

SURVEY ON BLOCKCHAIN BASED IOT PAYMENTS AND MARKETPLACES

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in Computer Science and Engineering

by

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SCHOOL OF COMPUTING

SATHYABAMA

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APRIL - 2024



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **KOTESWARA RAO DAVULURI(Reg.No-40110633)** and **MALLADHI SIVAMANI (Reg.No-40110705)** who carried out the Project entitled **"SURVEY ON BLOCK CHAIN-BASED IOT PAYMENT AND MARKETPLACES"** under my supervision from November 2023 to April 2024.

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I, **Sivamani Malladhi** (Reg.No - 40110705), hereby declare that the Project Report entitled **"SURVEY ON BLOCK CHAIN-BASED IOT PAYMENT MARKETPLACES"** done by me under the guidance of **V. Dharani, M.E.,(Ph.D)**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

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ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management of SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala M.E., Ph.D., Dean**, School of Computing, **Dr. L. Lakshmanan M.E., Ph.D.**, Head of the Department of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **MS.V. Dharani M.E.(Ph.D)** for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

ABSTRACT

The ever-developing clever programs will make bigger the Internet of Things (IoT) environment to connect over seventy five billion devices by using 2025. IoT ecosystems comprise sensors that act as records suppliers and applications in which economic transactions are required to compensate the data producers. This signifies the significance of IoT bills and marketplaces to facilitate micro-transactions of billions of connected gadgets inside the IoT ecosystem, that's heterogeneous, decentralized, and numerous. However, knowing such an ecosystem raises a couple of demanding situations such as overcoming bad inter-operability, resource constraints, and protection and privateness vulnerabilities of IoT gadgets and systems. Blockchain is a Distributed Ledger Technology (DLT) that may be recognized as a capacity solution to overcome the demanding situations in figuring out IoT payments and marketplaces. This is due to the traits of blockchain along with decentralization, traceability, immutability, and non-repudiation. This paper provides a comprehensive survey on blockchain-based totally IoT bills and marketplaces. This paper presents a short creation to the principles of IoT bills and IoT marketplaces. Then the technical demanding situations concerned in realizing IoT charge and marketplaces are mentioned by way of highlighting the blockchain-based answers. Furthermore, blockchain-based smart applications which use IoT marketplace and IoT charge standards are supplied marking the position of blockchain in each of the software. Subsequently, the paper discuss the mixing challenges even as additionally highlighting feasible answers. It is envisaged that this paper might shed light on the development of blockchain-based solutions to realise IoT bills and marketplaces.

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CHAPTER 1

INTRODUCTION

The number of devices related to the Internet of Things (IoT) is expected to grow beyond seventy five billion by way of 2025, recording an increase of extra than 50 billion devices inside the subsequent 5 years . Internet-linked devices communicating with every other had been initially referred to as Machine to Machine (M2M) conversation-based device networks . These M2M networks have advanced closer to IoT connecting heterogeneous devices which can communicate with every different

The partner editor coordinating the evaluate of this manuscript and approving it for booklet become Stefano Scanzio . The use of diverse protocols over the internet to change a huge variety of facts . IoT is similarly more advantageous together with the sunrise of the Internet of Everything (IoE), which facilitates the interactions amongst people, gadgets, and statistics Blockchain is one of the technologies that have created a disruptive change in several industries. Currently, Blockchain is getting used in numerous places and there are more applications of Blockchain yet to be discovered and implemented. Blockchain is characterized by its decentralized nature, the integrity of the information stored within the chain, and its openness. Due to these characteristics, another area in which Blockchain can be used is to release funds for government projects. Governments have to cater to an enormous number of responsibilities of a state. The working of state governments involves numerous transactions towards various operations that require to be applied throughout the state. This includes new projects, repair, and maintenance work, awarding contracts, paying off government employees, farmer schemes, and so on. A serious hurdle that the highest government faces is the low-level corruption that's sometimes impossible to trace, which deprives the state of progress. Tracking it's a really difficult task because of the present system. Blockchain is touted for its capability to reinforce the trust and ease of information-based exchanges among people and associations. The innovation offers a guarantee when deliberately applied within the proper settings. Customarily, associations working their own, singular IT frameworks trying to group must pander to difficulties including compromise of data, recognizing a solitary wellspring of truth, and provoking establishment. Blockchain innovation tends to those difficulties by giving a specialized establishment that underpins the execution of

shared business forms, such that no single substance controls the complete framework. Government incorporates a characteristic need to assemble, support, and ensure open trust in data and frameworks. In such kinds of situations, blockchain may help to boost this trust. The traditional laptop-aided industries have become transformed into smart industries because of numerous reasons such as higher quality and productivity, security troubles of present answers, and in the long run the disruptive nature of clever answers. So, the industries that emerge as intelligent by means of adapting smart solutions will evolve whilst the others will not be able to cope up with the disruptive nature of the clever industries. These smart industries make data driven selection making based totally on IoT and Big Data Analytics (BDA) principles. IoT software regions consisting of agriculture, utilities, healthcare and transportation are anticipated to be converted into smart IoT applications. Sensor networks have automated and stepped forward the performance of agricultural practices. Smart town idea may be supported by way of the application meters on the way to be deployed global as clever IoT structures. Smart healthcare systems will utilize present day technological advancements to perform essential faraway surgeries as properly. Connected automobiles is the subsequent revolution in transportation region.

1.1 SCOPE OF THE PROJECT:

Blockchain is referred to as the Digital ledger, same as the ledger maintained financial institutions for keeping the track of records. Blockchain technology harnesses the distributed software and provides a shared ledger with a single source of truth for the recorded transactions without depending on a centralized entity for trust. Hence, it helps in trust in the digital world using technology. Any tangible or intangible asset can be represented and tracked on a Blockchain network, which brings transparency, increases processing speed and reduces cost. On top of Blockchain, can be automated through smart contracts. Therefore, benefits of Blockchain technology include transparency, security, and efficiency, which make it in enabling a layer of trust over Internet for various applications. Each block in a blockchain is linked to one another forming a chain of, that's why the name "Blockchain". Each block has certain information like number of transactions and every time a transaction happens the record gets updated in peer network.

1.2 MOTIVATION OF THE PROJECT:

Here we propose a smart system to track funds allocated to the state government as they travel through the government process at each stage. We here make use of blockchain technology to secure the transactions at every stage while maintaining transparency in every transaction sealing every transaction with proofs as the funds move ahead. This allows to maintain crystal clear record with on demand right to transactional data on a need to know basis. The system makes use of encryption to secure transactional data using hashes to maintain a block of transactions in a chain manner which is maintained and verified by every node involved to verify the transaction and save the data in a transparent form within the government. The system allows for a full proof, secure and authentic fund allocation and fund tracking system to help form an incorruptible government process.

CHAPTER 2

LITERATURE SURVEY

2.1 INFERENCES OF LITERATURE SURVEY

In this paper, the writer attempted to discover the ability of block chain technology to decrease embezzlement which can also additionally arise for the duration of the fund's switch of government schemes. Also discovered 8 appropriate traits of any virtual fund switch method which incorporates a sequence of layers. To make certain equity on this form of the virtual method the writer has proposed to apply block chain-based technology through the usage of mathematical model transaction traits to officially make certain equity at all levels. This system also can be audited through common human beings to trace the cash flow of any schemes, making the system absolutely obvious and fair.

This system makes use of encryption to secure transactional data using hashes to take care of a block of transactions in a very chain manner which is maintained and verified by every node involved to verify the transaction and save the information in a very transparent way. Using the system, a transparent, incorruptible government process can be formed by providing a completely secure, authentic, and reliable system of allocation and tracking of funds

in this paper, the author considered block chain applications that allow maintaining crystal clear records with the on-demand right to transactional data on a need-to-know basis. the system makes use of encryption to secure transactional data using hashes to take care of a block of transactions during a chain manner which is maintained and verified by every node involved to verify the transaction and save the info in an exceedingly transparent form within the government. in order to form a completely incorruptible government process, the system provides a way to allocate funds securely and track them authentically.

This paper discusses the use of block chain technology for tracking government funds. When the government issues funds for projects, often a large part of it is unutilized and is barely used for the actual project, one of the main causes being corruption. So, if block chains are introduced here, everyone can track all the amounts regarding when and where it is being utilized. This technology is utilized in the government sector and can have a major impact on the growth and economy of a country.

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2.2 OPEN PROBLEMS IN EXISTING SYSTEM:

- In existing system during a project report is that section that suggests the numerous analyses and studies made in the discipline of your interest and consequently the outcomes already published, thinking of the varied parameters of the project and additionally the extent of the project.
- A literature survey is the maximum substantial step in any reasonable study. Before beginning development, we need to test the preceding papers of our area in which we're operating and the idea of the look at what we're capable of

expecting or generate the downside and start operating with the reference of preceding papers.

- During this phase, we briefly evaluate the associated work on the Government Fund Allocation & Tracking System and the usage of Block-chain Technology

CHAPTER 3

REQUIREMENT ANALYSIS

3.1 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

The feasibility study investigates the problem and the information needs of the stakeholders. It seeks to determine the resources required to provide an information systems solution, the cost and benefits of such a solution, and the feasibility of such a solution.

The goal of the feasibility study is to consider alternative information systems solutions, evaluate their feasibility, and propose the alternative most suitable to the organization. The feasibility of a proposed solution is evaluated in terms of its components.

3.1.1 ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

3.1.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The

developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

3.1.3 SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity.

3.2 SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

System : Pentium i3 Processor

Hard Disk : 500 GB.

Monitor : 15" LED

Input Devices : Keyboard, Mouse

Ram : 2 GB

SOFTWARE REQUIREMENTS

Operating system : Windows 10

Coding Language : Java

3.3 JAVA

Java is one of the world's most important and widely used computer languages, and it has held this distinction for many years. Unlike some other computer languages whose influence has weared with passage of time, while Java's has grown.

3.3.1 APPLICATION OF JAVA

Java is widely used in every corner of world and of human life. Java is not only used in softwares but is also widely used in designing hardware controlling software components. There are more than 930 million JRE downloads each year and 3 billion mobile phones run java.

Following are some other usage of Java:

1. Developing Desktop Applications
2. Web Applications like Linkedin.com, Snapdeal.com etc
3. Mobile Operating System like Android
4. Embedded Systems
5. Robotics and games etc.

3.3.2 FEATURES OF JAVA

The prime reason behind creation of Java was to bring portability and security feature into a computer language. Beside these two major features, there were many other features that played an important role in moulding out the final form of this outstanding language. Those features are;

1) Simple

Java is easy to learn and its syntax is quite simple, clean and easy to understand. The confusing and ambiguous concepts of C++ are either left out in Java or they have been re-implemented in a cleaner way.

Eg: Pointers and Operator Overloading are not there in java but were an important part of C++.

2) Object Oriented

In java everything is Object which has some data and behaviour. Java can be easily extended as it is based on Object Model.

3) Robust

Java makes an effort to eliminate error prone codes by emphasizing mainly on compile time error checking and runtime checking. But the main areas which Java improved were Memory Management and mishandled Exceptions by introducing automatic Garbage Collector and Exception Handling.

