

# E-Lib Digital Library Management System using Flutter and Dart

Mamata Rajput<sup>1</sup>, Rutuja Dhanorkar<sup>2</sup>, Shivani Nirmal<sup>3</sup>, Manisha Ubarhande<sup>4</sup>, Aniket shahade<sup>5</sup>

Student, Department of Information Technology<sup>1,2,3,4</sup>

Professor, Department of Information Technology<sup>5</sup>

Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Maharashtra, India

**Abstract:** This research aims to see the implementation of the digital library application made using Flutter and dart. In the day-to-day life, people who are interested in reading books face many problems of carrying the books along and also not even every time possible to go to libraries. Hence, to overcome this problem we propose this model of “A digital E-library management system” which is an android application. The E-library management system which serves the purpose of a virtual library that users can carry anywhere, anytime. This application contains several different genres of books well processed, and systematically arranged. Method used for the implementation of the application are flutter and Dart The motive of this technology application is to create a taxi provider library for engineers running Android and iOS, the usage of Dart Object-Oriented Programming, Dio, and Retrofit. Design of a visual interface to gaining access to particular functionality from the library and create Android and iOS apps from its projects requires accelerating software development. consequently, the high- quality answer is for the designer to apply it. Flutter is an open-source SDK for enhancing high performance with the most reliable mobile apps for iOS and Android, primarily based on a single code base. Use for downloading providing certain information on the web service. All communications made via the REST API using the HTTP application only.

**Keywords:** Digital Libraries, Flutter, Dart, Retrofit, REST API

## I. INTRODUCTION

When we talk about the resource of knowledge the very first thing that comes into mind is the library. It is very certain libraries have been the only and profound resources of knowledge right from ancient days, In the ancient days a library means a building or room where the collection of different types of books or information resources are managed or stored to help the readers to get the required information and it is not for a sale .but this type of traditional library faced some problems like appoint the staff which is costly and required humans resources in the physical library, books cannot be used simultaneously only one at a time, physical libraries are limited to storage, library resources can not avail twenty-four by seven , also readers of the physical library need to go to the actual library often which can lead to overcrowding of the library so due to the global pandemic like the situation is not possible to go to libraries and the readers facing a problem of carrying the books along so the solution of this above problems of the traditional library we design digital library management system . A digital library is the extension or renovation of traditional libraries. A Digital library is converting the written book into digital format or archive files of the organization's database so the interested reader who wants to read the book can read the book through computers, mobiles the presence of an e- library should be used because it saves and makes readers more efficient by time because the readers himself does not need to be literally in the library, the readers can access the book by phones online so we design This project is an android application which full fills almost all demands of a reader. This app contains hundreds of books well processed, and systematically arranged. Books are categorized as per the languages so that reader can easily identify their native language and access the book easily. The app provides the facility of putting the books on the shelf i.e. those books which are put on shelf will appear in the forefront on the first page for ease of access. The app uses the latest technology Flutter for overall UI and Backend purposes. The data is well processed and fetched from remote server storage. those users who are interested in reading premium books can have the facility of taking a membership which is the paid one and hence this app also includes e-commerce. By keeping the UI simple and attractive the app gives the user a feel of having books indeed in their hands. To sum up, all things mentioned above, that project is an e-Library management

system that serves the purpose of a virtual library that users can carry anywhere, anytime, and access the all-new features easily and efficiently

## II. LITERATURE SURVEY

For the implementation of the digital library, we did a literature survey, we studied more than 20 research papers overall. It helps us to know earlier research and literature related to an e-library research problem, and also know about various new technology which we can try to utilize for our project

Paper Number	Technologies Used	Methodology Used	Advantage	Result
[1]	<ul style="list-style-type: none"> <li>Machine learning,</li> <li>Artificial Intelligence</li> <li>Open-Biblio browser</li> </ul>	<ul style="list-style-type: none"> <li>Collect raw information</li> <li>Title summary based on Dameraul event in distance algorithm.</li> <li>Use Dewey Decimal classification system</li> <li>Book similarity information based on extensive knowledge of textbooks</li> <li>Apply support vector machine (SVM) training from multiple data sources to a single source of information.</li> </ul>	<ul style="list-style-type: none"> <li>Saves time and Energy.</li> <li>Increases the user-friendliness and the great success of the library.</li> </ul>	<ul style="list-style-type: none"> <li>This paper pursues to develop an Open-Source Automated Library System by book recommendations with an integrated approach used in a small library system.</li> </ul>
[2]	<ul style="list-style-type: none"> <li>SV (semantic web) annotation tool</li> </ul>	<ul style="list-style-type: none"> <li>Creating an annotation for the construction of document C (comment preparation)</li> <li>Specification of categories of shared information</li> <li>The identification of a document or piece.</li> </ul>	<ul style="list-style-type: none"> <li>Allows error to be easier spotted</li> <li>More critical thinking on any subject.</li> <li>Created better automated systems for your website.</li> </ul>	<ul style="list-style-type: none"> <li>This article introduces the Annotation Tool for Collaborative Activity) annotation plug. design is based upon the context of ANT-COW</li> <li>Support talks among users of the e-library library developing texts and annotation index in terms of social classification user interaction may result in new text.</li> </ul>

