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HISTORY & DEVELOPMENT OF MOBILE TECHNOLOGY WITH EVALUATION OF MOBILE LIBRARY SERVICES: A PROPOSED MOBILE LIBRARY CARD (MLC)

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INTRODUCTION

The total population of the world at the end of year 2013 is 7.125 billion. Over 5.6 billion means 79.86% mobile users overall, in the world. Some countries in the European region now have more mobile phones than people. Meaning, the actual number of handset subscriptions in that particular country was bigger than the actual number of people living in it. Because continuously developing application according to the needs of mobile users. From first generation 1982 to 2008/2010 fourth generations, there are various mobile companies doing research & try to show how their devices are different from other companies. We found that there are two groups of mobile phone users; one is internet users & second is non internet users who's intention is only communicated & not to surfing the internet, because different levels of economic & social conditions. Other hand every service sector has developed mobile based websites & gives information about their services. This paper related to library sector & their mobile based services. Curtin library is the best example of mobile based library services. WorldCat in your pocket this is the second best example. As a starting point we can say that mobile library services should cover the total range of online library services already offered through traditional web interfaces. However, mobile users may not want to use certain library services on their mobile devices.

Many library researcher's findings suggest that library customers, at least academic ones, are willing to search for syllabus books and articles on their mobile devices. But they couldn't find because copyright issue, many e-books novel or fictions are available in e format without any copy write issue. But academic user's needs are different, in poor country academic users are not ready to use mobile for downloading e-books, because different types of handset, problems with internet connectivity in short social & economic problems. I would like to fill this gap using augmented reality application for developing wireless library network.

Objective

1. To develop a wireless library network & establish a link between physical & virtual world.
2. To prepare indexing of index file & establish a link between books to books in libraries.
3. To fill the gap between mobile technology & augmented reality library services.

Limitation

1. Mobile handsets will require the facility to attach Mobile Library Card (MLC), which I have proposed through this study.

LITERATURE REVIEW

Electric transmission without the use of wire had been observed in the eighteenth century. In 1831, Michael Faraday formulated the law of electromagnetic induction, which built upon the discovery of electromagnetism by a Dance, Christian Oersted. In 1835, Samul F.B. Morse demonstrated the principle of the electromagnetic telegraph in the USA. The first commercially successful telegraph line was introduced between Washington, DC and Baltimore in 1844. When Western Union founded in 1851, more than 50 telegraphed companies already operated in the USA. Experimentation accelerated during the American Civil War, which witnessed large-scale military use of electrical communication (1a). Heinrich Rudolf Hertz (1857-1894) a German physicist who was the first to conclusively prove the existence of electromagnetic waves by engineering instruments to transmit and receive radio pulses using experimental procedures that ruled out all other known wireless phenomena in 1865(2). In late 1895, Guglielmo Marconi transmitted wireless signals across a distance of more than a mile, an event that many historians consider the birth of radio. In the UK, Oliver Lodge succeeded in transmitting detectable Morse signals over a range of 150 meters (1b). The practical use of wireless telegraphy was made possible by Guglielmo Marconi (1874-1937, Italian inventor) in the closing years of the 19th century. By 1904 there were many Trans-Atlantic British ships equipped with wireless. The number of ships equipped with wireless grew rapidly after the *Republic* disaster. For example, at the end of 1909 the Marconi Co. Owned and operated 143 wireless stations on the high seas. By the summer of 1911, the number grew to 303 stations. By the end of 1912, there were 580 shipboard wireless installations. From 1899 to 1908, there were nine such events. In 1909 there were 18 rescues and in 1915, 35 rescues (3). From the 1920s to the end of the 1970s, the USA dominated wireless R&D. With the advent of the **1G era**, the Nordic countries and Japan caught up in terms of technological capabilities (1c). In 1933, (After the World War II) Edwin, Armstrong H. Introduced a wideband frequency modulation (FM) system that gave