4) Platform Independent

Unlike other programming languages such as C, C++ etc. which are compiled into platform specific machines. Java is guaranteed to be write-once, run-anywhere language.

On compilation Java program is compiled into byte code. This byte code is platform independent and can be run on any machine, plus this byte code format also provide security. Any machine with Java Runtime Environment can run Java Programs.

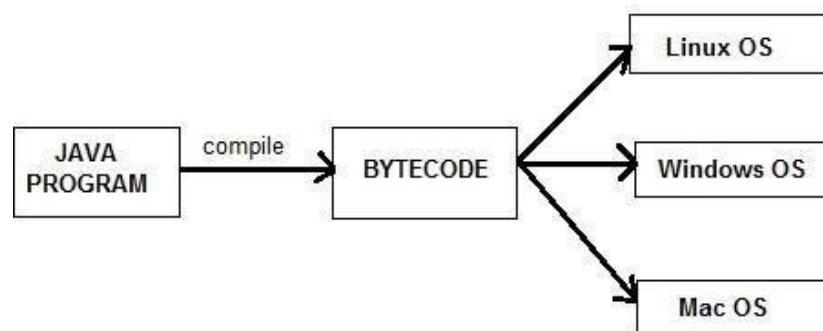


Figure 3.1 java compiled by bite code

5) Secure

When it comes to security, Java is always the first choice. With java secure features it enable us to develop virus free, temper free system. Java program always runs in Java runtime environment with almost null interaction with system OS, hence it is more secure.

6) Multi-Threading

Java multithreading feature makes it possible to write program that can do many tasks simultaneously. Benefit of multithreading is that it utilizes same memory and other resources to execute multiple threads at the same time, like While typing, grammatical errors are checked along.

7) Architectural Neutral

Compiler generates byte codes, which have nothing to do with a particular computer architecture, hence a Java program is easy to interpret on any machine.

8) Portable

Java Byte code can be carried to any platform. No implementation dependent features. Everything related to storage is predefined, example: size of primitive data types

10) High Performance

Java is an interpreted language, so it will never be as fast as a compiled language like C or C++. But, Java enables high performance with the use of just-in-time compiler.

3.4 SYSTEM TESTING

Test plan

Software testing is the process of evaluation a software item to detect differences between given input and expected output. Also to assess the feature of a software item. Testing assesses the quality of the product. Software testing is a process that should be done during the development process. In other words software testing is a verification and validation process.

Verification

Verification is the process to make sure the product satisfies the conditions imposed at the start of the development phase. In other words, to make sure the product behaves the way we want it to.

Validation

Validation is the process to make sure the product satisfies the specified requirements at the end of the development phase. In other words, to make sure the product is built as per customer requirements.

Basics of software testing

There are two basics of software testing: black box testing and white box testing.

Black box Testing

Black box testing is a testing technique that ignores the internal mechanism of the system and focuses on the output generated against any input and execution of the system. It is also called functional testing.

White box Testing

White box testing is a testing technique that takes into account the internal mechanism of a system. It is also called structural testing and glass box testing. Black box testing is often used for validation and white box testing is often used for verification.

Types of testing

There are many types of testing like

- Unit Testing
- Integration Testing
- Functional Testing
- System Testing
- Stress Testing
- Performance Testing
- Usability Testing
- Acceptance Testing
- Regression Testing
- Beta Testing

Unit Testing

Unit testing is the testing of an individual unit or group of related units. It falls under the class of white box testing. It is often done by the programmer to test that the unit he/she has implemented is producing expected output against given input.

Integration Testing

Integration testing is testing in which a group of components are combined to produce output. Also, the interaction between software and hardware is tested in integration testing if software and hardware components have any relation. It may fall under both white box testing and black box testing.

Functional Testing

Functional testing is the testing to ensure that the specified functionality required in the system requirements works. It falls under the class of black box testing.

System Testing

System testing is the testing to ensure that by putting the software in different environments (e.g., Operating Systems) it still works. System testing is done with full system implementation and environment. It falls under the class of black box testing.

Stress Testing

Stress testing is the testing to evaluate how system behaves under unfavorable conditions. Testing is conducted at beyond limits of the specifications. It falls under the class of black box testing.

Performance Testing

Performance testing is the testing to assess the speed and effectiveness of the system and to make sure it is generating results within a specified time as in performance requirements. It falls under the class of black box testing.

Usability Testing

Usability testing is performed to the perspective of the client, to evaluate how the GUI is user-friendly? How easily can the client learn? After learning how to use, how proficiently can the client perform? How pleasing is it to use its design? This falls under the class of black box testing.

Acceptance Testing

Acceptance testing is often done by the customer to ensure that the delivered product meets the requirements and works as the customer expected. It falls under the class of black box testing.

Regression Testing

Regression testing is the testing after modification of a system, component, or a group of related units to ensure that the modification is working correctly and is not damaging or imposing other modules to produce unexpected results. It falls under the class of black box testing

3.5 REQUIREMENT ANALYSIS

Requirement analysis, also called requirement engineering, is the process of determining user expectations for a new modified product. It encompasses the tasks that determine the need for analyzing, documenting, validating and managing software or system requirements. The requirements should be documentable, actionable, measurable, testable and traceable related to identified business needs or opportunities and define to a level of detail, sufficient for system design.

FUNCTIONAL REQUIREMENTS

It is a technical specification requirement for the software products. It is the first step in the requirement analysis process which lists the requirements of particular software systems including functional, performance and security requirements. The function of the system depends mainly on the quality hardware used to run the software with given functionality. **Usability**

It specifies how easy the system must be use. It is easy to ask queries in any format which is short or long, porter stemming algorithm stimulates the desired response for user.

Robustness

It refers to a program that performs well not only under ordinary conditions but also under unusual conditions. It is the ability of the user to cope with errors for irrelevant queries during execution.

Security

The state of providing protected access to resource is security. The system provides good security and unauthorized users cannot access the system there by providing high security.

Reliability

It is the probability of how often the software fails. The measurement is often expressed in MTBF (Mean Time Between Failures). The requirement is needed in order to ensure that the processes work correctly and completely without being aborted. It can handle any load and survive and survive and even capable of working around any failure.

Compatibility

It is supported by version above all web browsers. Using any web servers like localhost makes the system real-time experience.

Flexibility

The flexibility of the project is provided in such a way that is has the ability to run on different environments being executed by different users.

Safety

Safety is a measure taken to prevent trouble. Every query is processed in a secured manner without letting others to know one's personal information.

3.6 NON- FUNCTIONAL REQUIREMENTS

Portability

It is the usability of the same software in different environments. The project can be run in any operating system.

Performance

These requirements determine the resources required, time interval, throughput and everything that deals with the performance of the system.

Accuracy

The result of the requesting query is very accurate and high speed of retrieving information. The degree of security provided by the system is high and effective.

Maintainability

Project is simple as further updates can be easily done without affecting its stability. Maintainability basically defines that how easy it is to maintain the system. It means that how easy it is to maintain the system, analyse, change and test the application. Maintainability of this project is simple as further updates can be easily done without affecting its stability.

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEMS

4.1 PROPOSED SYSTEM

- The project's major objective is to develop a platform that tracks government fund allocation using blockchain technology.
- The platform aims to accomplish the following goals: Making the work of government fund allocation with reporting documentation is more convenient.
- Due to the fact that the data on donations will be aggregated in one place, it will allow us to prepare reports automatically.
- By developing a blockchain-based system, charitable foundations can become more transparent.
- To maintain transparency and security at every stage.
- In order to create a government procedure that is incorruptible.
- To provide an immutable environment for funds tracking.
- Utilization of funds

4.2 ADVANTAGES OF PROPOED SYSTEM

- Easy to track the funds granted to the state government as they go through the government process.
- It uses blockchain technology to safeguard transactions at each level while retaining transparency in every transaction and sealing every transaction with proof as the money goes forward

4.3 SYSTEM ARCHITECTURE

Describing the overall features of the software is concerned with defining the requirements and establishing the high level of the system. During architectural design, the various web pages and their interconnections are identified and designed. The major software components are identified and decomposed into processing modules and conceptual data structures and the interconnections among the modules are identified. The following modules are identified in the proposed system.

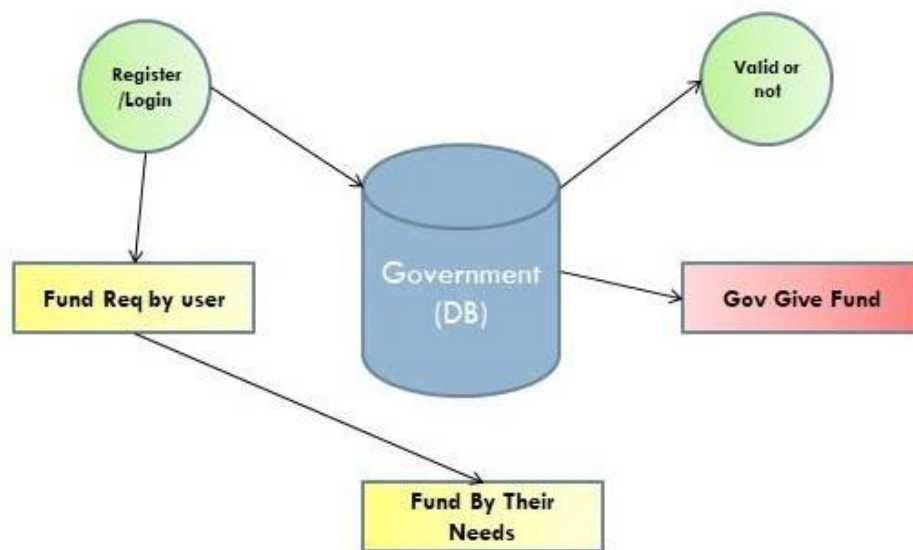


Fig 4.3.1 system architecture

4.4 COLLECTION FRAMEWORK

Collection framework was not part of original Java release. Collections was added to J2SE 1.2. Prior to Java 2, Java provided adhoc classes such as Dictionary, Vector, Stack and Properties to store and manipulate groups of objects. Collection framework provides many important classes and interfaces to collect and organize group of alike objects.

