Date of publication xxxx 00, 0000, date of current version Feb 2, 2023.

Digital Object Identifier 10.1109/ACCESS.2017.DOI

Online Bank Management System

REVANTH KUMAR KOMMU[1], KEVIN PATEL[2], SIDDHARDHA CHEDELLA[3]
[1]Middle Tennessee State University, Murfreesboro, TN 37132 USA (e-mail: rk4y@mtmail.mtsu.edu)
[2]Middle Tennessee State University, Murfreesboro, TN 37132 USA (e-mail: kap7u@mtmail.mtsu.edu)
[3]Middle Tennessee State University, Murfreesboro, TN 37132 USA (e-mail: mc2by@mtmail.mtsu.edu)

Corresponding author: Dr. Khem Poudel (e-mail: khem.poudel@mtsu.edu).

"This work is supported in part of the course project work for Spring 2023 Selected Topics in Database Management Systems - CSCI-6560-001."

ABSTRACT

The Banking Management System is a program used to monitor a person's bank account. This project aims to provide a range of banking task execution alternatives and enable the user's workspace to contain additional features not found in a standard banking project. It was created using MySQL, HTML, Google Cloud, and Python Flask, and MySQL was used to connect to the database. Organizations must effectively identify and manage requirements if they are to satisfy customer expectations, show compliance, finish on time, and remain within budget. The technology aims to interactively arrange the content. The content management system handles data entering, checking, confirming, and updating, and a high level security system handles sending mails to admin when a new login occurs. A high level security will be implemented which handles sending mails to admin when a new login occurs. Only basic access of login to check the account details is given to customers. Digital data is kept in a secure data center by cloud-based storage services, and the system interacts with users and administrators.

I. INTRODUCTION

ONE of the most technologically advanced systems in financial administration was last year. The database has now been completely filled up as client contacts have consistently increased. When dealing with money or important assets, it quickly turns into a crucial issue for the network operator, the client, and the authorities. The accounting system has evolved into one of the most cutting-edge instruments because of all the information it contains for consumer disclosure. It records information on clients and accounts as well as the activities that take place every minute or second. It entails gathering information to aid other banking operations including recording the specifics of the transaction, the party, and other information.

The goal of this banking management system is to administer banking by automating a number of processes. This lessens the amount of physical labor required and maintains that algorithms are tactical errors since they can only function in accordance with scripts, unlike to what was first believed about manual tasks, which are inherently prone to error. Online banking transactions contribute to comfort, standardization of banking procedures, and time and cost savings. Additionally, the environment gains since a significant amount of paper is saved. In today's world, online banking is becoming more and more common. A number of transactions can be made by customers online. Customers who use online banking can also monitor their account activities.

Customers are free to check on it whenever and wherever they like. Their lives are made simpler and faster by online banking. If you choose to use internet banking, you can manage your accounts every day until payday. You'll constantly be aware of what's occurring in your bank account if you keep a tight eye on your finances. Experienced buyers will find this alternative to be far more enticing than discovering you are suddenly penniless! Maintaining records of your investments, savings, interest rates, and any operating expenses is also a smart idea.

The following are the main modules of this system:

- Accounts
- Customers
- Employees
- Transactions
- Branches (Bank)

The security of client information and assets is a serious concern, even though this eliminates the majority of the bank's manual tasks. As a result, it's essential to keep up with security features and properly verify each module as it is implemented. When a new login happens, a high level of

security will be introduced that manages sending emails to the admin. Customers are only provided rudimentary access to login and view their account information. Cloud-based storage services keep our digital data in a safe data center where we can access it whenever we want as long as we have an internet connection. We can manage, maintain, and back up our data utilizing google cloud without having to maintain any costly physical servers.The bank's digitization will benefit all sections of its growth. It's no longer necessary to handle tangible documents and data sheets; it's all mechanically maintained by software and technologies, which not just reduces and also dramatically impacts your operation. If you wish to know more about your customers or you wish to know information regarding your consumers, or if your consumers want to know more about own selves, just a few clicks will automatically gain your customers' trust with better transparency and faster service between them.