clear reception in field tests, even through violent storms, and offered the highest fidelity sound yet heard on radio. The cellular concept becomes known at the end of the 1940s, but the key constituent technologies took year to evolve. Instead of a single technological “breakthrough”, many incremental developments in constituent technologies made the concept possible. The cellular concept did not emerge in the nation’s research universities, where wireless studies were rare and few until the launch of the cellular platforms, and where they remained ancillary to broader telecom studies. Nor was it an outgrowth of demand-driven technological improvements, or a result of basic research on radio frequency propagation and control. Rather, it drew from highly firm-specific competences and capabilities. Concurrently, functionalities have been upgraded from the primitive pre-cellular technologies to analog, digital and multimedia cellular, which will be followed by broadband platform. Overall, the wireless evolution comprises several transitions 1-**Wireless telegraphy**: Marconi’s commercial innovation (Wireless Telegraphy); 2. **Pre-cellular phase**: A. Emergence of AM wireless communications (US Police department). B. Transition to FM communications (defense forces) and the subsequent MTS and IMTS (consumer test markets) in America. 3. **Cellular phase** (dominant platforms) - A. **1G era (1983-1992)**: analog cellular (AMPS), B. **2G era (1992-2001)**: digital cellular (GSM), C. **3G era (2001-2008/10)**: multimedia cellular (W-CDMA), D. **4G era (2008/10-)**: broadband cellular.

Early, mobile services on June 17, 1946 in Saint Louis, Missouri, AT&T and southwestern Bell introduced the first American commercial wireless service (Mobile Telephone Service, MTS) for private customers. MTS concept relied on several key elements including narrowband FM channel, automatic Trunking, direct dialing and Full-duplex service. The first large scale commercial applications evolved between 1962 & 1964, when the improved Mobile Telephone Service (IMTS). Broad Scale market evolution has taken several years since the 1980s from Nordic countries, Japan & USA, these platform generations or more broadly, waves of innovation- have evolved from one dominant standard to the next and each technology has significantly improved spectrum capacity & the nascent 1G system relied on analog transmission for voice communication. The growth of the analog systems continued well into the mid-1990s worldwide. The process of Innovation evolved through three basic variations in the wireless industry. The first variation emerged in Bell Labs with the development of the cellular concept, including MTS, IMTS and eventually nationally (AMPS). The second variation involved Motorola’s R&D built on central innovation process initiated at the Bell Labs. **Motorola’s** own development of the cellular systems concept became public with the presentation of the DynaTAC Concept to the FCC. At the time Motorola’s primary interest was the design & manufacturing of FM mobile radio equipment it created mobile hardware for AT&T mobile radio systems and the equipment for some earlier cellular items. & third variation involved Ericsson’s R&D in this case; the sequence looked very much like that of Motorola, but was really quite different. In both cases, the innovation was first leveraged nationally and later internationally, just as it was subject to the corporate strategy, which was internationalized in the 1960s. In both cases, greater incentives and scope ensured a bolder R&D strategy. The difference was in the nature of the home base. Due to its small scale, Sweden provided more of a test market for Ericsson’s digital switch. Just as analog cellular (AMPS, NMT) had many advantages over the pre-cellular systems (MTS, IMTS), **digital cellular (2G era)** offered increased capacity due to more efficient usage of the spectrum. At the end of the 1990s, the story of the GSM commercialization is the story of Nokia’s wireless success. The project was dubbed the Great Software Monster by engineers debugging the slew of new applications required to support

