

# *An Anonymity and Interaction Supported Complaint Platform based on Blockchain Technology for National and Social Welfare*

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**Abstract**—People face numerous severe problems in their everyday life. Extortion, corruption, threat, harassment, negligence, poor public service, etc., are some common problems people are dealing with everyday. As it may take a long time, most of the victims do not have the intention to complain anymore. As a result, these issues are getting worse rather than getting resolved. There are some ways online to contact and complain to the competent authorities. However, a complainant may be hesitant to complain in fear of insecurity because of the transparency issue of a centralized system. To resolve the issues, in this paper, we will present a blockchain-based anonymous, transparent, and decentralized platform, where people can complain anonymously and interact with the authorities to resolve their complaints. An authority can start resolving a complaint after receiving it from the platform. Those facing a similar problem or evaluating a problem to be prioritized can support/oppose the complaint. Complaints like damaged roads or pandemic situations like Covid-19 may need some financial support to be solved. In this case, authorities can start crowdfunding where both complainants and authorities can donate. Ultimately, we can claim that our proposed blockchain-based platform will be one of the most secure and reliable platforms for complainants to complain about their issues.

**Keywords**—Blockchain, Anonymity, Hyperledger Aries, Hyperledger Indy, DID (Decentralized Identity), SSI (Self-Sovereign Identity), Zero Knowledge Proof

## I. INTRODUCTION

Effective complaint resolution is a crucial civil right that every citizen demands from their state. People experience various adversities at different situations in daily life that need to be properly addressed. Otherwise, their misery and suffering will hinder the growth of the state. Governments, hence, regulate complaint resolution process where people complain about their issues to government officials in either of the two ways— physical/offline complaint procedure and online complaint platform.

In the traditional physical complaint method, officials or elected representatives are assigned to different levels and divisions who are in charge of grievance redressal or complaint procedure [1]. People collect complaint forms and submit their complaints in a written form. Their complaints are addressed in a committee-based hearing process and handled within a specified period [2]. For example, the Local Government Ombudsman, or LGO, deals with complaints regarding social cares, councils, and local public services in the UK. People submit written statements of their complaints

to them if their complaints have not been redressed or responded to within a reasonable timeframe by the service or care provider that has affected them. In the online complaint method, complainants have to fill up an electronic complain form or email the officials about their grievances. For example, the online complaint filing system of Service Canada asks its complainants to fill up an electronic form.

But there are some issues with the current traditional complaint handling procedure used by the citizens and government officials in many countries. The contexts mentioned below capture some of the issues people face.

- In 2013, a report on the Mid Staffordshire NHS Foundation Trust scandal was disclosed in the UK. The Stafford Hospital administrated by the mentioned hospital trust was held liable for patient mistreatment [3]. More than 1000 deaths were caused between 2005 and 2009 because of their negligence in the care and treatment of the patients. The families of the patients persistently raised their complaints against such systematic failure. Still, their complaints were not properly scrutinized and were ignored by the accountable authorities for a long time.
- Another evidence-based report states that 64 percent of complainants in the UK do not think their complaints will bring any change, and some of the people who have the intention to complain but do not complain, think that the public service complaint handling process is too complex to resolve their issues [4]. Furthermore, it is mentioned that complainants find public service complaint systems difficult and not easy to navigate. These systems fall short to track and monitor complaints. Many complainants have also given their written evidence of how they suffer from not getting a response, not being able to communicate continuously with the resolvers, finding no clarity and accountability in resolving complaints, going around a lot only to get their complaints submitted and response back, and many more.
- In Bangladesh, violence against girls and women is a never-ending social issue. This includes acid attack, domestic violence, physical and mental abuse, rape, female child exploitation, etc. This issue is so

appalling that more than 3,300 girls and women have lost their lives over dowry-related domestic violence between 2001 and 2019 [5]. Just in this Covid-19 pandemic lockdown during March and April 2020, reported cases of violence targeting women had increased almost 70 percent than the same time of the previous year. Often victims of violence hesitate to seek legal recourse because of powerful perpetrators, financial vulnerability, lengthy legal processes, social stigma, and family pressure.

Here, we notice that the traditional complaint procedure is not only complex but also non-transparent and unreliable. Complainants hesitate to complain, either thinking it is time-consuming or may not get resolved. Some also fear that perpetrators may threaten them if they find out their identity. These perpetrators can also be anyone in the government. Thus, citizens lose their right to freedom of expression.

