A PROJECT REPORT

on

“Blockchain Based FIR Registration”

Submitted to

KIIT Deemed to be University

In Partial Fulfilment of the Requirement for the Award of

BACHELOR’S DEGREE IN
INFORMATION TECHNOLOGY

BY

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UNDER THE GUIDANCE OF
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May 2023

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Bhubaneswar, ODISHA 751024

CERTIFICATE

This is certify that the project entitled

"Blockchain Based FIR Registration"

submitted by

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is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor of Engineering (Computer Sci-ence & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work is done during year 2022-2023, under our guidance.

Date: 03/05/23

Dr. Hitesh Mohapatra
Project Guide

Acknowledgements

We are profoundly grateful to Sir Hitesh Mohapatra for his expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion. Thank you for your continuous support.

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ABSTRACT

The aim of this project is to create a decentralized system for FIR (First Information Report) registration using blockchain technology. The system will allow citizens to register FIRs online, providing a secure and tamper-proof way of storing the information. The project aims to solve the problem of corruption and inefficiency in the current FIR registration process, which is often a lengthy and tedious process, requiring citizens to visit police stations physically.

The blockchain technology used in the system will enable the creation of a tamper-proof record of FIR registration that can be easily accessed by authorized personnel, leading to a more efficient and transparent system.

The system will have a user-friendly interface that allows citizens to easily register an FIR. The system will prompt the user to input relevant details, such as the date, time, and location of the incident, along with a detailed description of the incident. Once the FIR is submitted, it will be recorded on the blockchain, creating a tamper-proof record that can be easily accessed by authorized personnel.

Keywords: Blockchain, User Interface, FIR Registration, Python, Decentralized Systems.

Content:

List of Figures:

1. Introduction

The FIR Registration through Blockchain project seeks to develop a decentralised system that makes use of blockchain technology to address issues with the FIR registration procedure as it is. FIR registration is currently done manually, takes a long time, and is prone to corruption in many nations. To lodge a FIR, citizens must physically visit police stations and go through a time-consuming process. Concerns concerning the validity and dependability of the data acquired are also raised by the manual method.

The FIR Registration with Blockchain project suggests a decentralised method that enables citizens to register FIRs online in order to address these problems. The system is based on blockchain technology, which provides safe and unhackable data storage.

The system's usage of blockchain technology will provide it a number of advantages over the way things are done now. First of all, it will lessen the need for middlemen like police officers and solicitors, decreasing the likelihood of corruption and power abuse. Second, because citizens can check the progress of their FIR registration online, the technology will increase transparency in the FIR registration procedure. Thirdly, since residents can file a police report without leaving their homes and without going to a police station, it will shorten the time it takes to file a FIR.

Through a secure login system, authorised personnel, including police officers and solicitors, can access the FIR registration data. Based on the information provided, they can view the data and take the relevant action. The system's implementation of blockchain technology assures that the data is impenetrable and that any alterations are transparently documented on the blockchain.

In conclusion, the proposal to register FIRs using blockchain technology offers a possible remedy for the issues that now plague the FIR registration procedure. The goal of the project is to use blockchain technology to build a decentralised system that offers safe and unhackable storage for FIR registration data. The system will make the FIR registration procedure more efficient, minimise corruption, and boost transparency.

2. Literature Review / Basic Concepts

The advantages of employing blockchain technology for many applications, particularly in the legal and justice systems, have been emphasised in a number of studies. Blockchain technology has been applied in various nations to the FIR registration setting to produce a tamper-proof record of FIR registration. The method is more secure and effective because only authorised individuals have access to these records.

This section will elaborate on the basic concepts of the project, including blockchain technology, decentralized systems, and FIR registration.

2.1 Blockchain Technology:

Blockchain is a distributed ledger technology that makes it possible to store data securely and openly. Each member of the network has a copy of the ledger, which is a decentralised system. Any changes to the ledger are recorded in a tamper-proof manner. The ability of blockchain technology to address a number of issues relating to data security, transparency, and privacy has helped it become more popular in recent years.

2.2 Decentralised Systems:

Systems that run without a central authority or middleman are said to be decentralised. All participants in a decentralised system have equal power over it, and any modifications that are made to it require the agreement of all participants. Decentralised systems have grown in popularity recently because of their potential to decrease reliance on middlemen and boost security and transparency

2.3 FIR Registration:

In many nations' legal systems, the registration of First Information Reports (FIR) is a critical step. It entails filing a complaint with the police once a person reports an offence that has been committed. To ensure that the legal system can take the proper action against the perpetrator, the FIR registration process is crucial. However, the current FIR registration procedure is frequently onerous, drawn-out, and corruptible, which undermines public confidence in the legal system.