such ambitious features as international roaming, Call forwarding, and SMS messaging. The first GSM call was made in 1991 in Finland with a Nokia phone with a Nokia-equipped network. **Nokia** was the first manufacturer to launch a series of hand portable phones for all major digital standards (GSM, TDMA, PCN, and Japan digital). Between 1997 and 2001, the number of DoCoMo's I-mode users soared from fewer than 11 million to more than 36 million. The cellular concept guided the evolution of technology platforms until the end of the digital cellular. The trend indicates an ongoing convergence into all-in-one desktop, mobile devices incorporating GPS navigators, satellite radios, MP3 players, mobile TV, mobile Internet, MVDER (vehicle black box), driving safety monitors, smart phones and even video games. With the coming of the 3G era, the internet concept emerged as a new dominant amalgam of intrinsic technologies, with new components- interconnected communication networks, common protocols, packet switching and routers. **BlackBerry** is a line of smartphone devices developed and designed by Research In Motion (RIM). The first BlackBerry smartphone was released in 1999. BlackBerry devices are smartphones, which are designed to function as personal digital assistants, portable media players, internet browsers, gaming devices, cameras and much more. They are primarily known for their ability to send and receive (push) email and instant messages while maintaining a high level of security through on-device message encryption. BlackBerry devices support a large variety of instant messaging features, with the most popular being the proprietary BlackBerry Messenger service. **Android** is a Linux-based operating system for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance, led by **Google**, and other companies. Android supports connectivity technologies, including GSM/EDGE, IDEN, CDMA, EV-DO, UMTS, Bluetooth, Wi-Fi, LTE, NFC and WiMAX. SMS and MMS are available forms of messaging, including threaded text messaging and now Android Cloud To Device Messaging (C2DM) is also a part of Android Push Messaging service. Android supports the audio/video/still media formats such as WebM, H.263, H.264 (in 3GP or MP4 container), MPEG-4 SP, AMR, AMR-WB (in 3GP container), AAC, HE-AAC (in MP4 or 3GP container), MP3, MIDI, Ogg Vorbis, FLAC, WAV, JPEG, PNG, GIF, BMP, WebP. Android does not support native video calling, but some handsets have a customized version of the operating system that supports it, either via the UMTS network (like the **Samsung Galaxy S**) or over IP. Video calling through Google Talk is available in Android 2.3.4 and later. Gingerbread allows Nexus S to place Internet calls with a SIP account. This allows for enhanced VoIP dialing to other SIP accounts and even phone numbers. Skype 2.1 offers video calling in Android 2.3, including front camera support. Multi touch and Multitasking of applications, with unique handling of memory allocation, is available on android. Android supports multiple languages & capturing a screenshot by pressing the power and volume-down buttons at the same time. Prior to Android 4.0, the only methods of capturing a screenshot were through manufacturer and third-party customizations or otherwise by using a PC connection (DDMS developer's tool). These alternative methods are still available with the latest Android. It also supports tethering, which allows a phone to be used as a wireless/wired Wi-Fi hotspot. Before Android 2.2 this was supported by third-party applications or manufacturer customizations. Most Android devices have external storage media such as USB flash drives and USB HDDs,

Google purchased the initial developer of the software, Android Inc., in 2005. The unveiling of the Android distribution in 2007 was announced with the founding of the Open Handset Alliance, Google releases the Android code as open-source, under the Apache License. The Android Open Source Project (AOSP) is tasked with the maintenance and

further development of Android. Google Play is a **digital-distribution multimedia-content service** from Google which includes an online store for music, movies, books, and Android applications and games, as well as a cloud media player. The service is accessible from the web, Play Store mobile App for Android and Google TV. Purchased content is available across all of these platforms/devices. Google Play was introduced in March 2012 when Google rebranded and merged its predecessors **Android Market** and Google Music services. The present paper addresses for android operating system to add IIF (Indexing of Index File) with MLC (Mobile Library Card) features for Organizing & distribution of digital multimedia content service of wireless library or libraries network through a mobile phone for augmented reality application.

MOBILE LIBRARY CARD (MLC)

MLC (Mobile Reserve Card) is external storage media to the mobile with wireless Support software having updating facility by attaching to the library server. Library or library network will issue such card to its users for improving library service. Users will use this card as an augmented reality application on their mobile phone without using internet. The only thing is that mobile handset required attaching facility.

Each MLC has its unique number it can be changed according to changes by MBR (Main Books Recorder) requirement only. Those libraries will agree to provide this service they can participate in library network. Each library has a unique ID in MLC. Users of one library can see the records of other library. Each library must require entering their bibliographic details in MLC.