The security of client information and assets is a serious concern, even though this eliminates the majority of the bank's manual tasks. As a result, it's essential to keep up with security features and properly verify each module as it is implemented. When a new login happens, a high level of security will be introduced that manages sending emails to the admin. Customers are only provided rudimentary access to login and view their account information. Cloud-based storage services keep our digital data in a safe data center where we can access it whenever we want as long as we have an internet connection. We can manage, maintain, and back up our data utilizing google cloud without having to maintain any costly physical servers. The banking industry is currently being transformed digitally and through innovation thanks to cloud technologies. Large system banks begin to implement cloud computing in numerous areas of their operations as they fall behind FinTech startups in this area.

A. LITERATURE SURVEY

Y. Wu examined the motivations for using internet banking. Web technology was employed in the system's design and development to manage user database resources, addressing the system's complexity, lowering system maintenance costs, and making life easier for developers and maintenance staff.

GUANGSHENG LUO, WENWEI LI, AND YUZHONG PENG analyze the HERCULES Architecture business intelligence machine learning algorithm model and detail the technical issues fixed by the intelligent online banking system. They also make suggestions for new features and challenges for the system.

Software for a banking management system employing a graphical user interface was developed by Drs. N. Ashok Kumar, M. Kannan, S.R. Sudharsana Raghavan, and K. Giridharan. The following actions are carried out by this project: creating an account, deposits, withdrawals, fund transfers, and updating the information.

H. Li, L. Wang, J. Qin, and B. Yang talked about a design system that creates the banking system's user interface using the cross-platform Qt Creator system development tool. The managed data, which may be added, deleted, modified, and checked, is stored in a Mysql database and is also stored using a C/S architecture. The majority of the system is made up of the client and teller interfaces.

B. PROJECT OVERVIEW

The banking management system industry has experienced rapid growth over the past year, and as consumer interactions rise daily, the database is now fully populated. This is a critical issue for the service provider, the client, and the credibility when it comes to managing money or important assets. The financial management system is one of the most intricate systems, covering customer and account information as well as transactions.It also creates a report to support other banking operations. Numerous tasks are automated in this banking management system, which makes it easier for the bank to operate and ensures that automated operations are error-free.

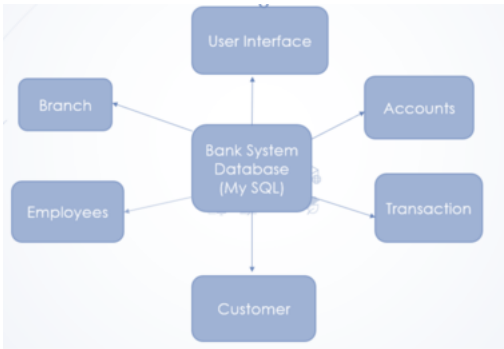

FIGURE 1. Banking Management System Block diagram

The accounts database, transaction data, software components and their interfaces, as well as the bank system's structure—which includes all of these—are depicted in this system block diagram.Their interdependence explains how they cooperate. System diagrams can be used to explain how software systems function at a high level or to show how each component functions at a lower level, such as in a package.

1) User Interface

User Interface is an important component of banking management system. This is particularly true in Internet Banking, where the users are customers, who access the banking services online, from different locations of the world. The user interface has different view for all the modules like customer, employee and administrator.

2) Customer

It keeps track of every non-personal detail about a person who patronizes a certain Bank branch. Customer Records produces a new entry that is exclusive to the Customer whenever someone requests to open an account with the Bank. Managers and employees of the banks have access to this record as needed.

3) Employee

It maintains a record of every Bank employee. The Bank's customer may access the record but not change it. The Manager of a Branch or the Bank itself may make changes to the record.

4) Account Details

Every customer's personal information is kept in database. It can be accessed/modified by the Customer and Bank employees with their respective web interfaces.

5) Transaction

The customer can transfer funds to another account using his web interface. On behalf of the Bank, the Cashier may carry out or assist in carrying out the transaction procedure, after which the Bank updates all pertinent information regarding the Customer.

6) Branch

There will be one main branch (i.e., headquarter) and different other branches. Main branch will act as an entity that controls all the accounts of all the branches of the Bank. The entity can get entry to all the databases. The Bank can regulate or do away with any guidelines in addition to create new guidelines for the Online Banking System.