3. Problem Statement / Requirement Specifications

Many countries' current FIR registration procedures are ineffective and prone to corruption. Citizens must physically visit police stations to register a FIR, and the procedure can take a while. Additionally, there is a lack of transparency in the procedure and the ease with which FIR registration records can be altered, which undermines confidence in the system. The goal of this project is to use blockchain technology to develop a more effective and transparent mechanism for FIR registration.

3.1 Project Planning

Starting with system design, the FIR Registration using Blockchain project will be implemented through various stages. The team will work together to create a thorough strategy, including the system architecture, database design, user interface, and security measures, throughout the system design phase.

Following the system design phase, the team will start working on developing the actual software application. Testing, coding, and blockchain technology integration are all part of the development phase. The team will also make sure the system is effective, scalable, and satisfies performance standards.

The testing phase will start after the development phase is over. To confirm that the system is operating properly and up to par, the team will run a number of tests. Unit testing, integration testing, performance testing, and security testing are all part of the testing process.

The deployment phase will start after the testing phase. The system will be launched during the deployment phase, and users will have access to it to register FIRs online. To guarantee that the system keeps working properly and satisfies user needs, the team will also offer support and maintenance services.

To guarantee that the system conforms with all legal and regulatory standards, the team will work in conjunction with legal experts throughout the project. To enhance the system's operation and design, the team will also solicit input from

stakeholders, including people, law enforcement officials, and legal experts.

The project will be broken down into a number of milestones, and the team will regularly inform stakeholders on its status. The updates on the project's progress will include the tasks that have been finished, those that still need to be done, and any difficulties or problems that the team has faced. To make sure the system fulfils the stakeholders' needs and expectations, the team will also ask for feedback from them at each milestone.

3.2 Project Analysis

Citizens will be able to register FIRs online through the system, which offers a safe and impenetrable method of storing the data. The system will become more effective and transparent thanks to the adoption of blockchain technology, which will make it possible to create a tamper-proof record of FIR registration that can be quickly accessed by authorised staff. To make sure that the information from the FIR registration is available and used for further inquiry, the system will also be connected with other government systems.

The project's next phase is to analyse the data acquired after gathering the requirements or conceptualising the problem statement. The team will analyse the requirements throughout the analysis phase to find any potential problems, ambiguities, contradictions, or information gaps. This step is essential for ensuring that the system's development and design are on track and that any possible issues are found at an early stage. The analysis step will assist in ensuring that the system satisfies the needs and expectations of the user. Before beginning the system design and development phases, the team will analyse the requirements and find any problems that need to be fixed.

The technical specifications for the system are described in the System Requirements Specification (SRS) paper. It contains information about the system architecture, user interfaces, and security specifications. The functional requirements for the system, such as user registration, FIR registration, and access control, are also described in the SRS paper.

3.3 System Design:

3.3.1 Design Constraints:

The system will be designed using a decentralized architecture, with the blockchain serving as the underlying technology. The system will be developed using the blockchain, which is known for its security and transparency. The front-end of the system will be developed using a combination of HTML and CSS while the back-end will be developed using Python.

Software used : Flask, Python, Numpy, PDFkit, Hashlib.
Hardware used: Laptop.