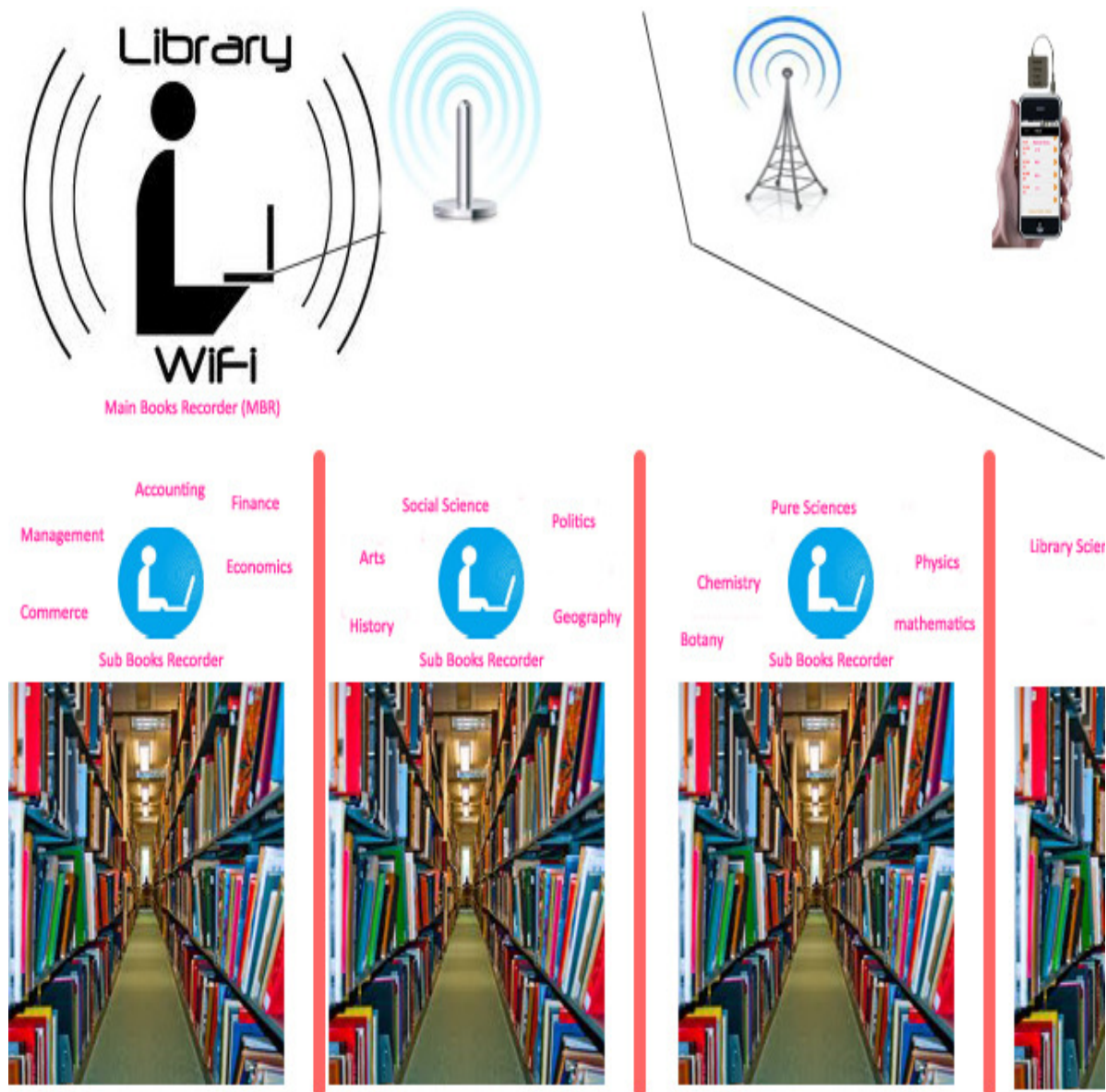


Benefit of MLC

1. Users need not to required recharge of the internet for searching, full text books or information.
2. Users can easily understand which types of collection available in which library.
3. Users have 24 hours to see MLC & give maximum time for selecting their books.
4. It will help to improve reading habit of the society, if public library or libraries network will provide this service.
5. It helps to prove the concept of “Books are open to all” and library will get success to reach each and every home or individual person.
6. At the end of every year it will be easily updated.