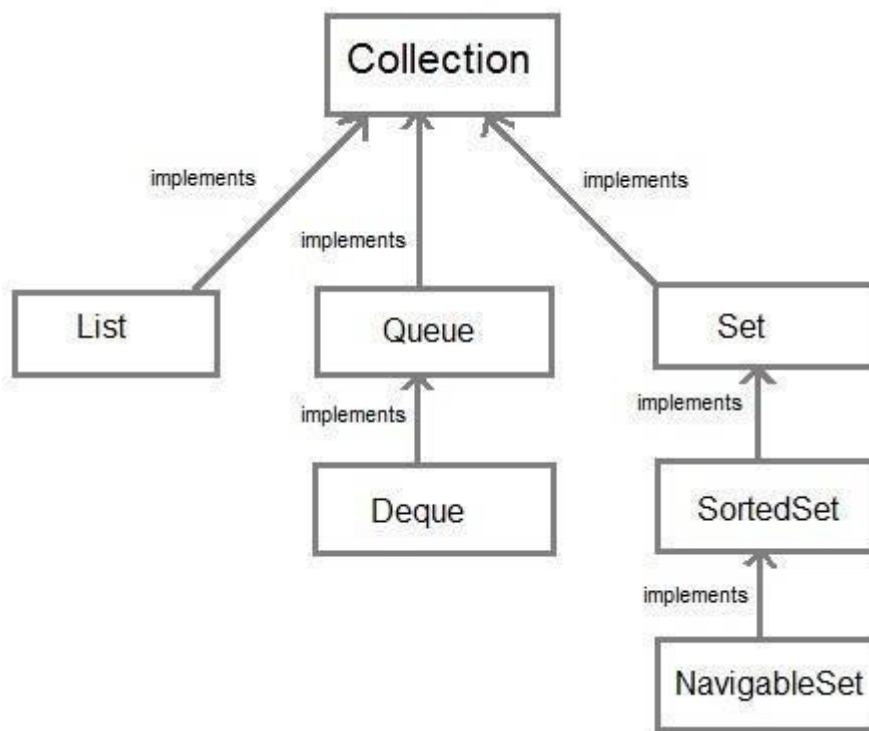


Fig 4.3.2 collection framework

CHAPTER 5

IMPLEMENTATION DETAILS

5.1 SELECTING METHODOLOGY OR PROCESS MODEL:

- Government
- Authority (TPA)
- User (Customer)

5.2 MODULE DESCRIPTION

- Module 1 - Government: - Government will give the fund which is requested by the user.
- Module 2-Register: In this module the user need to first register after that he need to login with his details.
- Module 3 – Authority (TPA):- This will authorize or verify the user that it is a valid user as well as valid request or not.
- Module 4- User (Customer):- User will request for the fund according to their needs.

5.3 ENCRYPTION AND DECRYPTION:

- For encrypting metadata file we are using AES encryption algorithm.
- In Method follows a process which is before reconstructing the File joiner needs the sequence of chunks in which they are being joined. This sequence information is stored in a metadata file which is being encrypted before storing it in the cloud. So the decryption module decrypts the metadata file for file joiner

5.4 ALGORITHMS:

- AES with SHA Key: For encrypting metadata file we are using AES encryption algorithm. The encryption process generates a symmetric key called around a key.
- SHA-1 is applied on this key which creates block of data which is hold by an array of data called the state array

5.5 RISK AND ANALYSIS OF PROJECT:

- The state government working involves a large number of transactions activities towards various operations throughout the state. This includes new actions, initiatives, projects, granting contracts, farmer schemes, and so on.
- One of the most challenging factors that top governments face is low-level corruption which at times is hard to follow and denies the state progress
- In this case, we use blockchain which enables cryptography and transaction security at every stage while maintaining transparency so that every transaction is backed up with proof of its authenticity

5.6 GOALS:

We are going to achieve this project in block chain:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.

Provide extendibility and specialization mechanisms to extend the core concepts

1. Be independent of particular programming languages and development process.

2. Provide a formal basis for understanding the modeling language.
3. Encourage the growth of OO tools market.
4. Support higher level development concepts such as collaborations, frameworks, patterns and components
5. Integrate best practices

CHAPTER 6

RESULTS AND DISCUSSIONS

6.1 DATA FLOW DIAGRAM:

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

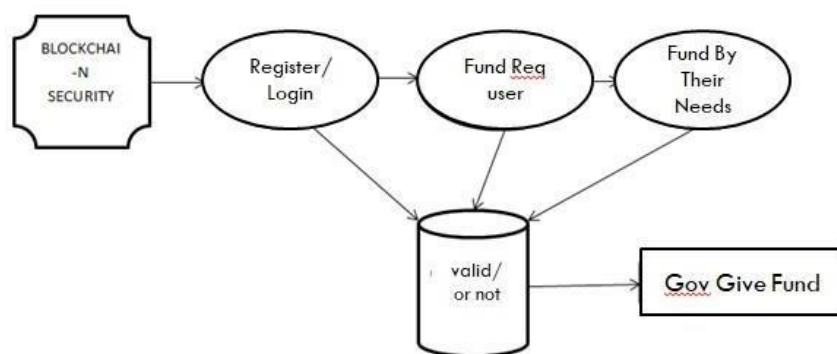


Fig 6.1 data flow diagram

6.2 UML&URL DIAGRAMS:

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

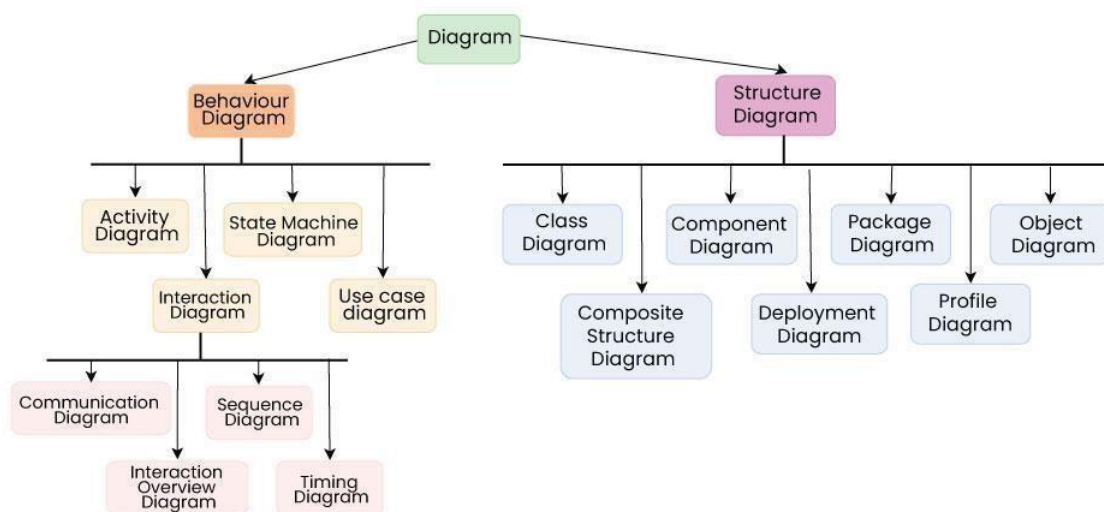


Fig.6.2.1 uml diagram

6.3 USE CASE:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted

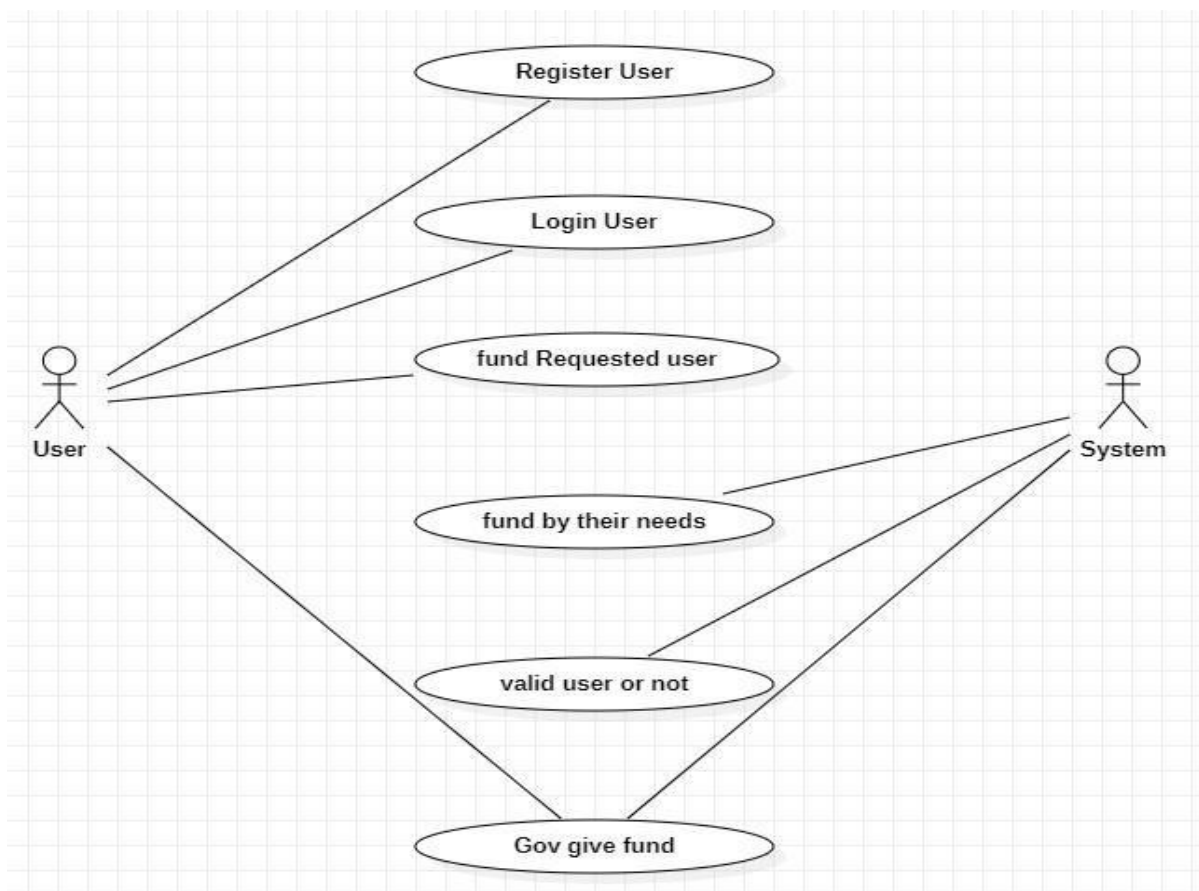


Fig 6.3.1 usecase diagram

6.4 ACTIVITY DIAGRAM:

This activity diagram contains three activities that are Server, TPA, Client and. This diagram of control shows the flow between these activities.