C. TECHNOLOGIES USED

MySQL is a system that helps store and manage data efficiently. Database generally stores data in a structured fashion.

FIGURE 2. MySQL

- Open-Source
- Quick and Reliable
- Scalable
- Data Types/Character Sets
- Secure
- Support for large databases

PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages.

HTML (HyperText Markup Language) is the code that is used to structure a web page and its content.

- HTML is the standard markup language for creating Web pages.
- It integrates easily with other languages such as JavaScript, CSS etc.
- It is platform-independent.

XAMPP The acronym XAMPP is made up of the letters X for Cross-Platform, A for Apache, M for MySQL, and P for

FIGURE 3. HTML

PHP, respectively. It is an open-source collection of online solutions that contains the Apache server, MariaDB, PHP modules along with command-line executable for a variety of servers. Before releasing a website to the primary server, XAMPP enables a local host or server to test its website and clients via desktop and laptop PCs. It is a platform that offers an appropriate setting for testing and confirming the performance of projects based on Apache, MySQL, and PHP through the host's system. The most prominent example of these technologies is MariaDB, which uses the back-end scripting language PHP.

MySQL is a system that helps store and manage data efficiently. Database generally stores data in a structured fashion.

- Open-Source
- Quick and Reliable
- Scalable
- Data Types/Character Sets
- Secure
- Support for large databases

HTML (HyperText Markup Language) is the code that is used to structure a web page and its content.

- HTML is the standard markup language for creating Web pages.
- It is platform-independent.
- It integrates easily with other languages such as JavaScript, CSS etc.

CSS stands for Cascading Fashion Sheets dialect and is utilized to stylize components composed in a markup dialect such as HTML. It isolates the substance from the visual representation of the location. The connection between HTML and CSS is emphatically tied together since HTML is the exceptionally establishment of a location and CSS is all of the aesthetics of a complete site.

How does CSS work?

- CSS uses a simple English-based syntax and has a set of rules governing it. As mentioned earlier, HTML was never intended to use style elements, only the markup of the page. Created for content only. For example: This is a paragraph. .

