective information services in Libraries.

2. Methodology

The principle tools for data collection covering the college Survey and supported by the observation on the RFID applications in college libraries. Questionnaire survey is the most popular method of collecting data today. The collected data is analyzed, tabulated, interpreted, observation and informal interview with college librarians. & Data collected was then analyzed in term of various aspects related to the Study using the SPSS (Statistical Package for Social Science) Software. A Chi-Square test was also applied wherever required. The data was interpreted in terms of objectives defined. Same for findings and suggestions.

Benefits of RFID in Library:

Times saving, fast accessing of books and eliminating manual errors are the main benefits of the RFID in Library. Although RFID can be used in library anti-theft systems, this doesn't mean that it is a highly secure technology. RFID tags can easily be shielded by a thick layer of Mylar, a few sheets of aluminum foil, or even an aluminum gum wrapper, so that they won't be detected by the reading device. There is, however, some potential savings because a single tag serves many different functions. The library saves some time in processing new items because it only has to affix one technology to the item. It may also save some money due to the integration of circulation and security with a single vendor and into a single system.

Key benefits:

To Librarian:

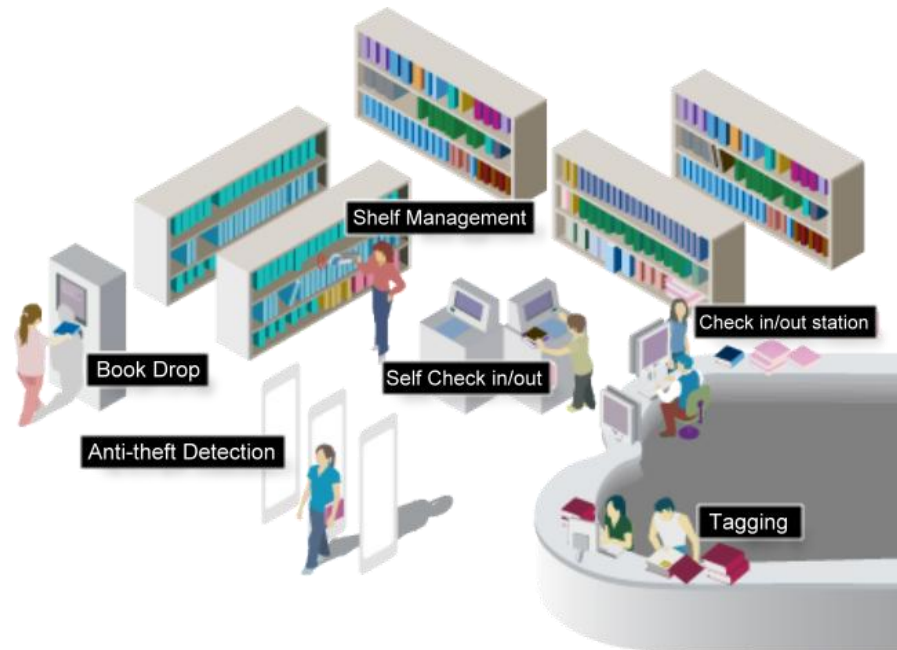
- 1) Speeds up book check-in / check-out
- 2) Frees staff to better service patrons
- 3) Better space planning
- 4) Increases membership rate

To Patrons:

- 1) Easy to use: books can be read in any orientation
- 2) Reduces queuing time
- 3) Provides patron privacy
- 4) Encourages patrons to come back



Library RFID Management System



Six Sentences about RFID For Library

- 1) RFID tags replace both the EM security strips and Barcode.
- 2) Simplify patron self check-out / check-in.
- 3) Ability to handle material without exception for video and audio tapes.
- 4) Radio Frequency anti-theft detection is innovative and safe.
- 5) High-speed inventory and identify items which are out of proper order.
- 6) Long-term development guarantee when using Open Standard.

Artificial Intelligence Applications

Artificial intelligence application through learning such as pilot course in an absolute figurative Space, so we can use this new science with precise planning.

Concept of Intelligent E-learning:

The new concept involves e-learning systems which use artificial intelligence methods and are equipped with intelligent two-way communication between the e-learning system and the user. According to the new concept, the e-learning system contains intelligent methods for analysis, evaluation and assessment of the user's knowledge and skills as well as e-learning process control, supervision and optimization. The communication system by input a natural language between the intelligent e-learning system and its users consists of intelligent mechanisms user identification, word and sentence recognition, sentence meaning analysis, and user reaction assessment. The intelligent e-learning system can be developed for personal computers as well as various mobile technology devices.