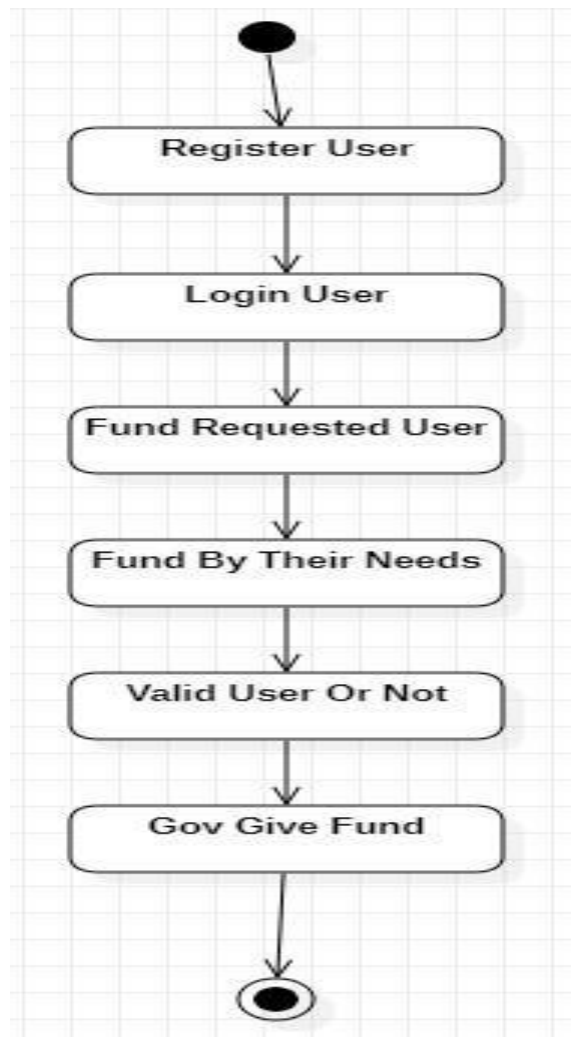


Fig 6.4.1 activity diagram

6.5 SEQUENCE DIAGRAM:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams

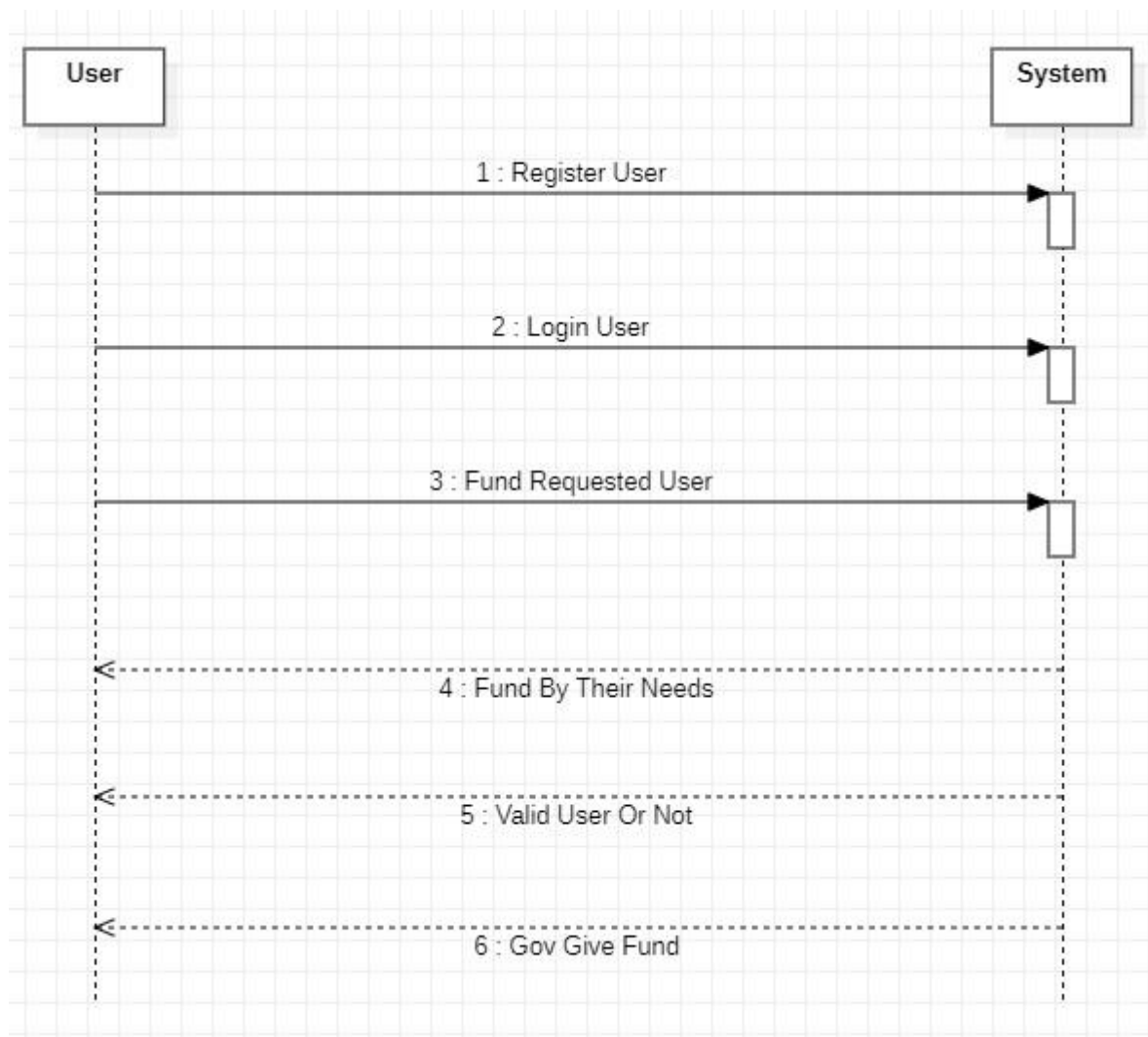


Fig 6.5.1 sequence diagram

CHAPTER 7

SUMMARY AND CONCLUSION

7.1 SUMMARY

The survey indicates a notable increase in interest in blockchain-based IoT payment marketplaces. This surge can be attributed to the potential benefits offered by combining IoT devices with blockchain technology, such as increased security, transparency, and efficiency in transactions. Respondents highlighted security concerns as a major factor driving adoption of blockchain in IoT payment marketplaces. By leveraging blockchain's decentralized and immutable nature, these marketplaces aim to enhance security and trust in IoT transactions, particularly in scenarios involving sensitive data or high-value assets. Another key finding is the emphasis on improving efficiency and transparency in IoT transactions. Blockchain's ability to create tamper-proof records and automate processes can streamline payment workflows and provide real-time visibility into transaction status, benefiting both buyers and sellers in IoT ecosystems. Despite the potential advantages, the survey identifies several challenges hindering the widespread adoption of blockchain-based IoT payment marketplaces. These challenges include scalability issues, interoperability concerns, regulatory uncertainties, and the complexity of integrating blockchain with existing IoT infrastructure. Overall, the survey suggests a positive outlook for the growth of blockchain-based IoT payment marketplaces, driven by increasing awareness of blockchain's potential benefits and ongoing efforts to address technological and regulatory challenges. However, successful adoption will require collaboration among stakeholders, including technology providers, regulators, and industry consortia, to overcome barriers and realize the full potential of blockchain in IoT payments.

7.2 CONCLUSION

In this full-proof, secure government fund allocation and tracking system, the allotted funds are tracked at each level until it reaches the beneficiaries. This proposed framework is added to assist the authorities to lessen corruption and offer transparency in all transactions because of the functions of blockchain-like immutability, proof of work, and security. It offers the right governance and transparency. It will maintain track of all transactions made. As blockchain technology is used the transactions as soon as made cannot be changed and if there's any try of tempering, we can get to recognize approximately that easily. There might be no requirement for the outsider and the exchanges might be regulated all the extra sturdily and transparently. In addition to preventing human errors and delays, it will help eliminate human errors. This framework will make the general public authority framework activities appreciably extra stable and productive. We can nevertheless upload customary schemes from everywhere in the world for fundraising to take it to the subsequent stage for big price range required the humans in need.

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APPENDIX

A.SOURCE CODE

trans.jsp:

```
<%@page import="java.sql.DriverManager"%>
<%@page import="java.sql.ResultSet"%>
<%@page import="java.sql.PreparedStatement"%>
<%@page import="java.sql.Connection"%>
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
    <!-- SEO Meta Tags -->
    <meta name="description" content="Description">
    <meta name="author" content="Author">
    <!-- OG Meta Tags to improve the way the post looks when you share the page on
    Facebook, Twitter, LinkedIn -->
    <meta property="og:site_name" content="" /> <!-- website name -->
    <meta property="og:site" content="" /> <!-- website link -->
    <meta property="og:title" content="" /> <!-- title shown in the actual shared post -->
    <meta property="og:description" content="" /> <!-- description shown in the actual shared
    post -->
    <meta property="og:image" content="" /> <!-- image link, make sure it's jpg -->
    <meta property="og:url" content="" /> <!-- where do you want your post to link to -->
    <meta name="twitter:card" content="summary_large_image"> <!-- to have large image
    post format in Twitter -->    <!-- Webpage Title -->
    <title>Fund Allocation</title>
    <!-- Styles -->
    <link
href="https://fonts.googleapis.com/css2?family=Open+Sans:ital,wght@0,400;0,600;0,700;1,
400&display=swap" rel="stylesheet">
    <link href="css/bootstrap.css" rel="stylesheet">
    <link href="css/fontawesome-all.css" rel="stylesheet">
    <link href="css/swiper.css" rel="stylesheet">
```

```

<link href="css/magnific-popup.css" rel="stylesheet">
<link href="css/styles.css" rel="stylesheet">

<!-- Favicon -->
<link rel="icon" href="images/favicon.png">
</head>
<body data-spy="scroll" data-target=".fixed-top">
  <!-- Navigation -->
  <nav class="navbar navbar-expand-lg fixed-top navbar-dark">
    <div class="container">
      <!-- Text Logo - Use this if you don't have a graphic logo -->
      <!-- <a class="navbar-brand logo-text page-scroll" href="index.html">Revo</a> -->
      <!-- Image Logo -->
      <a class="navbar-brand logo-image" href="index.html" style="
textdecoration:none;"><p style=" color:#ffff; font-size:20px; font-weight:bolder;" >Fund
Allocation</p></a>

      <button class="navbar-toggler p-0 border-0" type="button" data-toggle="offcanvas">
        <span class="navbar-toggler-icon"></span>
      </button>
      <div class="navbar-collapse offcanvas-collapse" id="navbarsExampleDefault">
        <ul class="navbar-nav ml-auto">
          <li class="nav-item">
            <a class="nav-link page-scroll-active" href="uhome.jsp" style="color: #ffff;
">HOME <span class="sr-only">(current)</span></a>
          </li>
          <li class="nav-item">
            <a class="nav-link page-scroll" href="add.jsp" style=" color: #ffff;">Add
Bank</a>
          </li>
          <li class="nav-item">
            <a class="nav-link page-scroll" href="view.jsp" style=" color: #ffff;">View
Balance</a>
          </li>
          <li class="nav-item">
            <a class="nav-link page-scroll" href="send.jsp" style=" color: #ffff;">Send
Money</a>

```

```

        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="trans.jsp" style=" color: #ffff;">Overall
Transaction</a>
        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="search.jsp" style=" color:
#ffff;">Search</a>
        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="order.jsp" style=" color: #ffff;">Scheme
Status</a>
        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="review.jsp" style=" color:
#ffff;">Reviews</a>
        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="topk.jsp" style=" color: #ffff;">Top k
Scheme</a>
        </li>
        <li class="nav-item">
            <a class="nav-link page-scroll" href="index.html" style=" color:
#ffff;">Logout</a>
        </li>
    </ul>

</span>
</div> <!-- end of navbar-collapse -->
</div> <!-- end of container -->
</nav> <!-- end of navbar -->
<!-- end of navigation -->
<!-- Header -->
<header id="header" class="header">
    <div class="container">
        <div class="row">