For this reason, many people use online complaint platforms to file their grievances. By complaint platform, we refer to an online medium where people can lodge their complaints if they have any problem with something or witness any unethical and illegal activities. People can easily complain to the authorities through this platform with the help of the internet. Some platforms also offer anonymity to disclose the identity of the complainants. Still, online complaint systems are unconvincing regarding their reliability, transparency, and security. Since centralized systems like online complaint systems are prone to data breach, data corruption, malicious attack and poor security, people do not have much trust in them. Again, oftentimes resolvers ignore the complaints of the complainants and do not inform them about the complaint status.

To overcome these limitations of both offline and online complaint handling methods, introducing blockchain can bring a revolutionary advancement in complaint management. Right now, blockchain is an emerging buzzword in the mighty world of technology. Ever since 2008, when Satoshi Nakamoto first introduced Bitcoin, a blockchain-based peer-to-peer cryptocurrency [6], blockchain technology has been widening its territory in various fields. It enables a more secure, transparent, and tamper-proof ledger [7] that is gained by its hash function enabled encryption. We can make decentralized applications using blockchain as a platform. It also offers anonymity and trustless environment. Since the complaint handling platform has to be secure, anonymous, transparent and tamper-proof, blockchain can excellently meet all these conditions.

This is why in this paper, we propose to build a public permissioned blockchain-based platform for complaint management. Our objectives are –

- (1) Assisting a citizen in lodging their complaint to the officials without the fear of getting their identity revealed to the public and even officials as well.
- (2) Alleviating the complexity, non-transparency, and lengthy processing of traditional physical methods and current complaint platforms by presenting features like filing a complaint, getting a timely response, viewing various complaints, voting others' complaints, and donating for a complaint as well for

citizens and as for the officials, they can resolve a complaint based on popularity, send complaint status as a response, request for a donation to handle a complaint if necessary.

## II. RELATED WORKS

Online complaint platforms have brought about a revolutionary change in complaint filing procedures. People now do not have to go through the hassles of going all the way to the officials to file a complaint. It is easier to complain online, and saving time and energy is an added benefit. Many countries have their own online platforms for their people based on complaint categories, ministries, divisions, or departments. We have mentioned two such platforms below –

Road Transport and Highways Division of the People's Republic of Bangladesh has an online grievance redressal system where grievants file their complaints regarding roads, streets, and transportations. A complainant has to provide their name, contact number, email, and location as an identity to file a complaint. The website discloses the complaint details with the complainant's identity and contact information that is likely to expose them to danger [8]. The status of the lodged complaints is not shown. So, there is no way to know if the complainant's complaint is accepted. Since it is a centralized system, a complainant's post might get deleted without any prior warning

Employment and Social Development Canada (ESDC) runs a program named Service Canada that also has a complaint system. Complainants are asked to provide their service Canada initiative, nature of complaint, description, name, email, area code, and telephone number. The system claims to offer user anonymity, but centralized systems like this are unable to do that as data correlating and security are issues here. Furthermore, complainants are not given a chance to keep constant communication with the resolvers and cannot get their urgent issues resolved on time.

In 2020, Shettigar R. et al. proposed an institutional grievance management system using blockchain that is meant to deal with the students' issues [9]. Their application solves the grievance of a student with a transparent three-level hierarchy. Grievant submits their grievance in the system, and the problem is received by level 1, the grievance committee, to be examined for validation and severity and then solved or debarred or forwarded to the next level based on severity. If a grievance is not solved within a specific period, it is forwarded to the next level. The next level decides to resolve or revert to the previous level or forward to the top level to resolve. If complainants are not satisfied with the solution, their grievance will be forwarded to the committee again. The proposed application is built on a private blockchain, so it is good for small organizations or institutions, e.g., schools, universities, and offices, but such a platform is not a good choice for a big community. The grievance committee can intentionally reject a grievance, and the grievant might not get help. In a private blockchain, identity is not anonymous, so there is a chance of revealing the identity of a grievant at any time.

In 2020, Suhani Jattan et al. proposed an Ethereum blockchain-based complaint redressal automated system where complainants can lodge their complaints on this platform if they face any problem in their ward [10]. It also provides a regular person to convey their complaint to the government officials and let the officials timely address the

complaints. If the complaint of a complainant is rightful, it will be accepted by the government officer, otherwise, it will be rejected and the complaint status will be updated. The main drawback of this system is it doesn't help the complainants to lodge their complaints anonymously as the system requires their phone number which risks data correlating. There might be an issue if a government officer holds a grudge against a complainant and rejects their complaint. In our proposed platform, anyone can independently lodge complaints keeping their identity anonymous, and if they wish, they can share their identity through a channel with a complaint resolver without the need to reveal themselves before everyone. This way, we can preserve user anonymity. Complaint resolvers cannot intentionally reject any complaint as there will not be any option for rejection, and they have to solve problems that got priority by voting.