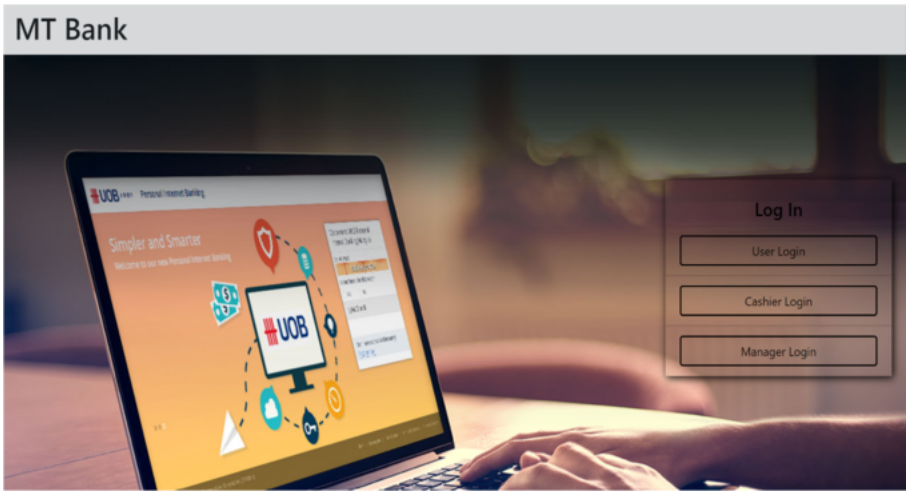

FIGURE 4. Login Page

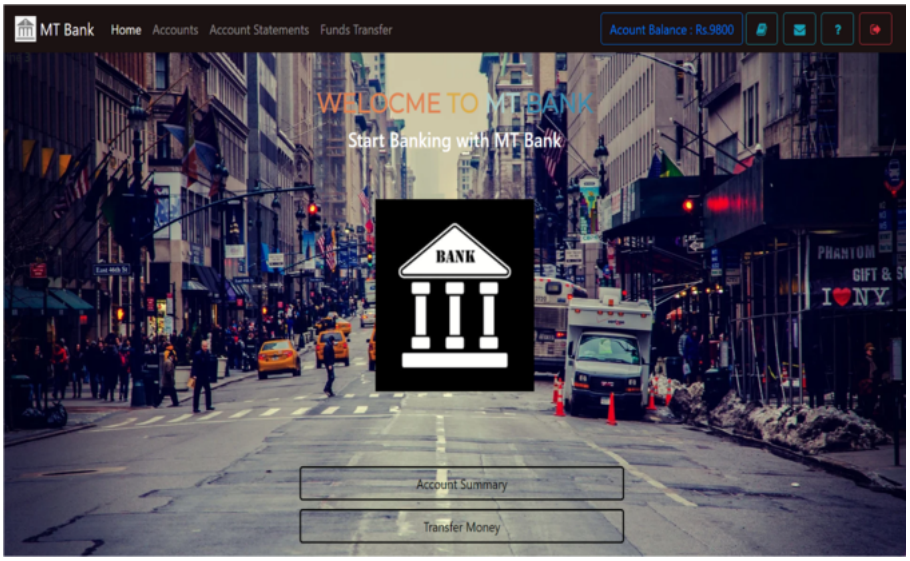

FIGURE 5. User Page

- But how do you design your paragraphs? The structure of CSS syntax is very simple. I have a selector and a declaration block. Select an item and specify what you want to do with it. So easy, right? However, there are rules that must be remembered. The rules of construction are very simple, so don't worry. A selector points to an HTML element to format. A declaration block contains one or more declarations separated by semicolons.
- Each declaration contains a CSS property name and value separated by a colon. CSS declarations always end with a semicolon and the declaration block is enclosed in curly braces.

D. WEB INTERFACES

HTML with CSS is used to create web pages, and php server programming language is used to link to the MySQL database.

- Employee Page Design: The employee uses his account and password to access the website. After logging in, he has access to all the choices available to customers, and as admin, he can also add or edit customers and review all transactions based on account numbers.
- Customer Page Design: The customer enters his account and password to access the website for the first time. After logging in, he has the option to edit his information, verify his account's balance using his account number, and view transaction records.

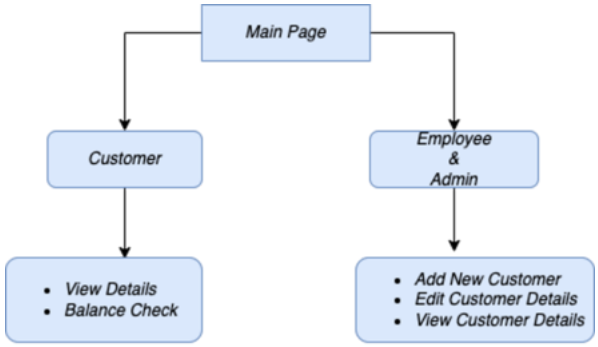

FIGURE 6. Web Interface

E. RESULTS / DISCUSSION

Online bank management systems are designed to meet the needs of people who operate without manual intervention, provide appropriate information and reports, and monitor and check the progress of accounts from time to time in relation to customer accounts,

From our research we have analyzed some studies which we restated below:

- We made a detailed study on how the present management systems work.
- We then analyzed the data and made a design document .
- We then gathered the resources and applications and then implemented the development of the application.

Even our project is a bank based application despite of having the information on paper, we successfully made the following:

- Only authorized person can retrieve the data from the database or application.
- Security maintained
- We stored the daily basis of the data and used it when needed.
- Data updates were done frequently so that there will be no flaws.