[3]	<ul style="list-style-type: none"> <li>Machine Learning</li> </ul>	<ul style="list-style-type: none"> <li>Use of VADER Lexicon, sentiment intensity analyser</li> <li>Reading data-set consisting of book reviews.</li> <li>Getting the polarity and accuracy scores</li> <li>Printing the classification report revealing the confusion matrix</li> </ul>	<ul style="list-style-type: none"> <li>It is useful for understanding students' attitudes and behaviour in the learning process.</li> <li>Provides the importance of the wisdom of reading student reviews.</li> <li>Ensure that the learner acquires a general knowledge of the subject.</li> </ul>	<ul style="list-style-type: none"> <li>In large institutions the data collection of resources is generate, this data can be used to advantage the student's learn style through professor.</li> </ul>
[4]	<ul style="list-style-type: none"> <li>Big Data</li> </ul>		<ul style="list-style-type: none"> <li>The study of surveys and institutions in this article helps in identifying real life scenarios.</li> <li>The major part focuses on Big Data usage in Digital libraries which provides a readymade analysis over technology.</li> </ul>	<ul style="list-style-type: none"> <li>This paper focuses on the advancement of digital libraries in the field of Big Data.</li> <li>In terms of services, digital library resources must be developed with switching resources as of a standard idle model to an active, automated, and personalized model.</li> </ul>
[5]	<ul style="list-style-type: none"> <li>Machine Learning - SVM, CNN, RCN</li> </ul>	<ul style="list-style-type: none"> <li>Text Pre- processing</li> <li>-cleaning input data i.e., removing other stuff than text from it, and into separate words.</li> <li>Calculating similarities using different methods.</li> <li>Calculating accuracy.</li> <li>Generating subjects from input data</li> </ul>	<ul style="list-style-type: none"> <li>The article provides small description of related work done previously on the topic, which is helpful.</li> <li>Accuracies of different classifiers are mentioned clearly.</li> <li>Processing is shown via examples of both English and Arabic languages.</li> </ul>	<ul style="list-style-type: none"> <li>This article gives a proper stepwise procedure to make a recommender system.</li> <li>Different classifiers are used to process data which ultimately improves the result.</li> </ul>
[6]	<ul style="list-style-type: none"> <li>ERMS- through an open source software "Calibre"</li> </ul>	<ul style="list-style-type: none"> <li>Since platform independent, the installation of this app is easy.</li> <li>Download .exe file</li> <li>Provide path</li> <li>Add books, and use other features</li> </ul>	<ul style="list-style-type: none"> <li>The software introduced in this article is platform independent.</li> <li>The article provides knowledge of different file formats of an e-book</li> </ul>	<ul style="list-style-type: none"> <li>This article introduces an ERM system for the management of e-resources in the Digital Library through software named Calibre. The software itself acts as an e-library and covers almost all features of an e-library.</li> </ul>

## II. PROPOSED METHODOLOGY

To write independent platform code shared between android and ios via flutter in this case install flutter to the system. Dartprogram language uses by flutter to create components and contains JSON to perform basic network functions .and MYSQL is for creating and modifying the data for admin Following is the details of proposedmethodology For the cross-platform library application we use the following methodology as per the flow:

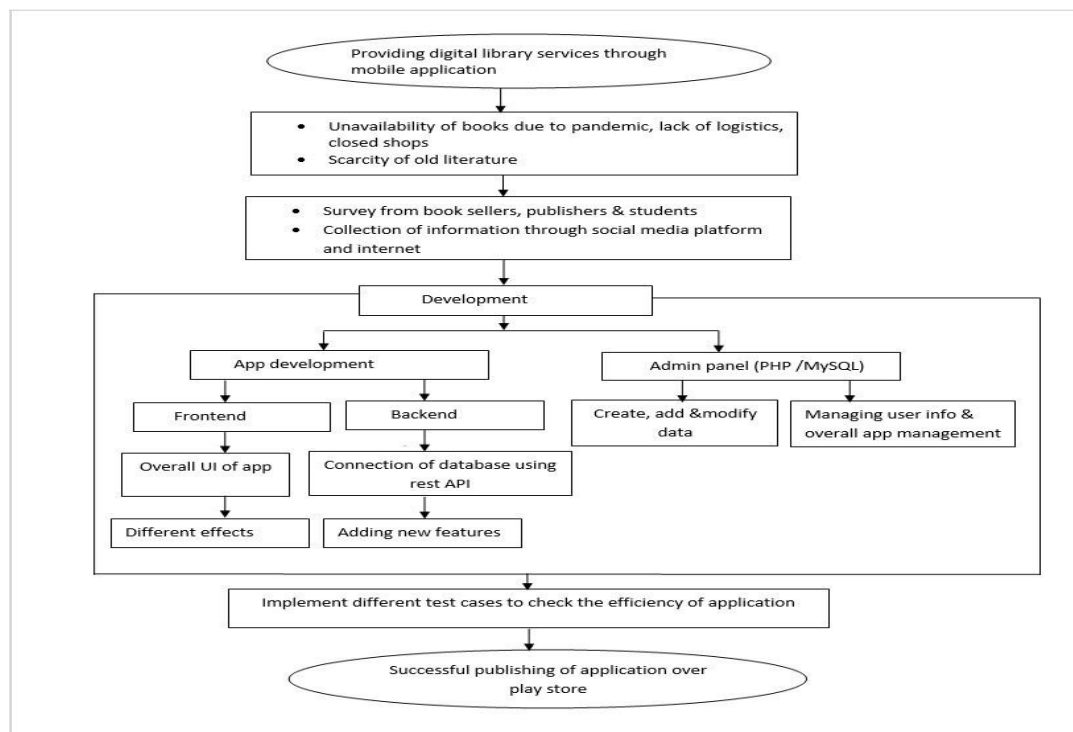


Fig (iii) proposed methodology

### Flutter

Flutter known for multi-platform framework aimed at develop highly efficient mobile applications. Besides working on flutter apps for Android and iOS and works on Fuschia. Flutter makes use of a very efficient rendering engine to give every part its own view. This allows you to create applications that behave just like native application. so on this application for making UI and giving functionality to our application.

### Dart

In Flutter, all requests are made using Dart. Dart programming language developed and maintained by Google. This is widely used within Google and tested to exist expertise in developing large web applications, which include AdWords. Initially the Dart became upgraded to install and implement JavaScript

### JSON

JSON or JavaScript Object Notation is an open text-based standard designed for the exchange of readable human data.JSON is thebest data sharing tool of any size even audio, video, etc.JSON is the most advanced APIS file format for web development application use json for books are store in the server in JSON format.

### **MYSQL**

This is an open-source software, maintained by Oracle Company. As compared to Microsoft SQL Server and Oracle Database it is a fast and easy-to-apply database management system. Often used along with PHP scripts to create powerful and flexible server or web applications.

### **PHP**

PHP HypertextPre-processor is a programming language that enables web developers to create compelling content to interact with information sites. PHP is primarily used for web application development.

### **REST API:**

REST (Representational State Transfer) is a architectural style that defines a set of criteria that will be used to create web resources. The REST API are a simple and flexible way to access web services without processing. It is used for downloading or providing certain information on the web service. All communications made via the REST API use the HTTP application only.

### **BOOTSTRAP, HTML5, CSS3:**

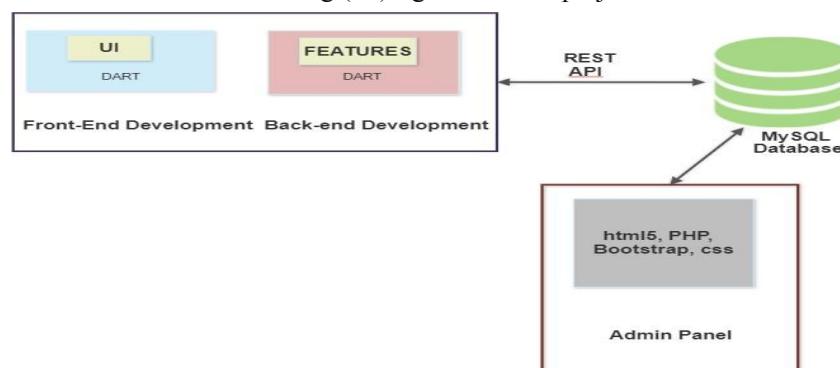
It is used for making the admin panel for create and modify the books related data managing user information and overall application