3.3.2 System Architecture:

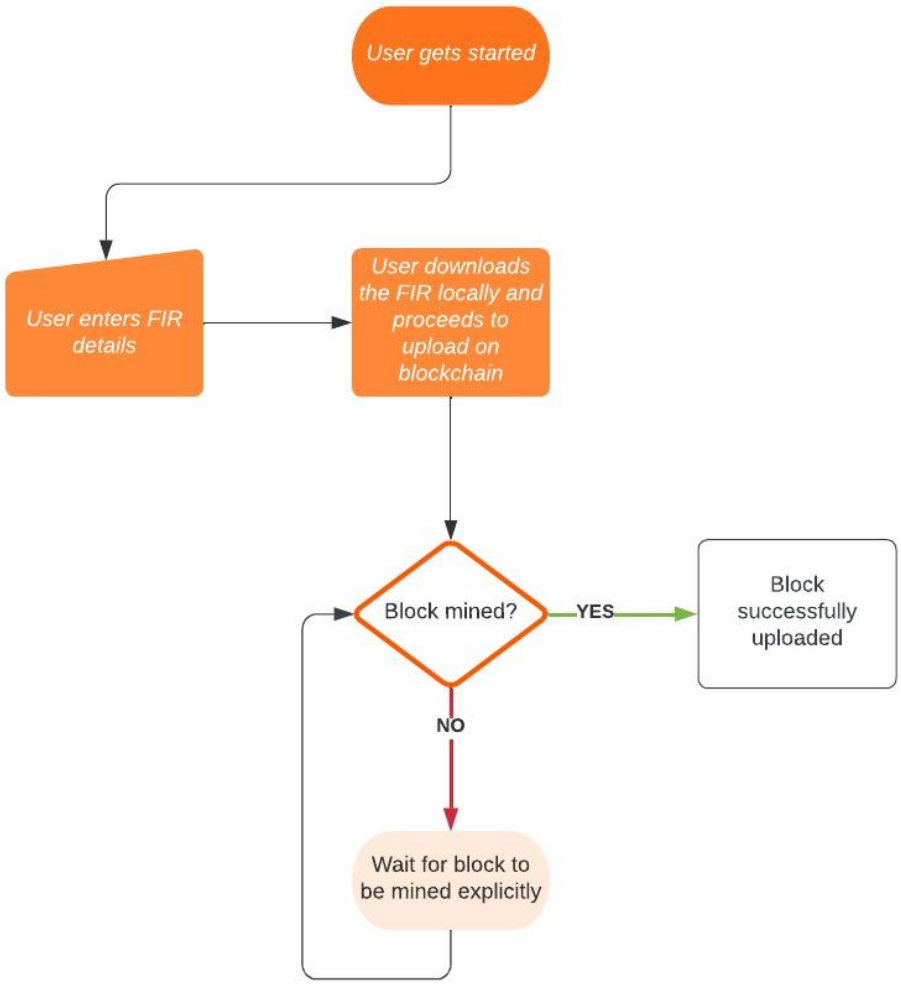


Figure 1.1: An architechture of the Project built

3.3.3 Block Diagram:

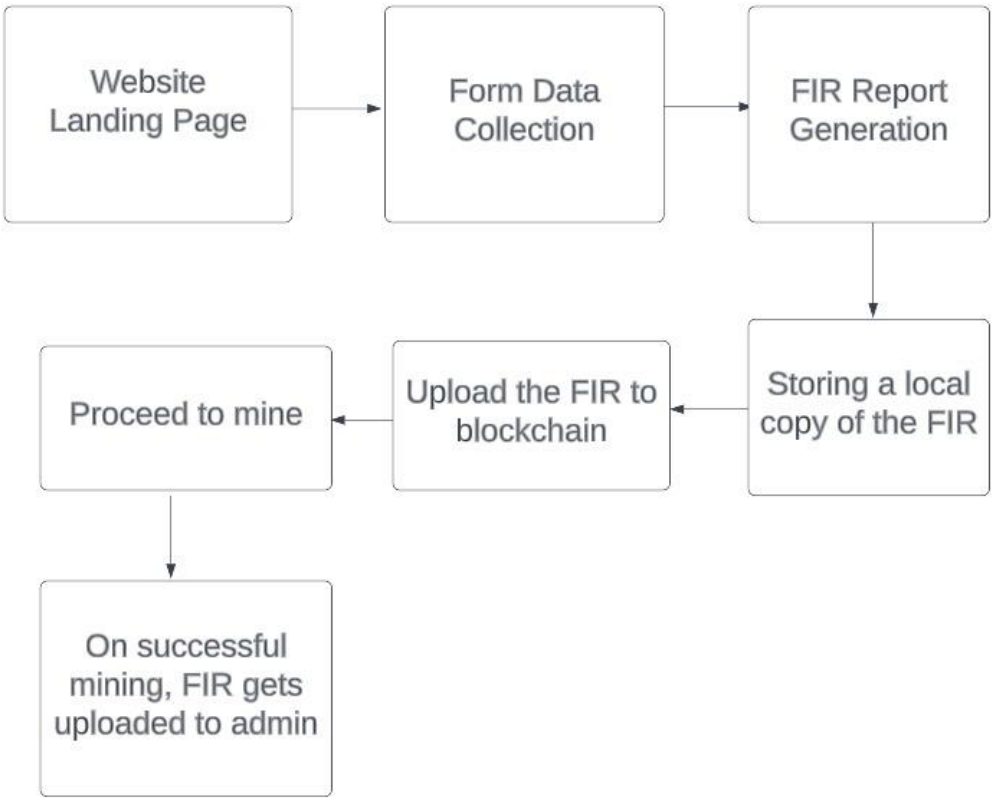


Figure 1.2: A block diagram showcasing the workflow of the project

In the above figure we can see how our project actually works a user first lands on the landing page and then registers themselves as a victim and we generate a pdf based on the information provided which they can submit to the police station which will go in a blockchain and upon succesfull mining the FIR Report is submitted to the police station.

4. Implementation

In the Figure 1.1 we can see the working of the the project how a user initiates the process and how does the pdf gets submitted into the blockchain. Here in, FIR Registration through Blockchain project, we have implemented a user-friendly web-based form using HTML, which allows citizens to register FIRs online. The form is designed to collect all the necessary information required to register an FIR, including the victim's name, contact information, location, and a description of the incident.