Artificial Intelligence Approach on E-Learning

The e-learning software, which was designed and developed by the authors have an intelligent mechanism for improving students' learning experiences. At this point, the main

objective of this mechanism is to determine appropriate digital materials that will be viewed along a possible e-learning activity process. In order to ensure that, two different artificial intelligence techniques: artificial neural networks and cognitive development optimization algorithm have been used in order to form a hybrid evaluation approach under the e-learning software. More details regarding to the intelligent evaluation approach can be expressed briefly as follows:

- 1) Artificial Intelligence-based evaluation mechanism is able to determine which material will be viewed next according to students' learning levels. In order to achieve this mechanism, each digital course material (lecture notes, exams, quizzes...etc.) have some importance points with the category tags defined by teachers
- 2) Along their e-learning activities, students can gain or lose some success points by viewing the provided digital materials. As it can be understood, different success points are gathered by the software in order to obtain learning level values for each student.
- 3) Categories related to the e-learning materials and learning level types for students are same values, which are typically subjects associated with the course given. So, it is possible for the teacher to define a new learning level type and also a new material category at the same time.
- 4) By taking the related explanations above, we can say that determining the most appropriate material depends on matches among low learning levels and categories meeting with these levels
- 5) Artificial neural network model is trained with training data set stored in infrastructure of the e-learning software. This data set can be updated with additional data sets given by teachers. As default, teachers are able to feed the model with examples of learning level output values according to different success point scenarios for the digital materials provided over the software.

E-Learning Software

The e-learning software is a web application, which has an easy-to-use, practical interface. Because of its highly flexible design, the software can be run easily over PCs, laptops, and also mobile devices. For e-learning scenarios, the software comes with three types of interfaces to which users can reach by using their own username and password. E-learning process experienced via the intelligent e-learning software. Teachers are allowed to form their courses, upload their course materials and perform any other activities regarding to management of intelligent evaluation mechanism of the software. In more detail, a teacher can revise intelligent evaluation function, define learning/category types, and also view students' performances along an educational time period.

Advantages of E-Learning

The advantages of intelligent e-learning systems using intelligent two-way communication input a natural language between the e-learning system and the user include the following:

- 1) More robustness against user's errors and more efficient realization, control, supervision and optimization of the e-learning process with the chosen level of supervision automation.
- 2) Improvement of the co-operation between a user and an e-learning system in respect to the richness of communication.
- 3) Achievement of a higher level of organization of a distance learning process.
- 4) E-learning decision and optimization systems can be remote elements with regard to an e-learning system. The letters grouped in segments are then processed by the word analysis module.
- 5) E-learning is more cost saving & cost effective than traditional learning;
- 6) Access by learners to teachers and immediate access to information
- 7) Helps students develop skills for self-directed learning.
- 8) Information can be displayed on a need to know basis.
- 9) By using learning style tests, e-learning can locate and target individual learning preferences.

- 10) Self-pacing for slow or quick learners reduces stress and increases satisfaction.
- 11) Confidence that refresher or quick reference materials are available reduces burden of responsibility of mastery.

E-Learning

E-Learning has many interpretations but in short it stands for learning by electronic means. This means learning not directly from lecture notes, books or face-to-face from teacher but through electronic means. Common forms are computer-based training and web-based lessons or on-line lessons. With the advent of advanced technology, lessons may be taken anytime anywhere. These lessons can be made more interesting using multimedia i. e. combination of text, graphics, sound and animation. Lessons can be delivered to the learner via various means e. g. PC, PDA, mobile phone and TV. E learning can be further categorized into formal lessons, which are structured, and informal means e. g. discussions, e-mail etc. The much talked about life-long learning through E-Learning includes both types of learning to help solve performance problems.

- 1) "There are two great the internet and education. By combining the two, e-learning will be the great equaliser in the next century. Individuals can now take charge of their own lifelong learning."
- 2) e-learning is a computer based educational tool or system that enables you to learn anywhere and at any time. Today e-learning is mostly delivered though the internet, although in the past it was delivered using a blend of computer-based methods like CD-ROM.
- 3) E-learning offers the ability to share material in all kinds of formats such as videos, slideshows, word documents and PDFs. Conducting webinars and communicating with professors via chat and message forums is also an option available to users
- 4) E-learning offers an alternative that is faster, cheaper and potentially better.
- 5) E-learning has followed suit to span the array of devices we use. In fact, e-learning developed specifically for mobile devices, such as tablets and smart phones.
- 6) E-Learning content includes the text and multimedia materials that are provided to learner