- Users will reserve their required book either taking help of MBR (Main Books Recorder) or directly, they can reserve themselves in the system before entering into the library.

For giving augmented reality library service it required following infrastructure



Main Books Recorder

MBR (Main Books Recorder): this task will assign to any library staff. MBR is the mediator between the users & SBR (Sub Books Recorder). If a library has different sections of book collection, in this case MBR will require handling the process of MLC. Role of MBR

- To updating of MLC
- To provide information about whether books are ready for reservation condition or not, give messaging on users mobile.

3. To soul users query of how to use of MLC.
4. To give a unique ID number to MLC & Maintain unique number of libraries & their network.
5. Controlling on (SBR) Sub Books Recorder of the library & co-operation among them.

SUB BOOKS RECORDER

SBR (Sub Books Recorder): a person who actually works individually in a subsection or special subject areas. He/she wills responsible for making books entry in IIF & compilation of the technical process of new books, and make it available for Issue / Return transactions.

Role of SBR

1. To make entries in IIF
2. To enter bibliographic details in library software
3. To compilation technical processing of books. E.g. tagging, pocketing, labeling etc.
4. SBR responsible for problems created in his/her individual subject area assign to them.

IIF will maintain by SBR (Sub Book Recorder). All collections, including books, Journals & Non Print Material (CDs & DVDs) cover in his/her area; they have made entries in IIF. IIF will help to maintain information about each word of the book means one word came in, which documents, that documents comes under which main subject, and also page number provide. Means there are many such words which come in different subject, different documents, different purpose, and different page so this whole data provide it to the right users at the right time in right format it may be full text in PDF or JPG if photo or images & video through this file. Bibliographic file & IIF excluding file format modules store in MLC. So users can only view information & can not be copied or download so this way large number of spaces can be saved in MLC.

E.g. following books are newly entered at SBR desk:

1. The 7 principles of Brand Management. By Gupta, Nitish Rai
2. Personal Branding. By Peter Montoya
3. Marketing Management by Kotler, Philip
4. Advertising: principles & practice by Wells & William

SBR has to follow the following process for entering data In IIF.

- I. Title of the book has to type in the bibliographic file for generating unique number.
- II. After completion of title entry in bibliographic file. SBR has to enter all indexes of book in this file using appropriate alphabets by choosing book option. E.g. book number 1 has following index:-
 - i. Absenteeism campaign 57
 - ii. Adolph Dassler 17, 18
 - iii. Apple 3, 108
 - iv. Beauty 5
 - v. Brand builder 5
 - vi. Cash management 21

- III. Make cross entry by giving key as a keyword.
- IV. E.g. in the above index “Absenteeism Campaign” entering in the IIF file under “A” alphabets, then SBR requires to scanning page number 57 & attach at the file format option of this file (It may be JPG, PDF, PNG,etc..)

INDEXING OF INDEX FILE (IIF)

Indexing of the index file is nothing but the **interconnection network or linking between all pages of book collection or different type collection of one library or many libraries.**

Indexing of index file

Books							
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z						

Figure 1

Journal							
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z						

Figure 2

Audio/Video CDs or DVDs							
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z						

Bibliographic file

BIDN	Author	Title	Publisher	Place	Date	Subject
0	Gupta, Nitish Rai	The 7 principles of Brand Management	Tata McGraw Hill	New Delhi	2011	Branding
1	Montoya, Peter	Personal Branding	Jaico	Mumbai	2008	Branding
2	Kotler, Philip	Marketing Management	Pearson	Dorling Kindersley	2007	Marketing
3	Wells & William	Advertising: principles & practice	PHI Learning	New Delhi	2008	Advertising

BIDN (Bibliographic Identity Number) generated automatically at the time of feeding entry in the bibliographic file. This is unique number dedicated to unique title. This number

helps to the programmer at the time of searching, selecting the title option by users. When users have select keyword option that time RRN (Record Related Number) generate in IIF & BIDN (Bibliographic ID Number) will select by programmer & will give detailed information on user desktop.