Once the citizen fills out the form and submits it, the system automatically generates a PDF file that contains all the information entered by the citizen. The PDF file serves as an FIR report that can be used as evidence and can be used for further investigations.

To ensure that the information entered in the PDF file is secure and tamper-proof, the system uses blockchain technology. The PDF file is encrypted and uploaded to the blockchain, where it is stored as an immutable record. This means that once the record is uploaded to the blockchain, it cannot be altered or deleted, providing a secure and tamper-proof way of storing the FIR information.

After the FIR report is uploaded to the blockchain, as you can see in the figure 1.2 it is then sent to the designated admin who can access the information and take necessary actions. The admin can also add notes or update the status of the FIR in the system, which can be accessed by authorized personnel.

Overall, the implementation of the project using HTML to create a user-friendly form, generating a secure and tamper-proof PDF file using blockchain technology, and sending it to the admin is a highly efficient and secure way of registering FIRs. It not only saves time and resources but also ensures the security and integrity of the information provided by citizens. The system's transparency and tamper-proof record of FIRs can help to increase accountability and reduce corruption in the FIR registration process.

4.1 Methodology / Proposal:

Why did we use Blockchain and not distributed systems:

Public blockchains were developed collaboratively, with the ultimate aim of establishing a totally decentralised world in which the ownership of digital goods is always safeguarded and transferable. Distributed databases, on the other hand, are centrally controlled by a service provider. Their objective is to build a logical hub that can offer scalable, cost-effective services.

The main benefit of blockchain technology is the creation of a new ecosystem of digital data assets and automated trust services, not the provision of basic data services (like the decentralised database). Data on the global blockchain can be tracked back to its source, and its state is automatically updated.

On the other hand, a distributed database's primary purpose is to give business systems access to and storage for data. The database is intended to provide operational assistance, mostly for corporate products and development initiatives, with a focus on assisting analysis and retrieval of the data.

Hence we are using Blockchain to deal with the problem at hand to easily build new ecosystems, make sure the data is trackable to its source and provide total transperancy in doing so and once its in blockchain no one can tamper with it.

We propose to use Blockchain Technology to tackle the issue of corruption and include transparency in the project. We used agile method to build this project.

A flexible process was used to design the system, and our teacher was provided frequent input and updates. The software development team adhered to best practises in the industry, including testing and code reviews. Along with putting security and data privacy first, the team also made sure that the system complies with all applicable legal and regulatory frameworks.

4.2 Testing OR Verification Plan For Future

The system will undergo rigorous testing to ensure that it is both functional and secure. The testing process will include unit testing, integration testing, and acceptance testing. The system will also undergo regular security testing to ensure that it is not vulnerable to cyber attacks. Quality assurance processes will be put in place to ensure that the system meets all relevant legal and regulatory requirements.

4.2 Result Analysis OR Screenshots

Proof of implementation:

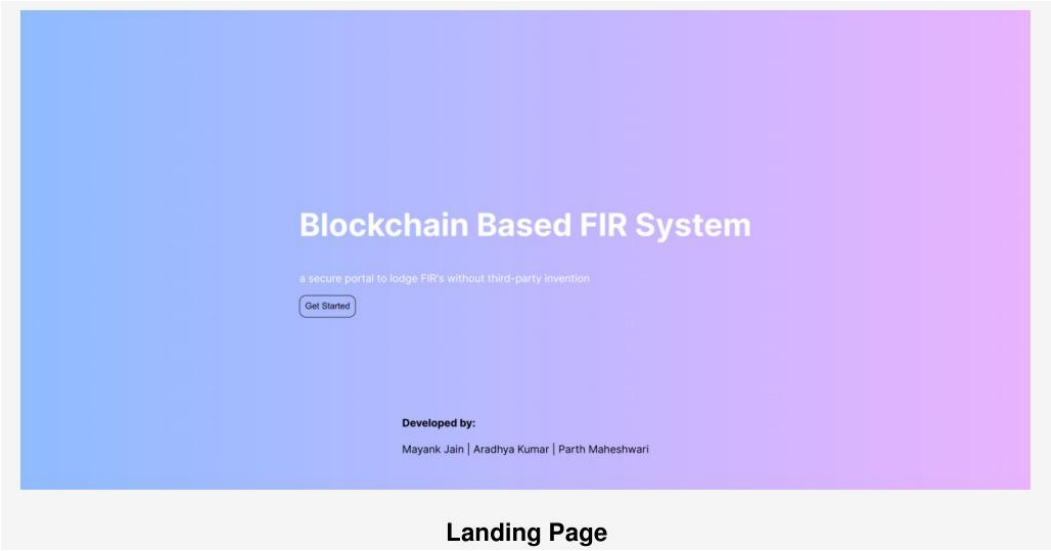


Figure 4.1: Landing page of our project.