Traditional & E-learning Approach

	Traditional Classroom	E-Learning
Classroom	Physical – limited size Synchronous	Unlimited Anytime, anywhere
Content	PowerPoint/transparency/etc Textbooks/library Video Collaboration	Multimedia / simulation Digital library On demand Syn & Asyn. Communication
Personalization	One learning path	Learning path and pace determined by learner

Mobile Learning

M-learning" = mobile learning, Distance learning or e-learning:

Learning a reality = "anytime, anywhere learning"

M-learning is a model of training that blends electronic and distance education with portable mobile devices such as smart phones and hand-held computers

Technology currently available for m-learning

- Text messaging
- Electronic reading material
- Internet capability
- MP3 audio files (podcasts – radio talk shows – music, lectures, and audio books)

- Video cameras and video capability allowing for video tutorials
- Smart mobile phones (phones capable of MP3 music files and videos)

Teleconferencing

- Telephone or video meeting between Two or more individuals
- Utilizes communication network technology
- Some transmit pictures as well as the voice
- Audio Teleconferencing
- Videoconferencing
- Computer-Mediated (Web conferencing)

3. Conclusion

RFID in the library speeds up book borrowing, monitoring, books searching processes and thus frees staff to do more user-service tasks. But the performance varies with respect to the vendors of RFID readers and tags. The efficient utilization of the technology also depends upon the information to be written in tag. Developments in RFID technology continue to yield larger memory capacities, wider read ranges, and faster processing. It is for this reason that major simultaneously in which these technologies are evolving with the use of artificial intelligence, likewise evolve our society. Its behavior on the basis of the experience through the process of repetitive tasks and also have a notion of what is wrong and you can avoid it, is very interesting. Educational institutions should move to adopt e-learning systems along with their conventional teaching learning systems to a greater degree than is currently the case. Since such systems have wide acceptance both from instructors and students, expanding e-learning opportunities may be a way to maintain higher levels of quality in the teaching-learning exercise. Although many institutions are moving towards more e-learning, it should be given more emphasis. In particular, educational institutions should recruit instructors with high levels of ICT ability in order to encourage an environment more conducive to the migration of the teaching-learning system in the direction of e-learning and ICT expertise should implement training on ICT for such instructors in order to enable them to face the challenges of the future, particularly as they related to increased use of e-learning-based systems.

References

- [1] Hisaham S. Koutha, Reasoning methodologies for intelligent e learning system, International journal of Computing Academic Research. Oct 12, vol 1.
- [2] Andreessen (2008). Knowledge Management in E-Learning Systems. Revista Informatics Eco nr.2 (46), 60-65
- [3] Johnson (2000). Animated pedagogical agents: Face-to-face interaction in interactive learning environments. International Journal of Artificial Intelligence in Education, 11, 47-78.
- [4] Prakasam, Anagent-based Intelligent System to enhance E-Learning through Mining Techniques,

- International Journal on Computer Science and Engineering, Vol.02, No.03, 2010, 759-763
- [5] Weber, T: An Adaptive Versatile System for Web-based Instruction. International Journal of Artificial Intelligence in Education 12 (4) (2001) 352-384
- [6] "Role of artificial intelligence based technologies in E-learning" " Hemant Ranal", " Rajiv2", " Prof Manohar Lal3" " (University College of Medical Sciences, Delhi, INDIA. " IJLTEST – Volume I, Issue 5 (May-June 2014).
- [7] " Some recent work in Artificial Intelligence", "R. J. Solomonoff, member, IEEE", "Preceding of the IEEE", "vol.54, No.12 December, 1966"
- [8] "Applications of AI in Education", " by Joseph Beck, Mia Stern, and Erik Haugsjaa", " 5/3/2005.
- [9] Karen Coyle, "Management of RFID in Libraries", Preprint version of article published in the Journal of Academic Librarianship, v.31, n.5, pp.486-489
- [10] www.wikipedia. org-Library [last accessed on 20/2/2009]
- [11] Psion Teklogix handheld reader manual – www.psionteklogix. com [last accessed on 20/2/2009]
- [12] Mercury 4 RFID reader manual – www.thingmagic. com [last accessed on 20/2/2009]
- [13] UHF RFID – Libraries taking the next step into the future – www.Adilam. com. au [last accessed on 20/2/2009]
- [14] Kern, C RFID technology: recent development and future requirements Proceedings of the European conference on circuit theory and design ECCTD99, 30.08. –02.09.1999 Stresa, Italy 1999 1 pp25-28,
- [15] Finkenzeller, K RFID handbook, fundamentals and applications in contact less smart cards and identification 2nd ed NY, Wiley & Sons 2003