Indexing of Index File (IIF)

A

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	O	GNR	Absenteeism Campaign	Campaign	57	22515	72xm902 M2	Text file PDF
2	O	GNR	Adolph Dassler	Dassler	17, 18	22515	72xm902 M2	
3	O	GNR	Apple	-	3, 108	22515	72xm902 M2	

B

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	1	PM	Backstreet Boys	Boys	22	13283	-	Text file PDF
2	O	GNR	Beauty	-	5	22515	72xm902 M2	
3	3	WW	Brand	Transformation	111	13298		JPG

Cross entry

T

RRN	Bibrec	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
3	3	WW	Transformation	Brand	111	13298		JPG

C

RRN	Bibrec	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	O	GNR	Cash Management	-	21	22515	72xm902 M2	
2	O	GNR	Campaign	Absenteeism	57	22515	72xm902 M2	-

2. Marketing Management by Kotler Philip

RRN	Bibrec	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	2	GNR	Absenteeism Campaign	Campaign Text file	57	22515	72xm902 M2	PDF
2	2	GNR	Adolph Dassler	Dassler	17, 18	22515	72xm902 M2	
3	2	GNR	Apple	-	3, 108	22515	72xm902 M2	
4	2	GNR	Beauty	-	5	22515	72xm902 M2	

EXAMPLE:- Mahatma Gandhi

A person who wants to show his grandfather photo along with Mahatma Gandhi to his friends, but he does not know title & author of the book, only one copy is available in the world & it cannot be borrowed. A person is living in Russia & book is available at the RRR library in India. But the person is a member of RRR library & he has MLC (Mobile Library Card) provided by the RRR library. In such case the person can show his grandfather photo to his friends if his mobile has facility to attach his MLC.

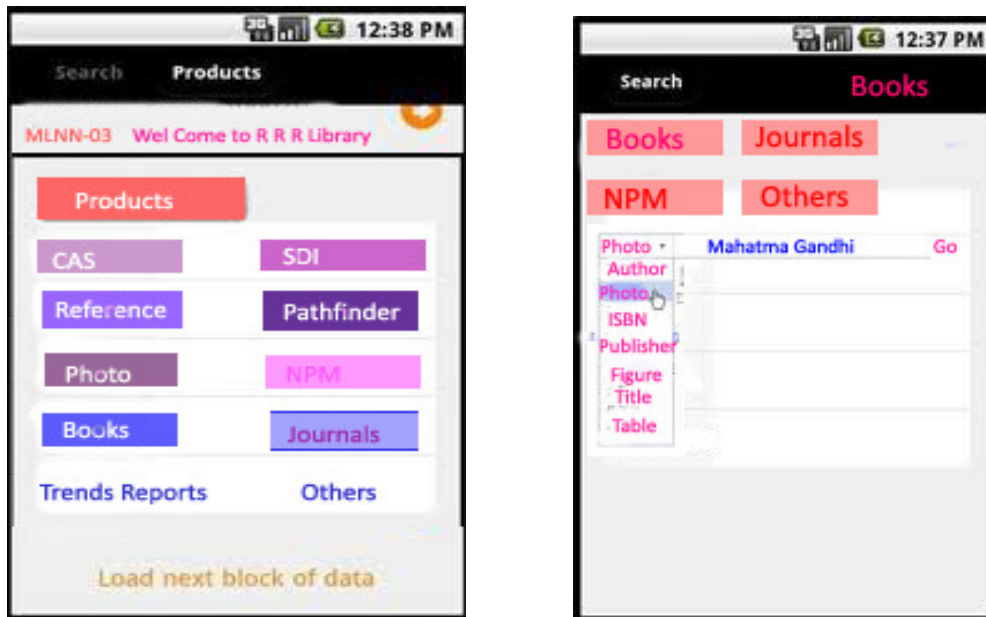
How? See below



Image (1): MLC Attach to Mobile



Image (2): Select RRR Library



M

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	O	M1	Mahatma G	photo	7,8,11,16	22515	72xm902 M2	JPG
2	1	M1	Mahatma G	-	51, 52, 53	45414	72x M8	
3	2	M1	Mahatma G	-	1, 2, 4, 6,	38369	72x N3	
4	2	M2	Mahatma H.R	-	119	25589	72x N3	