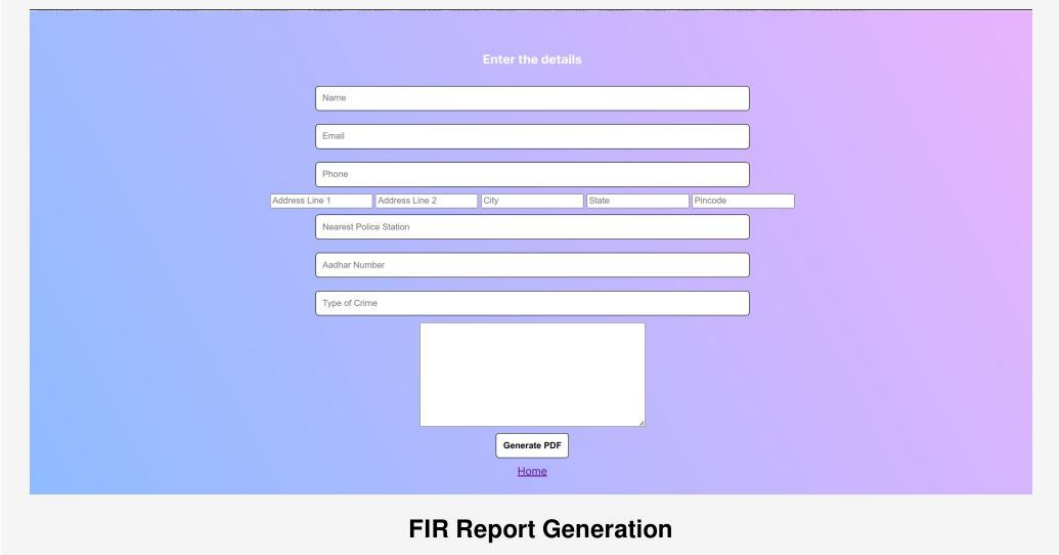
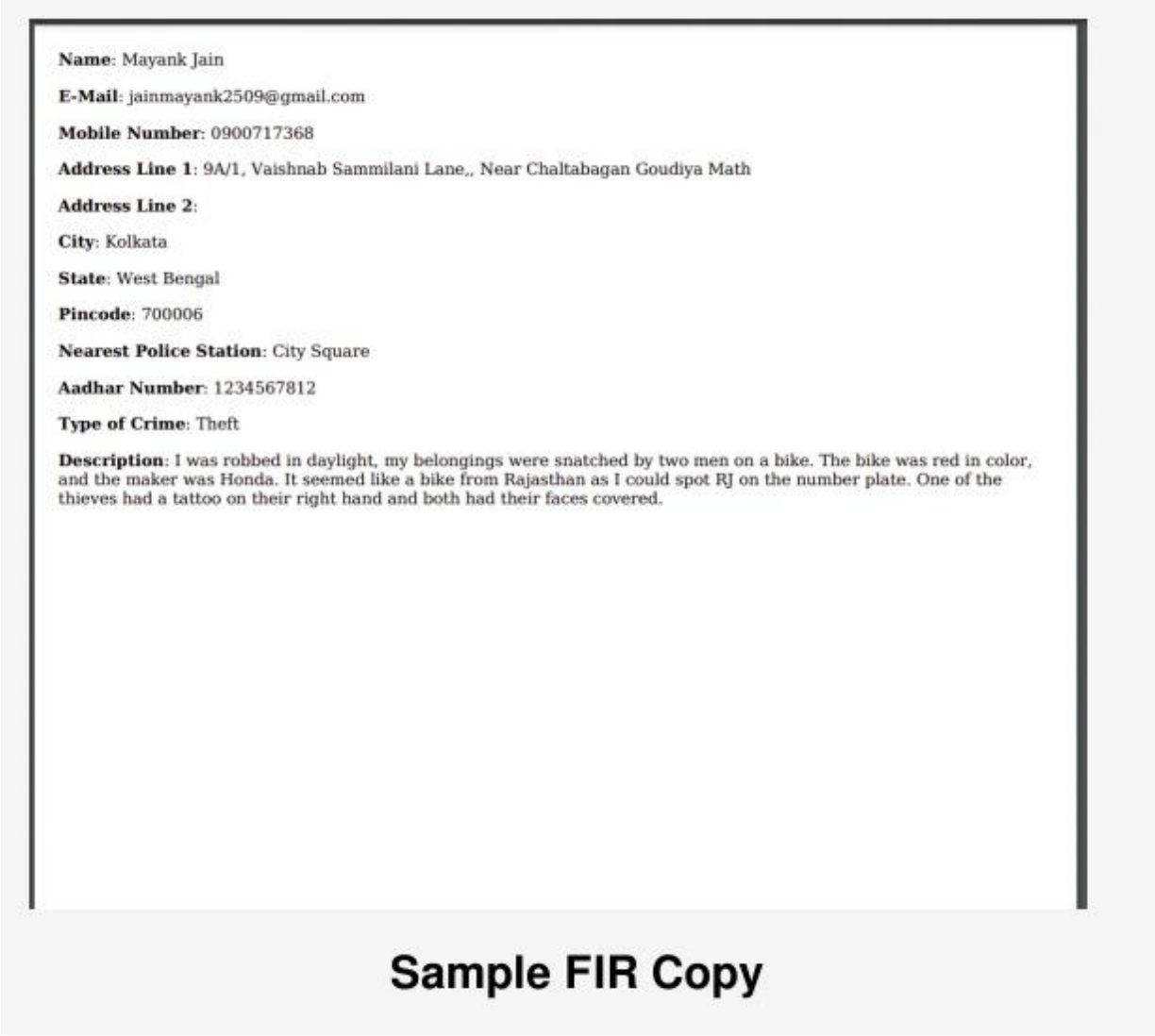