## **IV. IMPLEMENTATION**

### **Front End Development**

In the designing and implementation of the digital library management system using flutter and dart language. Generally, creating a mobile app is a complex and challenging task. There are many frameworks available, which provide excellent features for developing mobile applications. To improve mobile applications, Android offers a native framework based on the Java and Kotlin languages, while iOS offers an Objective-C / Swift language-based framework. So, we need two different languages and frameworks to improve applications for both OS. Today, overcoming these difficulties use flutter. Flutter is a free UI framework and open-source Google for creating mobile apps. The main development work is done in the Flutter framework, dart language. Front-end UI and features are created using dart. Hence, more than half of the back-end also created using flutter and dart.

Fig (IV) organization of project



Launched in Flutter 2017, Flutter enables developers to create mobile apps for iOS and Android using a single codebase and programming language. This feature simplifies and speeds up the creation of applications for iOS and Android. The Flutter framework contains both a software development kit (SDK) also a widget-based user interface library. This library contains a variety of reusable user interface items, like slides, buttons, and text

input. Developers who create mobile apps on the Flutter platform will do so usage of a programming language known as Dart.

Dart using syntax similar to JavaScript, Dart is a type object programming language focused on improving end –use. DartIn Flutter, all requests are written using Dart. Google developed and maintained a programming language known as Dart.it is widely used by Google and has experience developing large scale web applications such as AdWords. Dart becomes originally upgraded to install implement javascript. Therefore, it uses many important features of the next level of JavaScript(ES7), such as keywords "async" and "wait". Still, it is tempting developers unfamiliar with JavaScript, Dart hav Java-like syntax. The Flutter app is being updated a viewing tree throughout the new framework and even a small amount of other systems that make use of active viewing. These actions lead to the disadvantage is that lots of things, that may live in one frame, will be built. As Dart modern planning language, developed to manage this situation at the level of memory with the help of "Generational Waste Collection".

#### Connection Between Database and Application

Flutter's Retrofit be an easy technique to call rest APIs. For app development first, create a library for download data online is required for mainly applications Flutter contains a network and JSON configuration for basic network operations, as well as a link to the rest of the server usage but very difficult to utilize while managing certain advanced features. By comparison, Dio provides an intuitive API for performing advanced network tasks with ease

It uses function such as connectors and default alternative and is readable. Dio offers simplicity. It includes a totally intuitive planning API. but, building great Flutter apps may be painful if designer don't use correct layout patterns. To resolve this problem any such patterns is the Business Logic Component pattern. Simply put, a Bloc does two things: it Connects a data source to a user interface. Update the user interface as situation change. To call Rest API's through submitting dynamic titles, restrictions, request and feedback in a customized and secure manner, "Retrofit" is the excellent option. With this measurement method, Retrofit automatically converts the JSON response into a Dart object.

#### Storage:

MySQL is used to create and manage databases. The websiteis stored on a remote server. MySQL Server is the heart of the MySQL website. This server can be used as standalone program and managing all instructions, statements, or instructions for the website. often used in with PHP scripts to build a strong and flexible server-side or web-based business applications MySQL build a website where can create multiple tables to store and manage data and define relationships between each table. Clients perform queries with a graphical user interface screen or by commands using MySQL's specific SQL statements. Subsequently, the server application repllies to the requested words and convey the applicable end result on the user side. The graphical user interface of MySQL is easy to handle. However, ensuring Graphical user interface simple and easy to use makes your data management tasks quicker and simpler

The database stored on the remote server can be manipulated using a dedicated website called admin panel, which is created using php,html5, bootstrap and css. It is managed by admin only.

#### V. CONCLUSION

This study has recognized that digitization is an important function in current libraries. If the library is alive to present challenges, must be digital, that is, provide digital content and services. ways to search for information and improve access to the library resources. It is very important for library managers The mobile library app is



an additional and important feature use of mobile technology to transform library resources in simpler and better access mode by providing assistance in various ways through e-services and connectivity