### III. SYSTEM BACKGROUND

In this section, the system background of our proposed platform is explained.

#### A. Blockchain Technology

The first idea of blockchain technology was conceived by two Bellcore researchers, Stuart Haber and W. Scott Stornetta in 1991 [11]. Blockchain is a type of distributed ledger technology where every block stores data or transactions and system validators validate each block with a consensus mechanism. The first block of a blockchain is called the genesis block [12]. In addition to keeping data, a block is recognized with hash and previous hash. Each block's previous hash is linked with the earlier block's hash. This is how blocks create chains (Fig. 1).

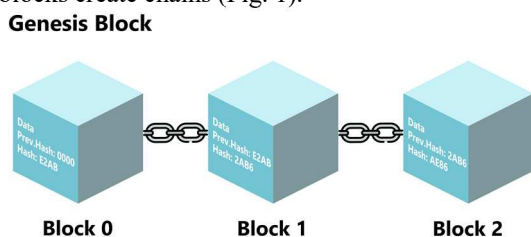


Fig. 1. Blockchain Technology

Blockchain is decentralized, immutable, secure, transparent and anonymous [7], [13].

Blockchain can be either permissioned blockchain or permissionless blockchain. Permissioned Blockchain is a closed ecosystem where only selected members can participate in the system with permission whereas permissionless blockchain is open for all. Anyone can participate in the system and validate any transaction [14].

#### B. Zero-Knowledge Proof (ZKP)

Shafi Goldwasser et al. first introduced the term zero-knowledge proof in 1985 [15]. It is a process where an entity proves something without exposing any useful information about it. For example, a prover without disclosing anything about the information can prove their claims about the information to a verifier.

#### C. Self-Sovereign Identity (SSI)

Self-sovereign identity refers to a digital identity that is transportable and can be used by anyone, any organization, or anything for a lifetime but cannot be withdrawn [16]. An SSI holder controls their data and can choose when and how to

share their data with others. So, the data of the holder is not under any central authority.

#### D. Verifiable Credential (VC)

Verifiable credentials have the same working principle as paper credentials but they are built cryptographically. In the verifiable credential model, a credential issuer issues a credential to a holder if they are qualified for it. The holder keeps the verifiable credential in their digital wallet. If a verifier asks the holder to prove his claims, the holder can provide their verifiable presentation. It also proves that their credential has not been cancelled. When a verifier gets a presentation from a credential holder, they verify the credential by getting information from the blockchain such as verifiable data registry and executing some cryptographic calculations.

#### E. Decentralized Identity (DID)

DIDs are a particular type of identifier that is cryptographically verifiable, globally unique, and can be created by any individual and any organization at any time [16]. DIDs are used as the key enabler of verifiable credentials. DIDs can be resolved the same as Uniform Resource Locator or URLs. But instead of returning a document, i.e., webpage, like a browser given a URL, a DID resolver resolves a DID and returns a JSON document named DID Document, or DIDDoc. DIDDocs hold public keys and service endpoints for the owner of the DID. With DID, entities can send end-to-end encrypted messages to each other and can verify the other entity by checking if they own the private key corresponding to the public key.

#### F. Hyperledger Indy and Hyperledger Aries

The most common problem with current digital identifiers while identifying and verifying the internet is data correlating. As trust is an issue here and the identities used are under the central authority, an entity might fall prey to data breaches, scams, central authority issues, and more. Hyperledger Indy is built to solve these identity-related issues. It helps an entity to create a self-sovereign identity for themselves on decentralized applications, distributed ledgers, or others using its tools, libraries, and reusable components [17]. Indy falls short of providing peer-to-peer communication that is mandatory for entities to communicate with each other over a closed, protected channel. Hyperledger Aries solves this issue. It provides necessary protocols for peer-to-peer communication, wallet, messaging, and key managing and also works with a crypto library, Hyperledger Ursa, to get advanced cryptographic aid [17].