Figure 4.2 Home page(Registration Form) : Here the user will put in the Fir details and he will get a pdf in return.



Name: Mayank Jain

E-Mail: jainmayank2509@gmail.com

Mobile Number: 0900717368

Address Line 1: 9A/1, Vaishnab Sammilani Lane,, Near Chaltabagan Goudiya Math

Address Line 2:

City: Kolkata

State: West Bengal

Pincode: 700006

Nearest Police Station: City Square

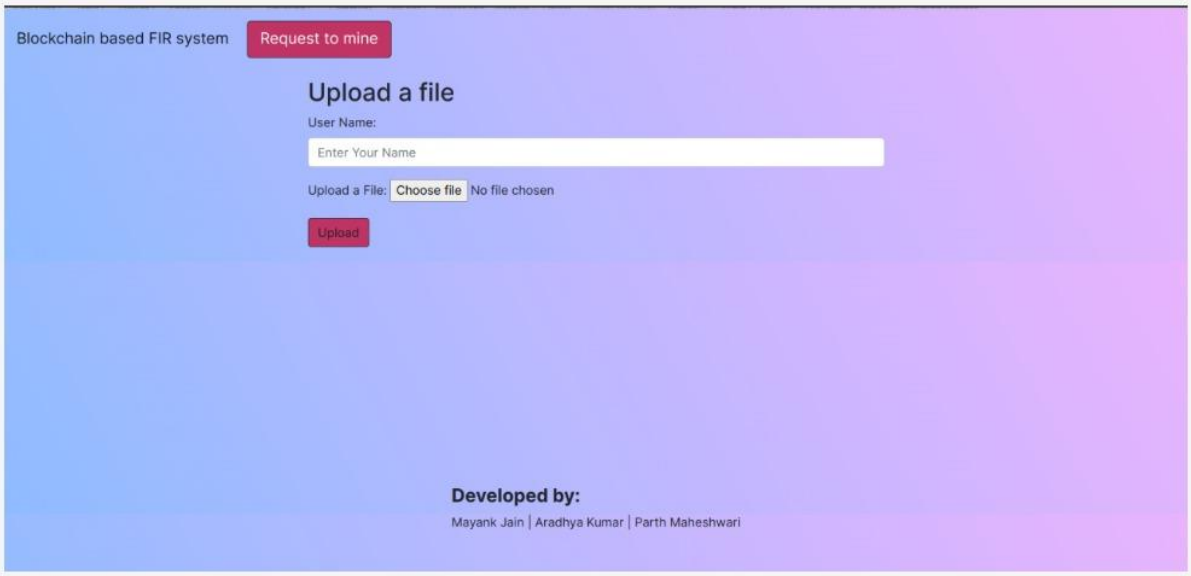
Aadhar Number: 1234567812

Type of Crime: Theft

Description: I was robbed in daylight, my belongings were snatched by two men on a bike. The bike was red in color, and the maker was Honda. It seemed like a bike from Rajasthan as I could spot RJ on the number plate. One of the thieves had a tattoo on their right hand and both had their faces covered.