F. FUTURE LOOK

The "Online Bank Management System is a significant and ambitious project. I appreciate the opportunity to work on it, and I will do so. This project has undergone thorough research, as was already described. We successfully created and executed our online bank management system based on the study work. Since internet banking is not a recent development, it is probably worthwhile to examine the present in order to predict the future of the industry. You likely see a computer (desktop or laptop), a three- or four-step security procedure, and an interface that allows you to view the balances of your various bank accounts and credit cards as well as send money and make payments. This project is created to sustain wants of a client in keeping money segment by implanting all the errands of exchange taking put in a bank. Future form of this project will still be much improved than the current form. Composing and depositing checks are maybe the foremost crucial ways to move cash in and out of a checking account, but head-ways in innovation have included ATM and charge card exchanges. All banks have rules around how long it takes to get to your stores, how numerous charge card exchanges you're allowed in a day, and how much cash you'll be able pull back from an ATM. Get to to the adjust in your checking account can moreover be constrained by businesses that put holds on your stores. Banks are giving web keeping money administrations too so that the clients can be pulled in. By inquiring the bank utilizes we came to know that greatest numbers of internet bank account holders are youth and trade man.

G. REFERENCES

[1] Y. Wu, "Design of User Database Resource Management System Based on Web," 2017 International Conference on Computer Technology, Electronics and Communication (ICCTEC), 2017, pp. 364-367, doi: 10.1109/ICCTEC.2017.00084.

[2] GUANGSHENG LUO, WENWEI LI, AND YUZHONG PENG , "Overview of Intelligent Online Banking System Based on HERCULES Architecture", IEEE 10.1109/ACCESS.2020.2997079, volume 8, 2020.

[3] Dr. N. Ashok Kumar, Dr. M. Kannan, S.R. Sudharsana Raghavan, K. Giridharan, "Bank Management System", Volume-7, Issue-3, May-June 2017 International Journal of Engineering and Management Research Page Number: 547-549.

[4] H. Li, L. Wang, J. Qin and B. Yang, "Bank Management System Based on QT," 2021 International Wireless Commu- nications and Mobile Computing (IWCMC), 2021, pp. 1184- 1188, doi: 10.1109/IWCMC51323.2021.9498865.

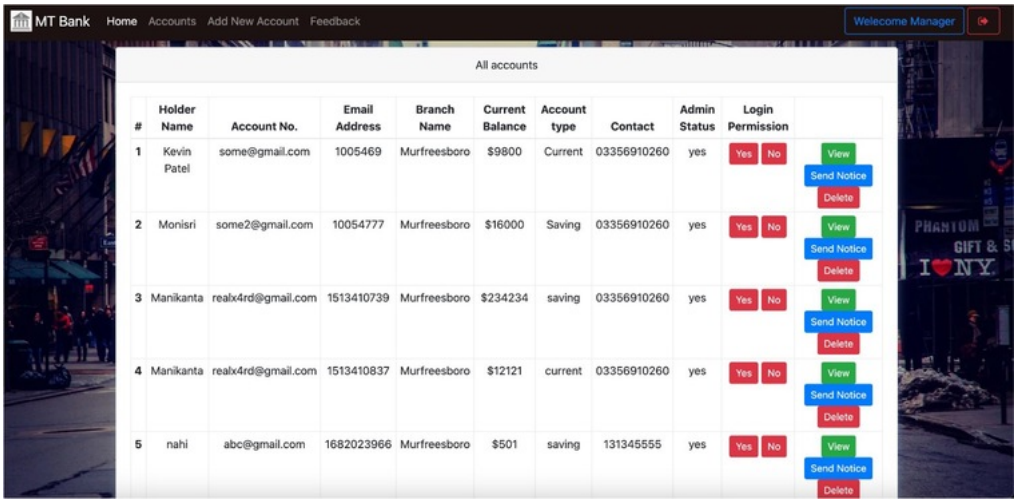

FIGURE 7. Manager Page

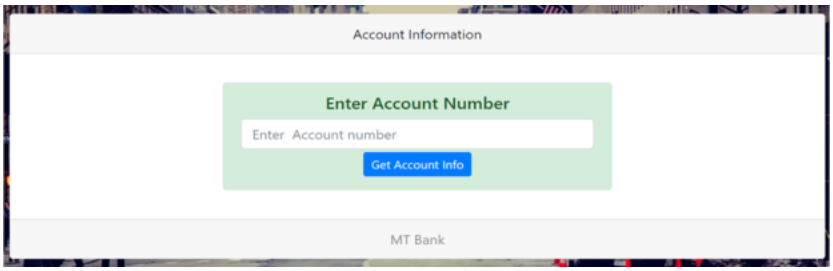

FIGURE 8. Chasier Page