#### G. InterPlanetary File System (IPFS)

IPFS works as a storage to build a persistent distributed web. Storing large files on a blockchain may cause access latency and more expenses. Using IPFS in blockchain technology for storing and sharing large files is an efficient way to avoid access latency. It works with cryptographic hashes and stores the hash values on a blockchain [18]. It generates a hash value of a content which is also an address of the content, and shares it with peers so that they can access the content. IPFS utilizes a content-addressed block storage model [19], which means a peer can get their desired content from the neighbors who have access to the content address. It stores data with Distributed Hash Tables. Once a peer gets the hash, they request the network to find the peer that owns the content placed at that hash, and thus the content is directly availed from the owner peer.

#### IV. OUR PROPOSED FRAMEWORK

Our proposed system includes two types of entities –

a. *Complainant*: A concerned citizen who addresses a complaint to the authority responsible for resolving it. Complainants lodge complaints, browse others' complaints, support or oppose other complaints to express their opinion, and prioritize them to get the authority's early attention. They can even donate for a complaint if requested.

b. *Complaint Resolver*: An official preselected by the higher authority to resolve lodged complaints from citizens. Complaint resolvers resolve a complaint tactically. They keep check on trending and recent complaints, accept a complaint based on many supports offered by the complainants, submit a response to it stating accepted, proceeding, or solved, and ask for a donation for a proceeding complaint that needs financial support.