```

```

<div class="col-md-12">
    <div class="titlepage text_align_center">

```

Uhome.jsp:

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
    <!-- SEO Meta Tags -->
    <meta name="description" content="Description">
    <meta name="author" content="Author">
    <!-- OG Meta Tags to improve the way the post looks when you share the page on
    Facebook, Twitter, LinkedIn -->
        <meta property="og:site_name" content="" /> <!-- website name -->
        <meta property="og:site" content="" /> <!-- website link -->
        <meta property="og:title" content="" /> <!-- title shown in the actual shared post -->
    <meta property="og:description" content="" /> <!-- description shown in the actual shared
    post -->
        <meta property="og:image" content="" /> <!-- image link, make sure it's jpg -->
        <meta property="og:url" content="" /> <!-- where do you want your post to link to -->
    <meta name="twitter:card" content="summary_large_image"> <!-- to have large image
    post format in Twitter -->    <!-- Webpage Title -->
    <title>Fund Allocation</title>
    <!-- Styles -->
    <link
href="https://fonts.googleapis.com/css2?family=Open+Sans:ital,wght@0,400;0,600;0,700;1,
400&display=swap" rel="stylesheet">
    <link href="css/bootstrap.css" rel="stylesheet">
    <link href="css/fontawesome-all.css" rel="stylesheet">
    <link href="css/swiper.css" rel="stylesheet">
        <link href="css/magnific-popup.css" rel="stylesheet">
        <link href="css/styles.css" rel="stylesheet">
    <!-- Favicon -->
    <link rel="icon" href="images/favicon.png">

```

```

</head>
<body data-spy="scroll" data-target=".fixed-top">

    <!-- Navigation -->
    <nav class="navbar navbar-expand-lg fixed-top navbar-dark">
        <div class="container">
            <!-- Text Logo - Use this if you don't have a graphic logo -->
            <!-- <a class="navbar-brand logo-text page-scroll" href="index.html">Revo</a> -->
            <!-- Image Logo -->
            <a class="navbar-brand logo-image" href="index.html" style="
textdecoration:none;"><p style=" color:#ffff; font-size:20px; font-weight:bolder;" >Fund
Allocation</p></a>
            <button class="navbar-toggler p-0 border-0" type="button" data-toggle="offcanvas">
                <span class="navbar-toggler-icon"></span>
            </button>
            <div class="navbar-collapse offcanvas-collapse" id="navbarsExampleDefault">
                <ul class="navbar-nav ml-auto">
                    <li class="nav-item">
                        <a class="nav-link page-scroll-active" href="uhome.jsp" style="color: #ffff;
">HOME <span class="sr-only">(current)</span></a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link page-scroll" href="add.jsp" style=" color: #ffff;">Add
Bank</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link page-scroll" href="view.jsp" style=" color: #ffff;">View
Balance</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link page-scroll" href="send.jsp" style=" color: #ffff;">Send
Money</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link page-scroll" href="trans.jsp" style=" color: #ffff;">Overall
Transaction</a>

```

```

</li>

<li class="nav-item">
    <a class="nav-link page-scroll" href="search.jsp" style=" color:
#ffff;">Search</a>
</li>
<li class="nav-item">
    <a class="nav-link page-scroll" href="order.jsp" style=" color: #ffff;">Scheme
Status</a>
</li>
<li class="nav-item">
    <a class="nav-link page-scroll" href="review.jsp" style=" color:
#ffff;">Reviews</a>
</li>
<li class="nav-item">
    <a class="nav-link page-scroll" href="topk.jsp" style=" color: #ffff;">Top k
Scheme</a>
</li>
<li class="nav-item">
    <a class="nav-link page-scroll" href="index.html" style=" color:
#ffff;">Logout</a>
</li>
</ul>
</span>
</div> <!-- end of navbar-collapse -->
</div> <!-- end of container -->
</nav> <!-- end of navbar -->
<!-- end of navigation -->
<!-- Header -->
<header id="header" class="header">
    <div class="container">
        <div class="row">
            <div class="col-lg-12">

```

```
<!-- Text Slider -->
<div class="slider-container">
```

user.jsp:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

  <!-- SEO Meta Tags -->
  <meta name="description" content="Description">
  <meta name="author" content="Author">

  <!-- OG Meta Tags to improve the way the post looks when you share the page on
  Facebook, Twitter, LinkedIn -->
  <meta property="og:site_name" content="" /> <!-- website name -->
  <meta property="og:site" content="" /> <!-- website link -->
  <meta property="og:title" content="" /> <!-- title shown in the actual shared post -->
  <meta property="og:description" content="" /> <!-- description shown in the actual shared
  post -->
  <meta property="og:image" content="" /> <!-- image link, make sure it's jpg -->
  <meta property="og:url" content="" /> <!-- where do you want your post to link to -->
  <meta name="twitter:card" content="summary_large_image"> <!-- to have large image
  post format in Twitter -->

  <!-- Webpage Title -->
  <title>Fund Allocation</title>

  <!-- Styles -->
  <link
href="https://fonts.googleapis.com/css2?family=Open+Sans:ital,wght@0,400;0,600;0,700;1,
400&display=swap" rel="stylesheet">
  <link href="css/bootstrap.css" rel="stylesheet">
  <link href="css/fontawesome-all.css" rel="stylesheet">
  <link href="css/swiper.css" rel="stylesheet">
```

```

<link href="css/magnific-popup.css" rel="stylesheet">
<link href="css/styles.css" rel="stylesheet">

<!-- Favicon -->
<link rel="icon" href="images/favicon.png">
</head>
<body data-spy="scroll" data-target=".fixed-top">

<!-- Navigation -->
<nav class="navbar navbar-expand-lg fixed-top navbar-dark">
  <div class="container">

    <!-- Text Logo - Use this if you don't have a graphic logo -->
    <!-- <a class="navbar-brand logo-text page-scroll" href="index.html">Revo</a> -->

    <!-- Image Logo -->
    <a class="navbar-brand logo-image" href="index.html" style="
textdecoration:none;"><p style=" color:#ffff; font-size:20px; font-weight:bolder;" >Fund
Allocation</p></a>

    <button class="navbar-toggler p-0 border-0" type="button" data-toggle="offcanvas">
      <span class="navbar-toggler-icon"></span>
    </button>

    <div class="navbar-collapse offcanvas-collapse" id="navbarsExampleDefault">
      <ul class="navbar-nav ml-auto">
        <li class="nav-item">
          <a class="nav-link page-scroll-active" href="index.html" style="color: #ffff;
">HOME <span class="sr-only">(current)</span></a>
        </li>
        <li class="nav-item">
          <a class="nav-link page-scroll" href="admin.jsp" style=" color:
#ffff;">ADMIN</a>
        </li>
        <li class="nav-item">

```

```

        <a class="nav-link page-scroll" href="user.jsp" style=" color: #fff;">USER</a>
    </li>
</ul>

</span>
</div> <!-- end of navbar-collapse -->
</div> <!-- end of container -->
</nav> <!-- end of navbar -->
<!-- end of navigation -->

<!-- Header -->
<header id="header" class="header">
    <div class="container">
        <div class="row">
            <div class="col-lg-12">

                <!-- Text Slider -->
                <div class="slider-container">
                    <div class="swiper-container text-slider">
                        <div class="swiper-wrapper">

                            <!-- Slide -->

                                <div class="row">
                                    <div class="col-lg-5 col-xl-5">
                                        <div class="image-container">
                                            
                                        </div> <!-- end of image-container -->
                                    </div> <!-- end of col -->

                                </div>

                            </div>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>

```

```

        <!-- end of text-container -->
    </div> <!-- end of col -->
    <div class="col-lg-10">
        <style>
.form-group{
margin-left:150px;
width:300px;
    }
    .form-control-input{
width:360px;            border-
radius: 30px;            text-
align:                    center;
width:300px;
    }
    .form-control-submit-button{text-align:center }
        </style>

<br>
<br>
<h6 style=" margin-left:240px;">User Login !!!!</h6>
<br>
<form action="uloginc.jsp" method="post">
    <div class="form-group">
        <input type="text" class="form-control-input" name="user" required>
        <label class="label-control" >Username</label>
    </div>
    <div class="form-group">
        <input type="password" class="form-control-input" name="pass" required>
        <label class="label-control">Password</label>
    </div>