Figure 3

Cross entry

P

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no	File format
1	0	M1	Photo	Mahatma G	16	22515	72xm902 M2	JPG

EXAMPLE:- Mahatma Gandhi

M

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no
1	0	M1	Mahatma G	photo	7,8,11,16	22515	72xm902 M2
2	1	M1	Mahatma G	-	51, 52, 53	45414	72x M8
3	2	M1	Mahatma G	-	1, 2, 4, 6,	38369	72x N3
4	2	M2	Mahatma H.R	-	119	25589	72x N3

Figure 4

Cross entry

P

RRN	BIDN	IIFID	Keyword	Key	Pages	Acc no	Call no
1	0	M1	Photo	Mahatma G	16	22515	72xm902 M2

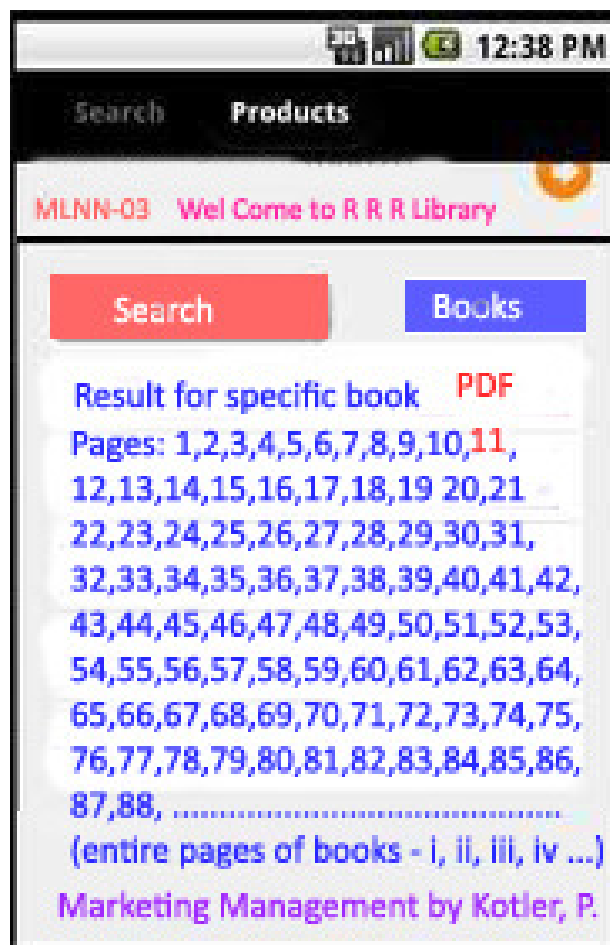
Figure 5

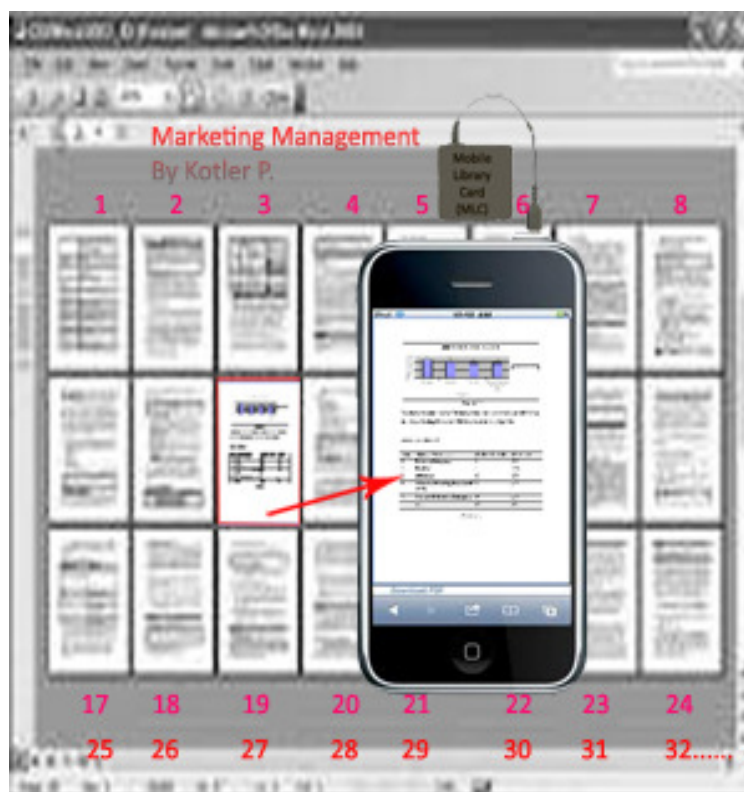
In above example:

If a particular user wants to create a pathfinder on Mahatma Gandhi, then this file helpful for those types of user to create an automatic pathfinder within few minutes. If the user selects pathfinder option, and enter Mahatma Gandhi then programmer search “M” alphabet in the Indexing of Index File (IIF). Then that file each record has unique number means Mahatma Gandhi has Unique number that called IIFID (Indexing of Index file ID number), if there are someone else also mahatma then that IIFID number will change. Programmer search only Mahatma Gandhi simultaneously Biographic ID Number (BIDN) also finds out Bibliographic records file that help title, author, publisher and other records which is stored in bibliographic file.Means how many books have information about Mahatma Gandhi and which page number, this information displayed on a mobile user. In this example mahatma Gandhi is keyword if there is a sub key also in book indexes, then that key again become main keyword and Mahatma Gandhi will sub key this type of entries called cross entry. It's helpful for those user their needs only search mahatma Gandhi photo so there are 100 books written on Mahatma Gandhi but only Five books have mahatma Gandhi photos. So only five books result will display on the users mobile. Because Mahatma Gandhi has a unique number, but their RRN (Related Records Number will change) number will change according to their special or variety of information stored in those books. It is helpful for avoiding unnecessary books. And wastages time, so it is helpful for providing the right information to the right user at the right time.