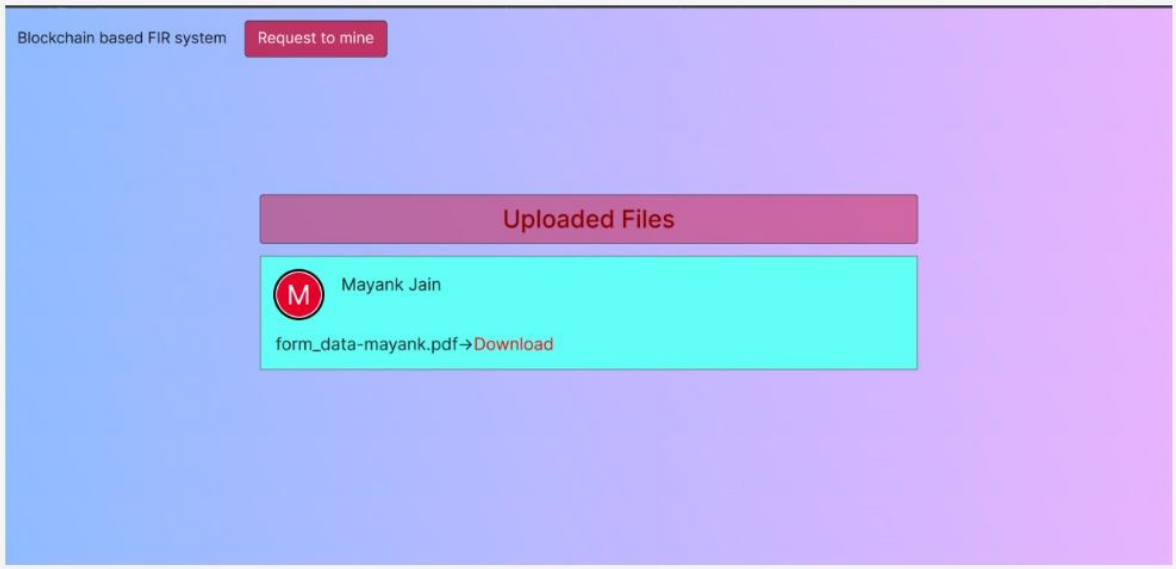
Sample FIR Copy

Figure 4.3 : Sample of the PDF generated. The details that were filled by the user is all compiled and a pdf is generated. This is the FIR Report that is generated.



FIR File Upload on Blockchain

Figure 4.4 :Submit the file to the police station (file goes into blockchain). Here the user can upload the pdf/ FIR Report that was generated to the police station.



Admin Side View

Figure 4.5: Admin panel (Police reviews the FIR) The FIR Report that was submitted by the victim is being worked upon after succesful submission of the report.

5. Standards Adopted

5.1 Design Standards:

The blockchain is used as the system's foundational technology, and it is constructed using a decentralised architecture. The system adheres to design concepts including modularity, scalability, and simplicity. The design was checked by the team to make sure it complies with all applicable legal and regulatory standards.

5.2 Coding Standards:

Coding standards are collections of coding rules, guidelines, and best practices. Few of the coding standards are:

To make the code simple to read, maintain, and test, the development team adhered to coding standards. The group adhered to naming conventions, utilised a consistent coding style, and made sure the code is correctly documented. The group gave security first priority while adhering to best practises to guard against vulnerabilities and cyberattacks.

5.3 Testing Standards:

In order to make sure the system was secure and functioning, it was put through extensive testing. Unit testing, integration testing, and acceptance testing were all parts of the testing process. To make sure that the system was adequately tested, the team prioritised test coverage and employed automated testing tools.
The development team managed code modifications with version control to keep the system dependable and stable. Best practises for branching and merging were adhered to, and Git was utilised for version control.

6. Conclusion

6.1 Conclusion and Future Scope:

In conclusion, the FIR Registration through Blockchain project aims to create a decentralized system for FIR registration, providing citizens with a secure and efficient way of registering FIRs. The project has outlined the technical requirements, system architecture, and development methodology required to create the system. The team will prioritize security, data privacy, and compliance with relevant legal and regulatory frameworks.

Looking to the future, there is significant potential for the application of blockchain technology in the legal and justice systems. The FIR Registration through Blockchain project is just one example of how blockchain technology can be used to create more efficient and transparent systems. In the future, similar systems could be developed for other legal processes, such as land registry or court records.

Furthermore, the project could be expanded to include other stakeholders, such as lawyers and judges, who could access the FIR registration data. The system could also be integrated with other government systems to create a more comprehensive database of legal and criminal records.

Overall, the FIR Registration through Blockchain project has the potential to revolutionize the FIR registration process, creating a more efficient, transparent, and secure system. With further development and integration with other legal systems, blockchain technology could have a significant impact on the justice system as a whole.

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Aradhya Kumar
2006542

Abstract: The aim of this project is to create a decentralized system for FIR (First Information Report) registration using blockchain technology. The system will allow citizens to register FIRs online, providing a secure and tamper-proof way of storing the information. The project aims to solve the problem of corruption and inefficiency in the current FIR registration process, which is often a lengthy and tedious process, requiring citizens to visit police stations physically.