### REFERENCES

- [1]K.Puritat and K. Intawong, "Development of an Open Source Automated Library System with Book Recommendation System for Small Libraries," 2020 Joint International Conference on Digital Arts, Media and Technology with ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (ECTI DAMT & NCON), 2020, pp. 128-132, doi: 10.1109/ECTIDAMTCON48261.2020.9090753. [2]G.Lortal, M. Lewkowicz and A. Todirascu-Courtier, "An annotation service for e-library: enhancing collaborative reading," 2006 International Conference on Service Systems and Service Management, 2006, pp. 25-29, doi: 10.1109/ICSSSM.2006.320583.
- [3]G. S. Deo, A. Mishra, Z. M. Jalaluddin and C. V. Mahamuni, "Predictive Analysis of Resource Usage Data in Academic Libraries using the VADER Sentiment Algorithm," 2020 12th International Conference on Computational Intelligence and Communication Networks (CICN), 2020, pp. 221-228, doi: 10.1109/CICN49253.2020.9242575.
- [4]A. L. Beena and H. Kabir S., "Defence Mechanism for DoS Attack in Digital Library (Using Citation Network)," 2019 International Conference on Intelligent Computing and Control Systems (ICCS), 2019, pp. 1065-1068, doi: 10.1109/ICCS45141.2019.9065625.
- [5]Y. Zhao and J. Zeng, "Library Intelligent Book Recommendation System Using Facial Expression Recognition," 2020 9th International Congress on Advanced Applied Informatics (IIAI-AAI), 2020, pp. 55-58, doi: 10.1109/IIAI-AAI50415.2020.00021.
- [6] F. Hao and F. Liu, "Research of Hadoop-Based Digital Library Data Service System," 2017 9th International Conference on Intelligent Human- Machine Systems and Cybernetics (IHMSC), 2017, pp. 85-88, doi: 10.1109/IHMSC.2017.26.
- [7] Li, S., Jiao, F., Zhang, Y. and Xu, X., 2019. Problems and Changes in Digital Libraries in the Age of Big Data From the Perspective of User Services. The Journal of Academic Librarianship, 45(1), pp.22-30.
- [8]F. Xiao et al., "Research and Design of Digital Library Based on Virtual Reality," 2019 IEEE 4th International Conference on Image, Vision and Computing (ICIVC), 2019, pp. 544-549, doi: 10.1109/ICIVC47709.2019.8981083.
- [9]M.Almaghrabi and G. Chetty, "Deep Machine Learning Digital library recommendation system based on Metadata for Arabic and English Languages," 2020 IEEE Asia-Pacific Conference on Computer Science and Data Engineering (CSDE), 2020, pp. 1-6, doi: 10.1109/CSDE50874.2020.9411525.
- [10]S. R. Ghani and J. Ahmed, "Managing Electronic Resources through Open Source Software Calibre," 2018 5th International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS), 2018, pp. 26-30, doi: 10.1109/ETTLIS.2018.8485247. [11]Frederick, Donna. (2019). Blockchain, libraries and the data deluge. Library Hi Tech News. ahead-of-print. 10.1108/LHTN-09-2019-0059.
- [12] Y. Shi and Y. Zhu, "Research on Aided Reading System of Digital Library Based on Text Image Features and Edge Computing," in IEEE Access, vol. 8, pp. 205980-205988, 2020, doi: 10.1109/ACCESS.2020.3037349.
- [13]N. T. Viet and A. G. Kravets, "Analyzing Recent Research Trends of Computer Science from Academic Open-access Digital Library," 2019 8th International Conference System Modeling and Advancement in Research Trends (SMART), 2019, pp. 31-36, doi: 10.1109/SMART46866.2019.9117215.
- [14] L. Cai and Y. Zhu, "The Challenges of Data Quality and Data Quality Assessment in the Big Data Era," pp. 1-10, 2020

- [15] Chunlei Ye, "Research on the Key Technology of Big Data Service in University Library," 13th International Conference on Natural Computation, Fuzzy Systems and Knowledge Discovery (Guilin, China, 2018): 2573–78
- [16] Barbara Blummer and Jeffrey M. Kenton, "Big Data and Libraries: Identifying Themes in the Literature," Internet Reference Services Quarterly 1
- [17] Y. Shi and Y. Zhu, "Research on Aided Reading System of Digital Library Based on Text Image Features and Edge Computing," in IEEE Access, vol. 8, pp. 205980-205988, 2020, doi: 10.1109/ACCESS.2020.3037349.
- [18] C. Wang, "Intelligent Integration of Digital Resources in University Libraries Based on Mobile Agent Distributed Computing," 2020 IEEE International Conference on Artificial Intelligence and Computer Applications (ICAICA), 2020, pp. 239-244, doi: 10.1109/ICAICA50127.2020.9182629.
- [19] B. A. Rabut, A. C. Fajardo, and R. P. Medina, "Multi-class document classification using improved word embeddings," in Proc. 2nd Int. Conf. Comput. Big Data (ICCBD), 2019, pp. 42–46.