```

B.SCREENSHOTS



Fig B.1 Web Home Page

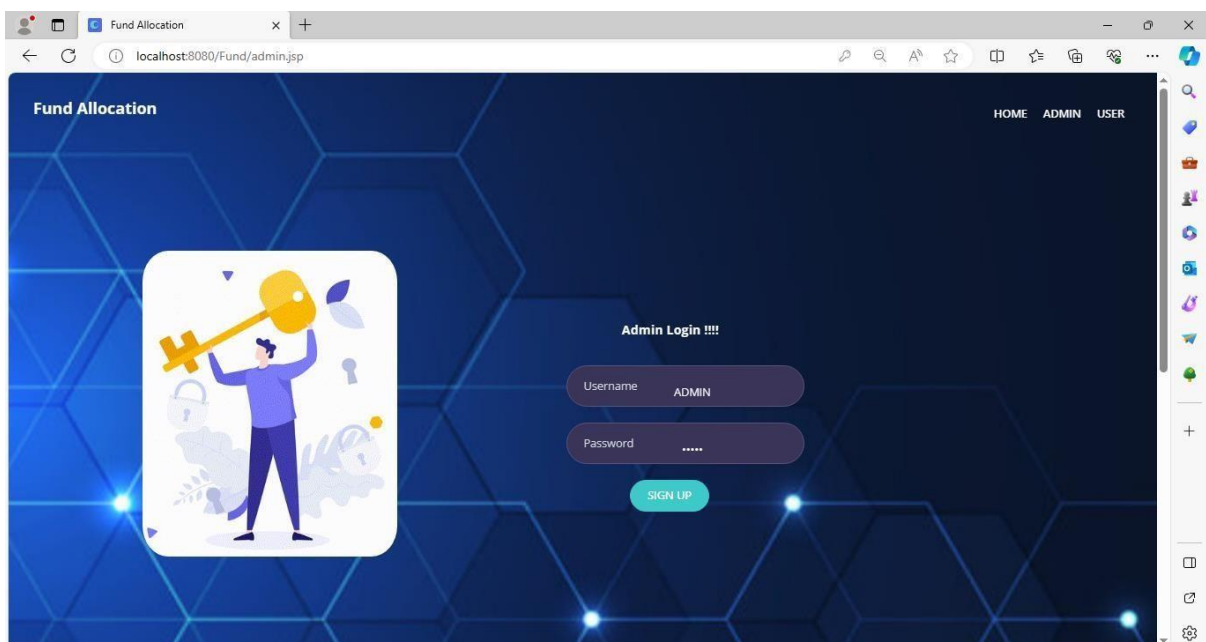


Fig B.2 Login page

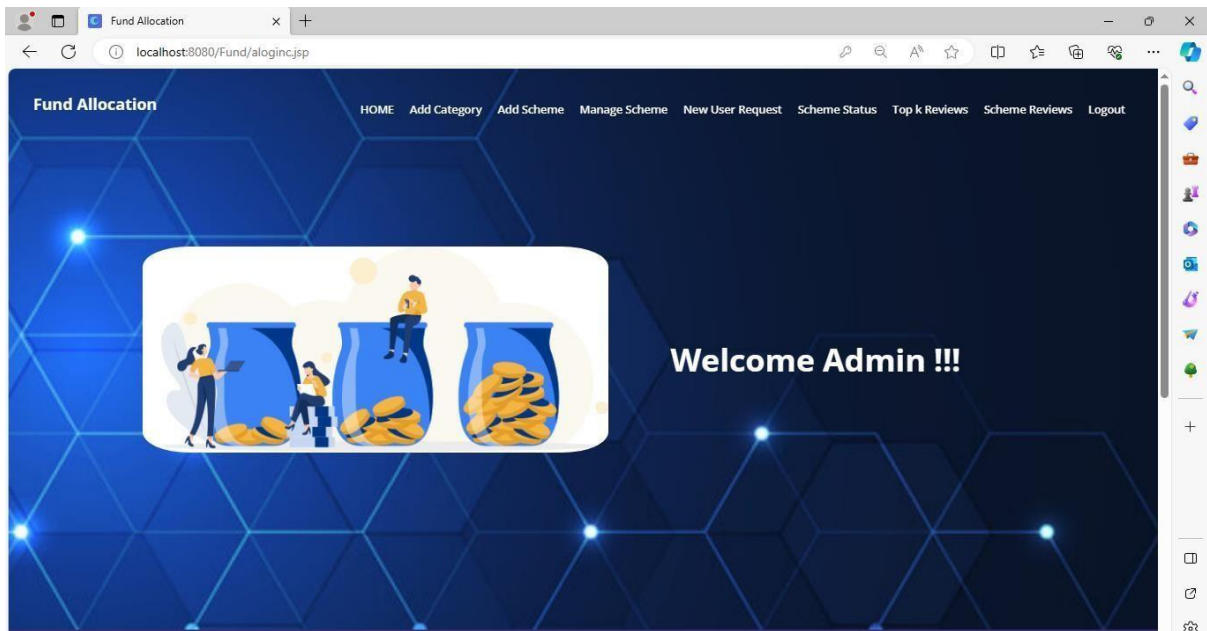


Fig B.3 Admin page

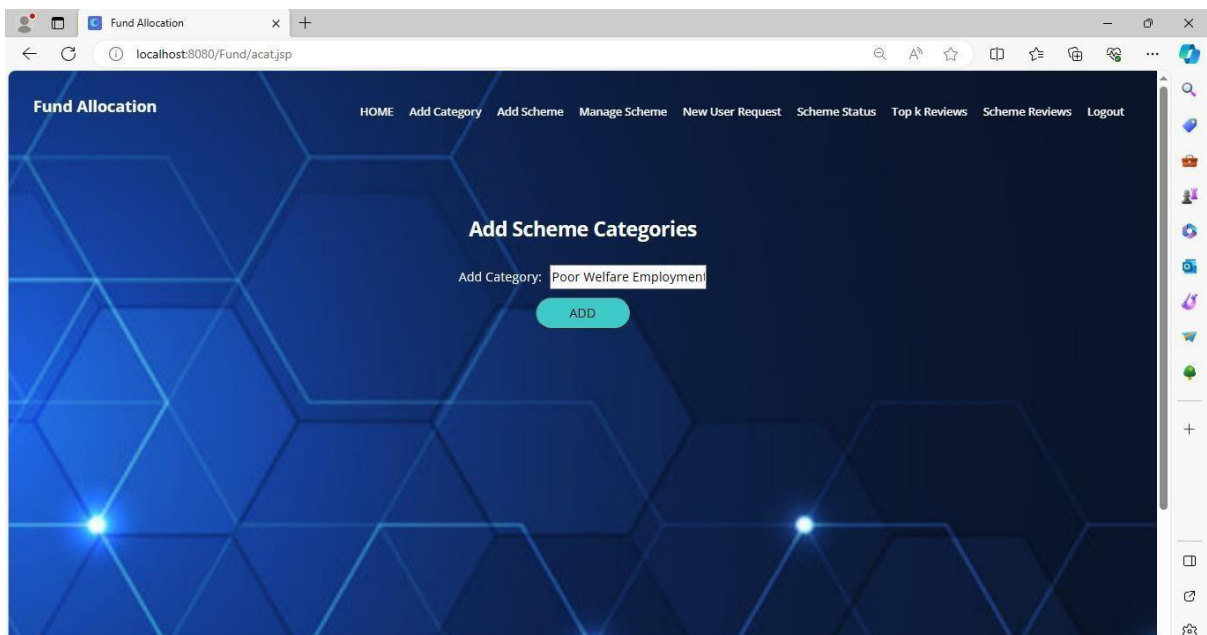


Fig B.4 Categories page

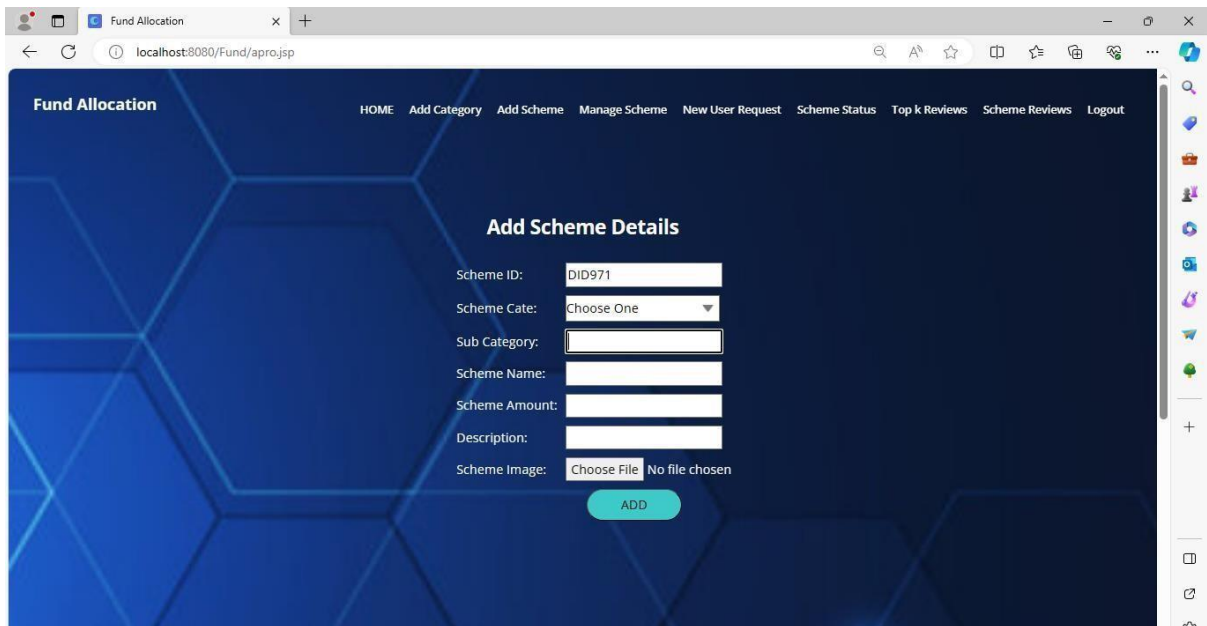


Fig B.5 Scheme Details page

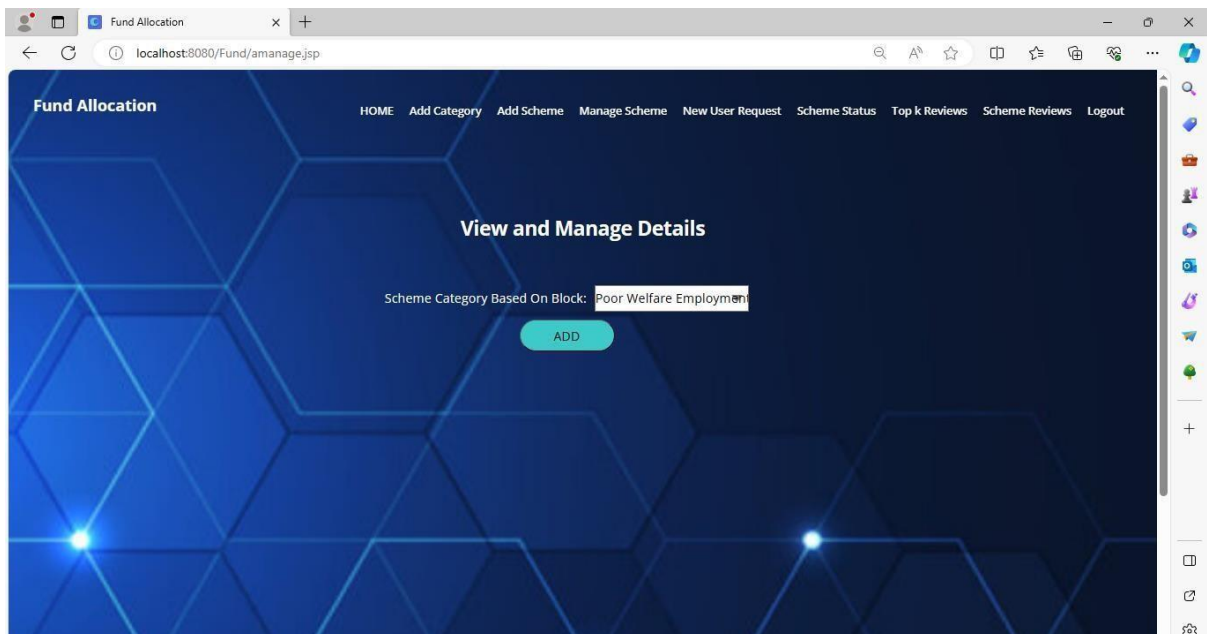


Fig B.6 View and Manage page

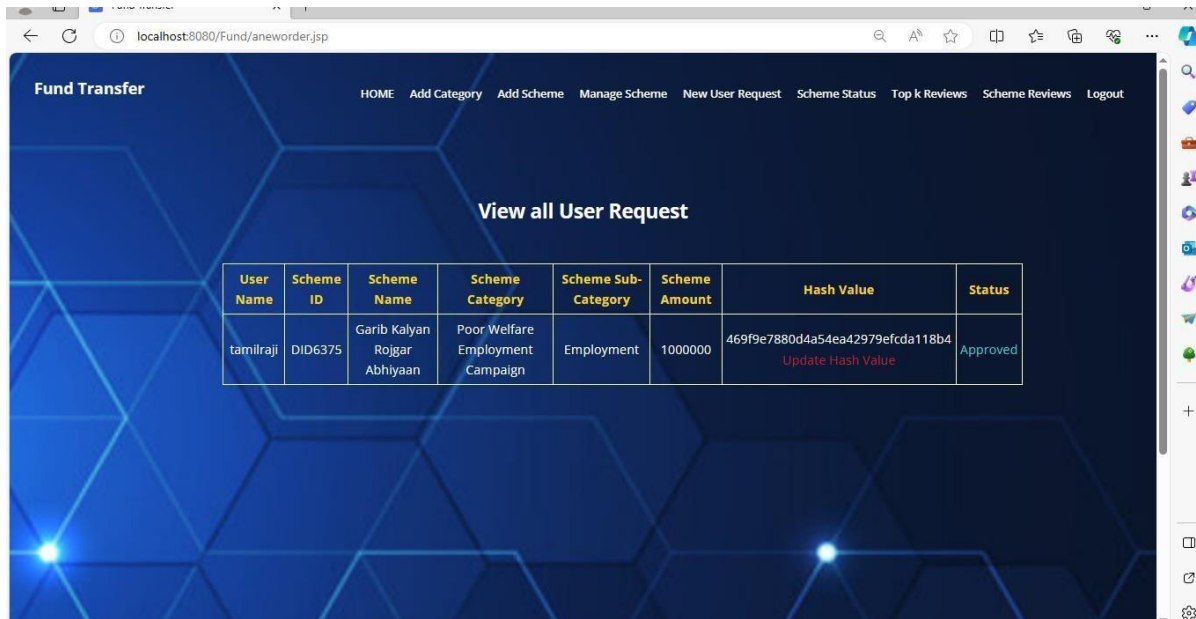


Fig B.7 Request page

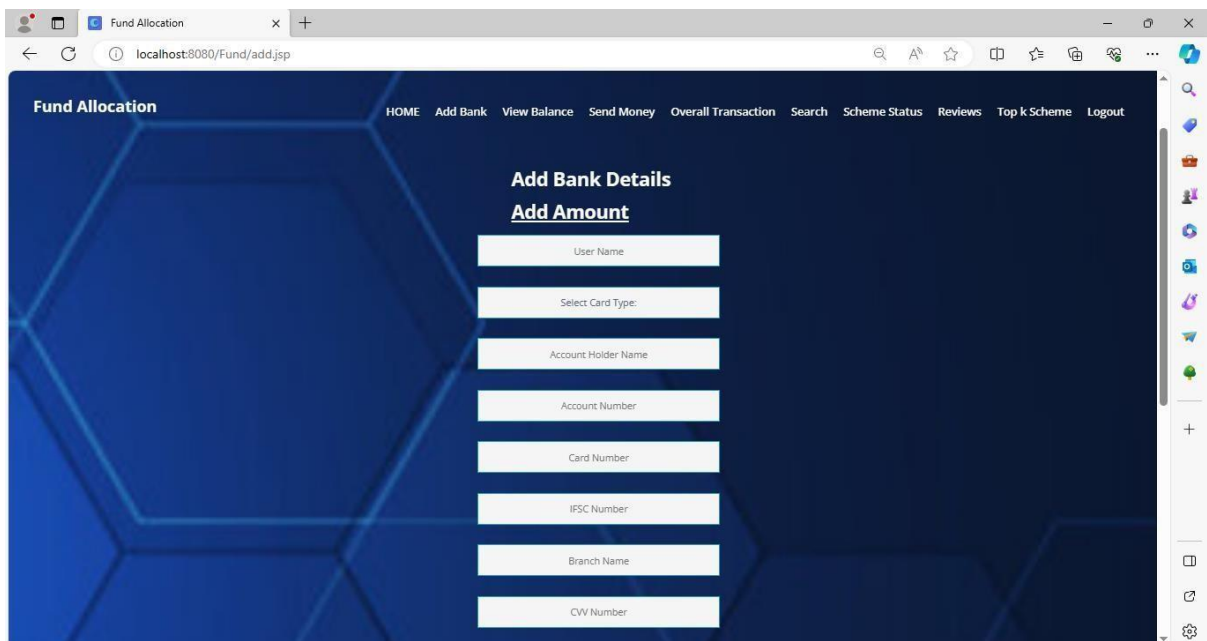


Fig B.8 bank Details page

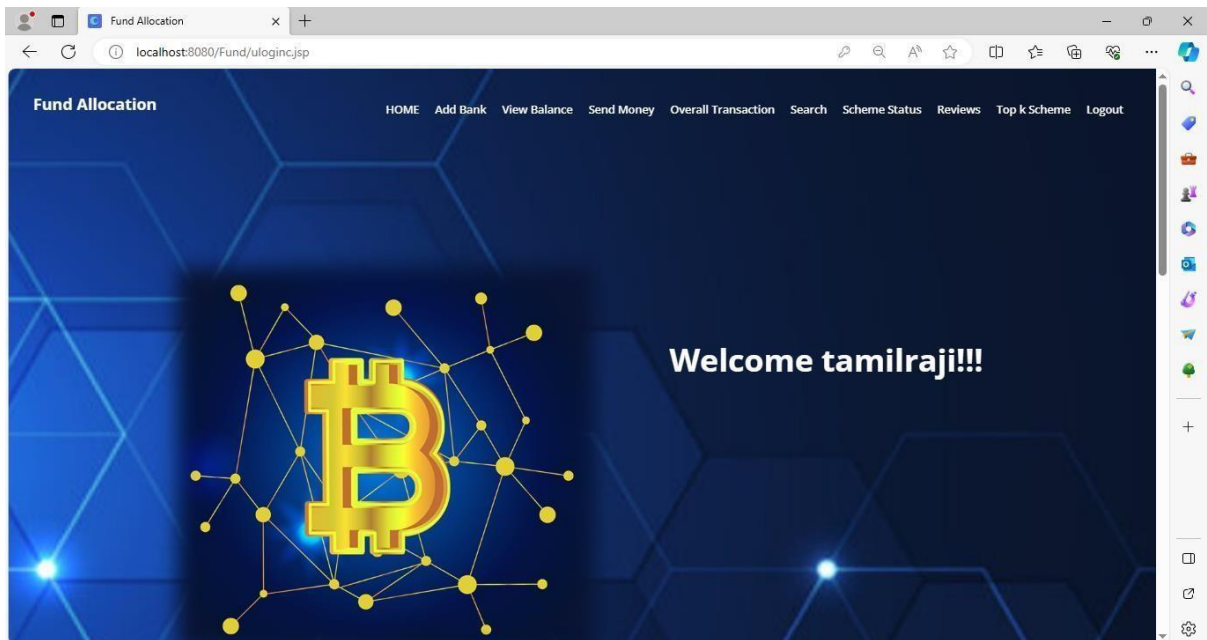


Fig B.9 welcome page

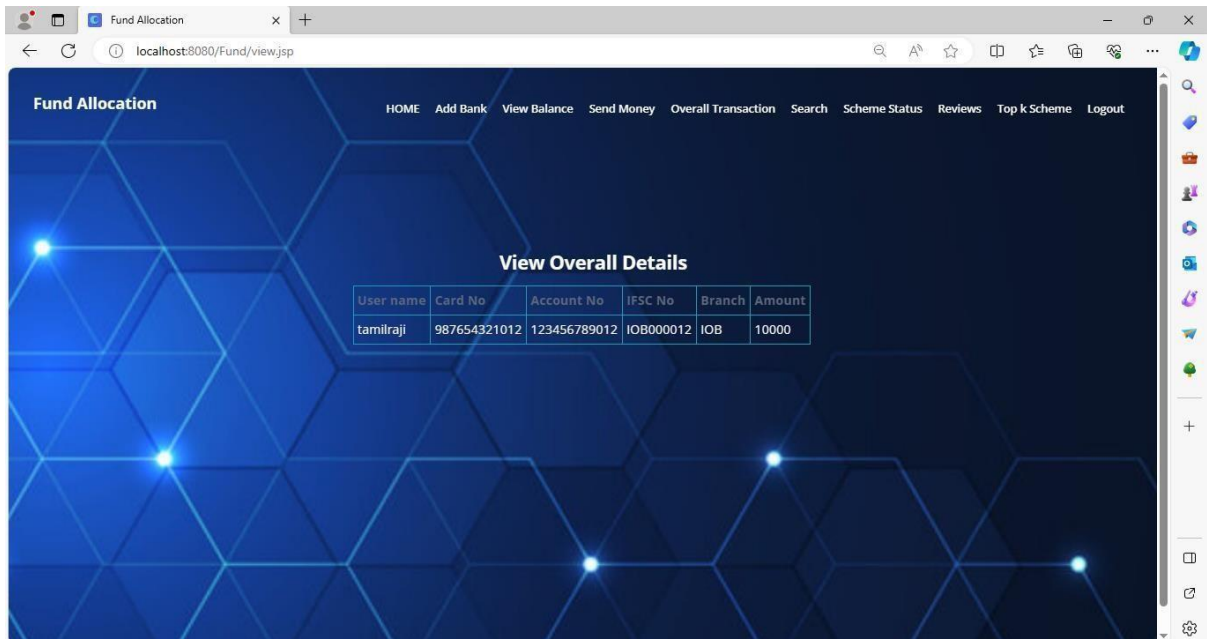


Fig B.10 over all details page

SURVEY ON BLOCKCHAIN-BASED IOT PAYMENT AND MARKETPLACES

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ABSTRACT- *State governments have a massive range of state functions to perform. The paintings of kingdom governments involves a large wide variety of activities to perform various features in the country. This consists of new projects, renovations and upkeep works, awarding of contracts, salaries of presidency personnel, agricultural guidelines and so on. The largest obstacle going through the pinnacle government is the corruption within the grass subject, which once in a while it can't control. So progress. Due to the contemporary device, tracking that is very tough. Here we advocate a shrewd machine to track public solutions dispensed at some point of the governance procedure at every degree. We use present day technology to conduct every transaction, retaining transparency in every transaction. This allows the venture request to be a obvious device of information on which the request is primarily based. The gadget uses encryption to guard business information by way of the usage of it to store transactions in a chain that may be demonstrated by every collaborating node to verify transactions and shop information in an obvious form within the government. It is stored and validated. This device helps in creating an unbreakable governance procedure with a completely audited, secure and reliable release and tracking gadget.*

Keywords: *Internet of Things, IoT payments, IoT marketplace, clever contract block chain.*

OBJECTIVE

- The work of public authorities includes a big range of transactional sports related to the overall performance of various functions within the kingdom. This includes new sports, tasks, schemes, contracts, agricultural schemes and so forth.
- One of the largest troubles going through the top authorities is corruption in the grassroots, which sometimes makes it tough to music the progress of the government and derails it.

- In this case, we use block chain, which presents cryptography and transaction security in any respect tiers, maintaining it obvious that each transaction is supported via evidence of its authenticity.