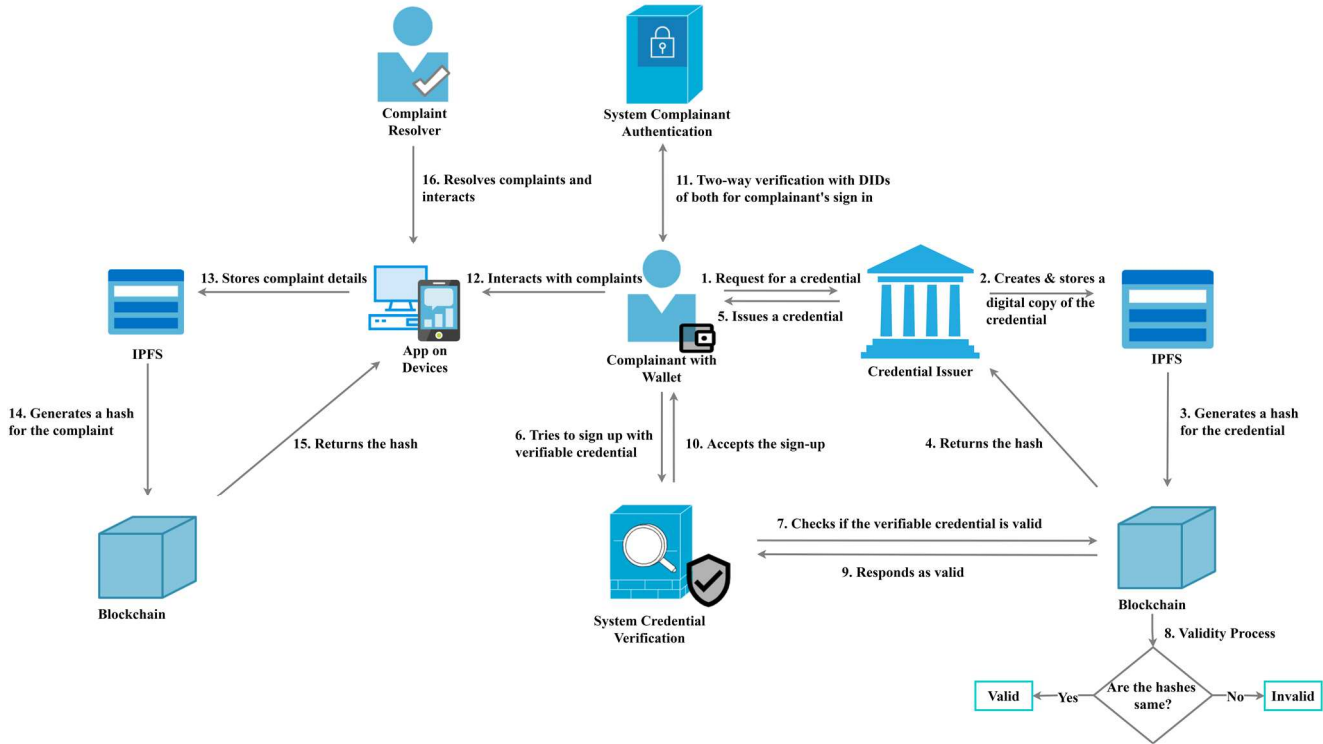


Fig. 2. A General Idea of Our Proposed Platform

A complainant needs to create a wallet beforehand, where they will keep their DIDs and verifiable credentials (Fig. 2). When a complainant wants to sign up on our platform, they have to prepare a Verifiable Credential (VC) with a credential issuer if they do not have it already and create a new DID that has not been used before. Credential issuers use IPFS to create and store the digital copy of the credential and blockchain to store the hash that the IPFS generates. Our implemented autonomous System Credential Verifier verifies their credential is valid or not using the issuer's blockchain. It is quite time-saving as we need not go through the lengthy process to directly contact the issuer and verify. After getting verified and doing a two-way DID verification with our System Complainant Authenticator, the complainant can use our platform. Here, VC and DID work as a Self-sovereign Identity that supports Zero-knowledge Proof to provide anonymity by letting them enter and complain without revealing their identity on our platform. When a complaint is filed that may include images, it is stored in our IPFS. IPFS provides a hash to our blockchain using a complex Hash function encryption that is impossible to break ensuring enhanced security and tamper resistance.

The following use case diagram (Fig. 3) shows how the complainant and complaint resolver interact on our platform –

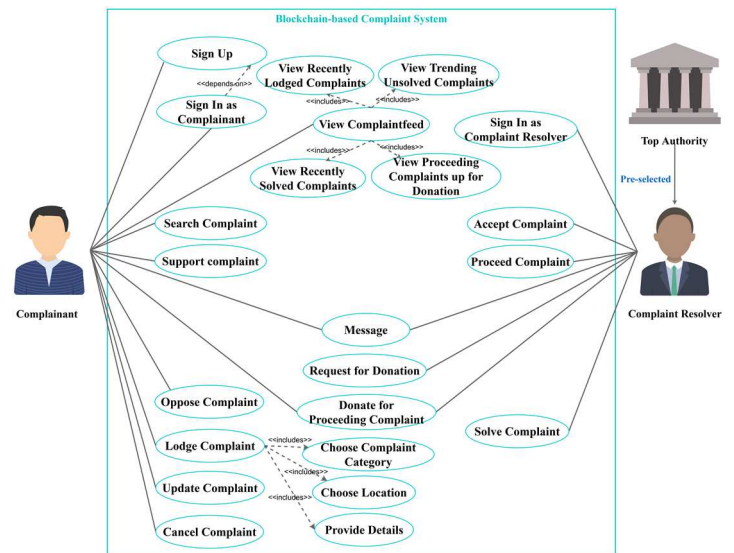


Fig. 3. Use Case Diagram of Our Proposed System

We can categorize our proposed application system into three subsystems which are –

- Member Registration and Authentication System
- Complainant Interaction System
- Complaint Resolver Interaction System

### A. Member Registration and Authentication System

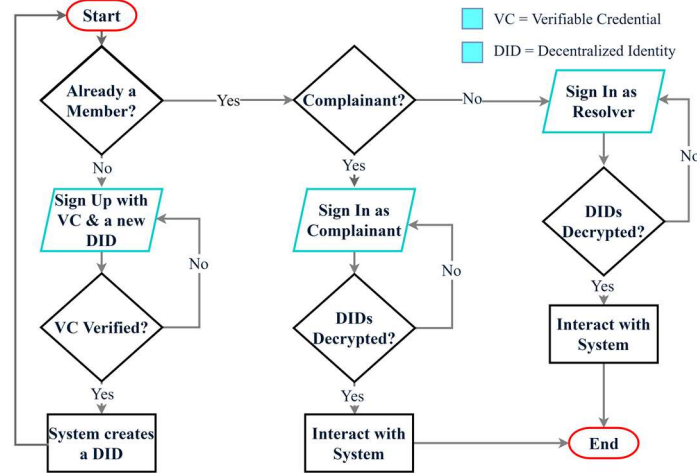


Fig. 4. Flowchart of Member Registration and Authentication System

To lodge a complaint, a complainant has to sign up in our platform at first. He needs to provide a verifiable credential issued by an issuer to the system. The system checks if the credential is valid and allows the complainant to sign up if it is valid (Fig. 4). Now, the complainant creates a new DID for the platform and the platform also creates a DID for the

complainant for two-way verification. The complainant can sign into the platform if he and the platform both decrypt the encrypted messages that are sent from both sides with their private keys. As for a complaint resolver, he is already preselected and preregistered by the top authority, and the sign-in process is the same as the complainant.