Example: Student wants to read a full text book by Philip Kotler, Marketing Management at their homes, yes library service can give such types of services without conflicting copyright issue. Because this IIF file can generate all textbooks in e-format through a scanning process, but each page has different PDF with different bibliographic records. The student has to read one by one page or selecting page by clicking on the page number link. After clicking next page, previous page automatically terminate so it cannot be copied, paste or download option. It will provide from particular library server to MLC. Only Bibliographic records have stored in MLC not all types of file format. Even library staff cannot also have generated all scans, copy in one PDF. In short all scan, copy cannot be available at one time at one result, but students can read all textbooks at their homes on mobile phone using MLC.

The following image shows the result of Marketing Management By Kotler. All pages available in different PDF in different bibliographic records, PDF files are in server of library & the bibliographic file in MLC. If the user has clicked on page number 11, so MLC inform this instruction to library server & server will display PDF on user mobile through MLC. In this process users have not an option of copy, paste or download etc. same things happen with library staff who handled all this process, he/she cannot also generate all text books. So authors need not to worry about their copyright issue. & other hand user can view all textbooks without visiting the library. That is why this is an augmented reality application.





This is result file of Marketing Management, these results generated at the time of searching on the server of library software, but the user can view only one page after click on a particular page, if user wants to see next page, previous page will terminate it has not facility to download, copy and paste etc.

CONCLUSION

This is true that the number of mobile users is increasing day by day, “Books are open to all”, and still day by day reading habits has decreased. The aim of this study is that to give reading culture to the mobile world, including non internet users because numbers of mobile non internet user are very high & other hand library can maximize utilize their valuable collection. But cooperation from mobile companies is also valuable for library to increase library service through mobile phones.

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