INTRODUCTION

Block chain is one of the technology that has revolutionized many industries. The block is now used in lots of regions and lots of its programs are but to be located and perfected. The nature of the block chain is decentralized, the integrity of the statistics saved within the chain, and its openness. Because of these features, every other area of use is to provide interference manipulate software program. Governments, like States, have great duties at their disposal. The commercial enterprise of kingdom governments includes a huge range of groups to fulfill various features so as to be used during the kingdom. This consists of new projects, renovations and upkeep works, awarding of contracts, salaries of government employees, agricultural rules and so forth. An essential obstacle to the highest tiers of government is grass-roots corruption, that's from time to time invisible and results in deprivation. Development reputation Due to the modern-day system, monitoring this is very tough. The block chain is thought for its capability to build believe and facilitate the alternate of facts between human beings and businesses. Innovation gives confidence when the selection is made in the proper situations. Typically, corporations that attempt to outgrow their monolithic IT architectures face demanding situations which includes compromising brands, figuring out a single source of truth, and incentivizing innovation. The innovation block helps resolve these challenges by using offering a special feature that permits for common commercial enterprise fashions, as no single entity controls the entire structure. This consists of the particular want for government to combine, guide, and offer open agree with throughout records and infrastructure. In such conditions, block blocking can help to growth self assurance

1. Government guidelines

Author/Year: Shejin Cherian/2022

In this newsletter, the writer explores the capacity of technology to reduce fraud that happens when buying public tasks. Eight associated houses of each virtual switch machine are compensated by using a series of winding layers. To create some capital on this shape of a digital machine, the writer proposed the usage of blockchain-primarily based generation the usage of the residences of mathematical models to publicly create a few capital at all degrees. The gadget also can be heard by way of non-specialists, to make certain the moisture of any task, making the device completely obvious and beautiful.

2. Protect the transaction information thru hashes.

Author/Year: Shetty & Rajeev/2022

In this newsletter, the author looked at block chain applications that open glass records with the proper to query a given transaction on a need-to-recognize basis. To process block transactions at the chain, the system uses encryption to guard the transaction facts. This gadget offers the potential to soundly control payments and song them securely, creating a very incorruptible governance system.

3. Government pays

Author/Year: Krishna after Kumar Patel and Saurav/2021

This article examines the usage of block chain generation to search for authorities solutions. When the government allocates budget for projects, regularly most of them are not used and are hardly ever used inside the actual global, one of the important reasons being corruption. If the check is filled in right here, anybody might be capable of tune whilst and in which they may be used. This technique is used within the public sector and may have a large impact at the improvement and financial system of the u's

4. Protect transaction facts the usage of hashes.

Author/Year: Sheran, Lavanya, Kunal Patel and Ahmed/2020

The system makes use of encryption to shield transaction statistics, making sure end-to-stop processing of transaction

blocks. Using the system, you can actually create a transparent, faultless management system, through pursuing inquiries and solutions, in a completely safe, secure and reliable way.

EXISTING SYSTEM

- In the system that is included in the report, the section looks at the various parameters of the project and, in addition, the scope of the project, a lot of analyses and studies are carried out in the discipline that is of interest. . The results have now been published.
- Literature review is the most important step in any solid research. Before we start development, let's look at the previous
- documents and what we can expect, or what to eliminate and start working in the context of the previous documents.
- In this step, we briefly evaluate the roles that are in the control of the distribution solution and the track system and the use of the technology.

Disadvantages:

- Opportunities to kill candidates or veterans.
- Not every old union has a computer or internet, so voters can go to a polling station and vote.

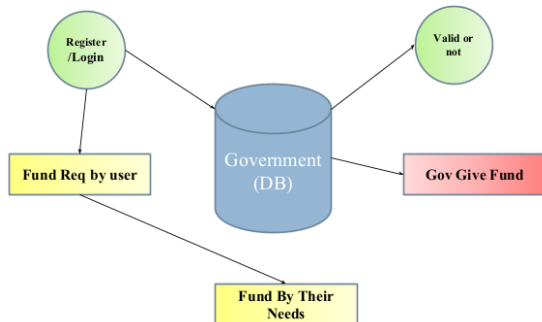
PROPOSED SYSTEM

- The main purpose of the plan is to use a platform to monitor the distribution of public funds.
- The platform pursues the following goals: • It is more convenient to carry out the task of distributing government solutions using reporting documents.
- Aggregated donation data in one place will allow automated reporting.
- Donation can be made more transparent by creating a payment system.
- Maintain transparency and security at all levels.
- Create a non-corrupt government service.
- Provide a consistent environment for tracking solutions.

Advantages:

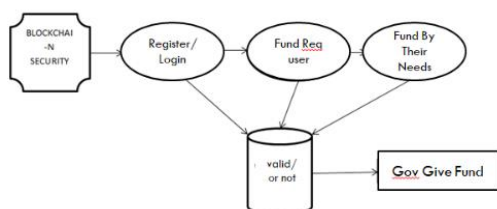
- Easily track payments made to state government through the government process.
- It uses technology to carry out transactions at every level, maintaining transparency in each transaction and in each transaction evidence that money is being used.

SYSTEM ARCHITECTURE



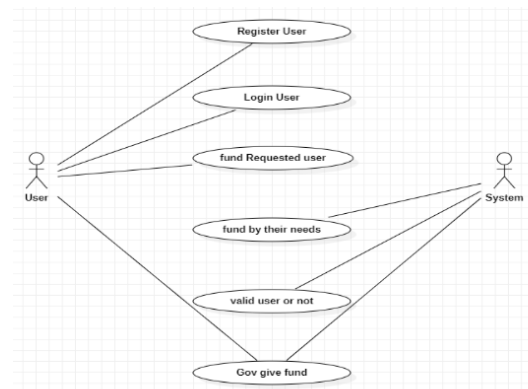
Data Flow Diagram

1. A DFD is in this way called an air pocket frame. A fundamental graphical formalism can be utilized to address the commitments to a machine, the various realities that it systems, and the realities produced through that machine.
2. Information skim graph (DFD) is one of the central appearance gear. Displaying parts of the gadget is utilized. These parts are the construction methods, the records utilized by the procedure, the outer thing that looks at to the contraption, and the evaluations streams inside the system.
3. The DFD shows how insights developments through the contraption and how its miles changed through a chain of changes. A graphical system depicts the float of evaluations and the movements which should be possible as records rehearses from enter to yield.
4. A DFD is other than known as an air pocket outline. A DFD might be utilized to address a gadget at whatever point of reflection. A DFD might be divided layers that contain slow assessments float and man or lady tasks.



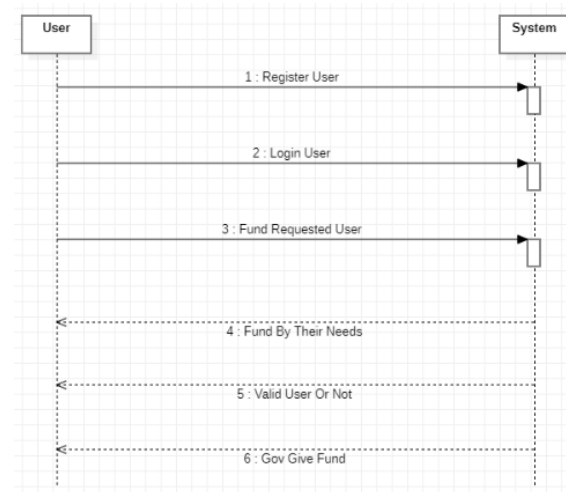
Use Case Diagram

The Bound together appearance Language (UML) use case frame is a kind of human outline depicted and set forward using use protection evaluation. The goal is to offer a graphical overview of the value of the machine in verbalizations of performers, their longings (would consistently talking as use events), and any circumstances among client cases. The particular use diagram of a development is to show which contraption limits are done for which performer. You can depict the spots of the performers inside the contraption



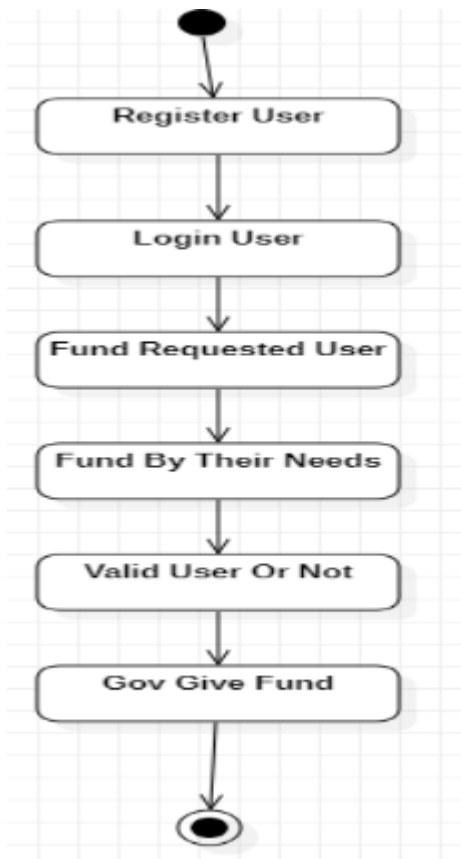
Sequence Diagram

A Bound together appearance Language (UML) gathering diagram is a sort of joint effort outline that shows how cycles draw in with each exceptional and in what request. This convey is a movement of posts. Plan charts are sometimes known as occasion frames, occasion scripts, and timing graphs.



Activity Diagram

Development frames are a graphical depiction of step-through-step and working exercises with help for decision, age and synchronization. In One In the programming language, a relaxing advancement graph can be utilized to sort out the things and the reasonable step work portrayal of the parts inside the contraption. The improvement outline shows the general float of control.



REQUIREMENTS:

Hardware Requirements

System: Pentium i3 Processor.

Hard Disk: 500 GB.

Monitor: 15'' LED

Input Devices: Keyboard, Mouse

Ram: 4 GB

Software Requirements

Operating system: Windows 10.

Coding Language: .Net

IDE: Visual Studio

MODULES:

Module 1 - Government: - Government can pay the rate asked with the aid of the consumer.

Module 2 - AUTHORIZATION (TPA): - The user authenticates or tests whether or not the user is valid and has a valid request.

Module 3 – User (Client): - The user requests charge as consistent with his necessities.

Algorithms Used

AES with SHA Key: For encrypting metadata file we are using AES encryption algorithm. The encryption process generates a symmetric key called around a key.

SHA-1 is applied on this key which creates block of data which is hold by an array of data called the state array

RESULT AND DISCUSSION:

The issue of users is increasing unexpectedly each day. Block chain applications are widely open in the regions of safety, crypto currency, healthcare, coverage, etc. Here are the benefits and downsides of blocking off. The block promotes real integration with the actual economy and strengthens core studies technologies.

CONCLUSION

The invention of block chain has officially had an effect on digital economic programs. The key constructing blocks of innovation, logging, consensus tools and public cryptography, are promising for IoT and deliver chain monitoring programs. We mentioned IoT application design and the innovation block mentioned packages to focus on the challenges associated with block chain for the IoT. Next, we talked about that the doorways are open to the blocking of things using the Internet. In the stop, we concluded that its miles difficult to take full benefit of block chain tendencies within the Internet of Things. Despite the demanding situations, block chain improvements are very encouraging in addressing the challenges of protection, protection and consider in multi-player software scenarios.

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