Individual contribution and findings: Aradhya Kumar was involved in ideating the need to store two copies of the FIR created by the complainant. When the complainant enters their details into the portal and presses the Generate PDF button, the FIR copy gets downloaded onto the local system. This ensures that the user instantly gets a copy of their generated FIR. On proceeding towards uploading the FIR onto the blockchain network, the administrator instantly gets access to the FIR. At any point of time in the future, if the victim needs to verify, he can easily verify his copy of the FIR with the administrator on request. Coming to the technical aspect of the project, Aradhya was involved in devising the logic for the /forms route, making all the necessary codes for taking user input and storing the data from the form. Defining the HTML code for the form elements is the first step in building a form in HTML. To link the input with the data that will be sent to the server, each input element needs to include a name attribute. Additionally, it is crucial to specify the type of data that will be collected using input type attributes and the required attribute to show that the field is required. We must validate the form data after the HTML form has been constructed before sending it to the server. JavaScript may accomplish this by including event listeners in the form of elements. The event listener will activate a validation function when a user submits the form, which verifies that the user-supplied accurate data in each field. The validation feature will alert the user if any of the fields are incorrect and prohibit the form from being submitted until all mandatory fields have been correctly filled out.

Individual contribution to project report preparation: For the project report, Aradhya was involved in curating the Introduction, literature review and the basic concepts.

Individual contribution for project presentation and demonstration: For the project presentation and demonstration, Aradhya was involved in creating the introductory slides, from the introduction up until explaining what exactly is blockchain.

Full Signature of Supervisor: Full signature of the student:

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Mayank Jain
2006553

Abstract: The aim of this project is to create a decentralized system for FIR (First Information Report) registration using blockchain technology. The system will allow citizens to register FIRs online, providing a secure and tamper-proof way of storing the information. The project aims to solve the problem of corruption and inefficiency in the current FIR registration process, which is often a lengthy and tedious process, requiring citizens to visit police stations physically.

Individual contribution and findings: Individual Contribution and Findings: Mayank Jain was involved in deciding to choose an On Chain Blockchain for this particular project. There are two categories of blockchain applications: on-chain and off-chain. Off-chain blockchain refers to storing actual data outside of the block and only retaining metadata inside the block. On-chain blockchain refers to keeping information inside blocks. One of the major advantages of using an On-Chain blockchain is that information is contained in safe blocks, which can make on-chain blockchain more secure. In the event of a system failure, information can be simply restored. When security and data backup are the primary concerns, on-chain blockchain is more efficient. We used an on-chain blockchain for this project, which includes the file name and file size as well as the whole file data in a block. Mayank was primarily involved in ideating the base idea and structure of the project. Apart from this, Mayank also contributed toward writing the code for implementing the blockchain for initialising, adding a block and also to mine the block on the blockchain. Furthermore, since the project involved considerable use of frontend, Mayank also took active participation in styling each and every page of the project. With the help of CSS (Cascading Style Sheets) and appropriate class names, care was taken to give the project a visually appealing look for the viewer.

Individual contribution to project report preparation: For the project report, Mayank was involved in curating the system design as well as the implementation chapters of the project report.

Individual contribution for project presentation and demonstration: For the project presentation and demonstration, Mayank was involved in creating the Blockchain code implementation, conclusion as well as the future scope.

Full Signature of Supervisor: Full signature of the student:

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Parth Maheshwari
2006556

Abstract: The aim of this project is to create a decentralized system for FIR (First Information Report) registration using blockchain technology. The system will allow citizens to register FIRs online, providing a secure and tamper-proof way of storing the information. The project aims to solve the problem of corruption and inefficiency in the current FIR registration process, which is often a lengthy and tedious process, requiring citizens to visit police stations physically.

Individual contribution and findings: Parth Maheshwari was involved in deciding which particular framework to use for this project - Flask or Django. Since we had to incorporate Blockchain into the project, it was ideal that a particular Python framework could be used to properly integrate the necessary HTML files and at the same time run Python scripts. Flask is a lightweight framework that is well-suited for small to medium-sized projects where flexibility and simplicity are more important than scalability and complexity.
Flask allows developers to start with a basic skeleton and add only the features that are required for the specific project. Flask is easy to set up and configure and has a small learning curve, making it ideal for beginners. On the other hand, Django is a full-stack web framework that comes with a lot of features out of the box, making it well-suited for large-scale, complex projects. Django follows the "batteries included" philosophy, meaning that it provides everything needed to build complex web applications, including authentication, admin panel, and ORM. Django has a steep learning curve and takes time to set up and configure, but it provides better scalability and maintainability for large-scale projects. Considering the current scale of the project, it was decided to proceed with Flask as the framework.

Individual contribution to project report preparation: For the project report, Parth was involved in curating the problem statement and requirement specifications.

Individual contribution for project presentation and demonstration: For the project presentation and demonstration, Parth was involved in creating the proof of work and project screenshots slides.

Full Signature of Supervisor: Full signature of the student:

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Plagarism Report

A PROJECT REPORT on "Blockchain Based FIR Registration"

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