### B. Complainant Interaction System

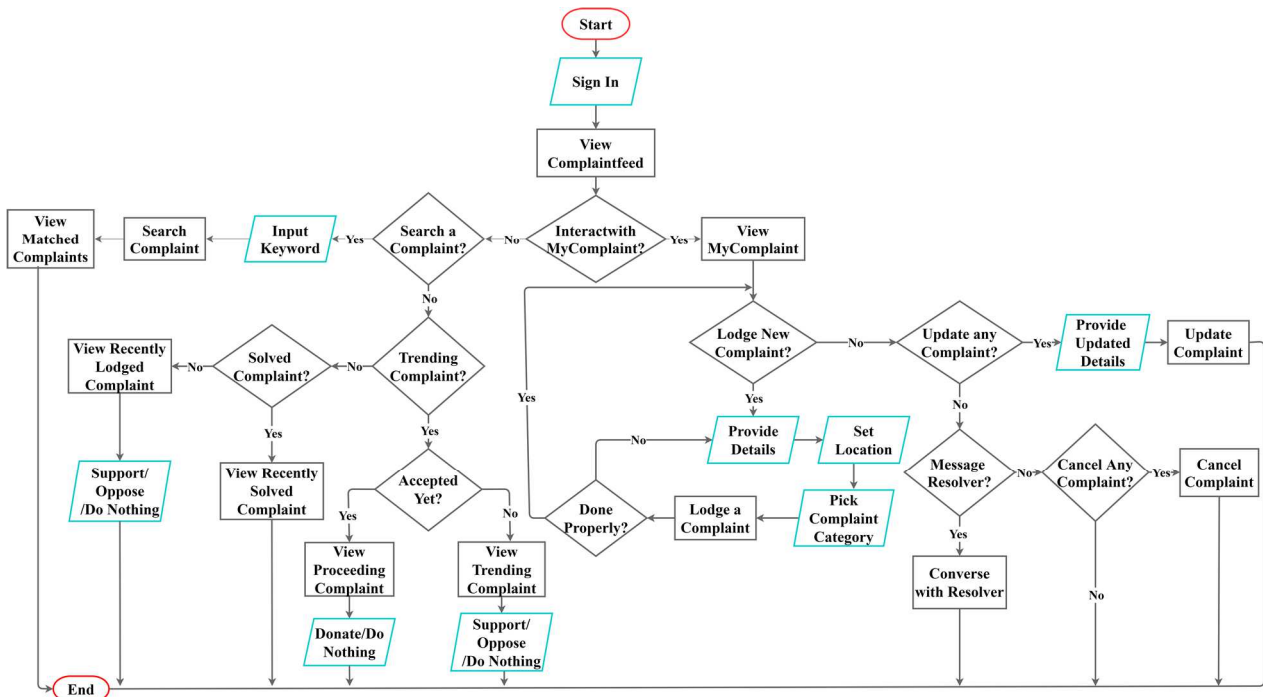


Fig. 5. Flowchart of Complainant Interaction System

The following section describes the process of Complainant Interaction System (Fig. 5)–

**Complaintfeed:** After signing in, a complainant can view his Complaintfeed where he can browse through complaints of other complainants and can perform actions like support, oppose, donate and search.

**Trending Complaints:** These complaints are prioritized as they have received much supports from the complainants but have not been accepted yet by the complaint resolvers.

**Proceeding Complaints:** These complaints are already accepted by the complaint resolvers and are on proceeding to be solved.

**Recently Lodged Complaints:** These are the complaints that are just lodged by the complainants.

**Recently Solved Complaints:** These complaints are solved by the complaint resolvers.

**Support and Oppose:** Complainants can express their opinions about a complaint by the support and oppose options.

A complaint gets prioritized if it receives much supports from the complainants.

*Donate:* If a complaint resolver asks for financial support for a complaint, complainants can donate any amount as they wish. A QR code (Fig. 6) will be provided with details, where complainants can donate any cryptocurrency. Since the ledger is transparent, everyone can see how much donation has been raised and spent.



Fig. 6. QR Code

*Search:* Complainants can search for any complaint based on category or with keywords. This way, they can find out if any complaint that matches their issues has already been lodged or solved.

*MyComplain:* Here, complainants can see their previously lodged complaints and perform actions like lodge

### C. Complaint Resolver Interaction System

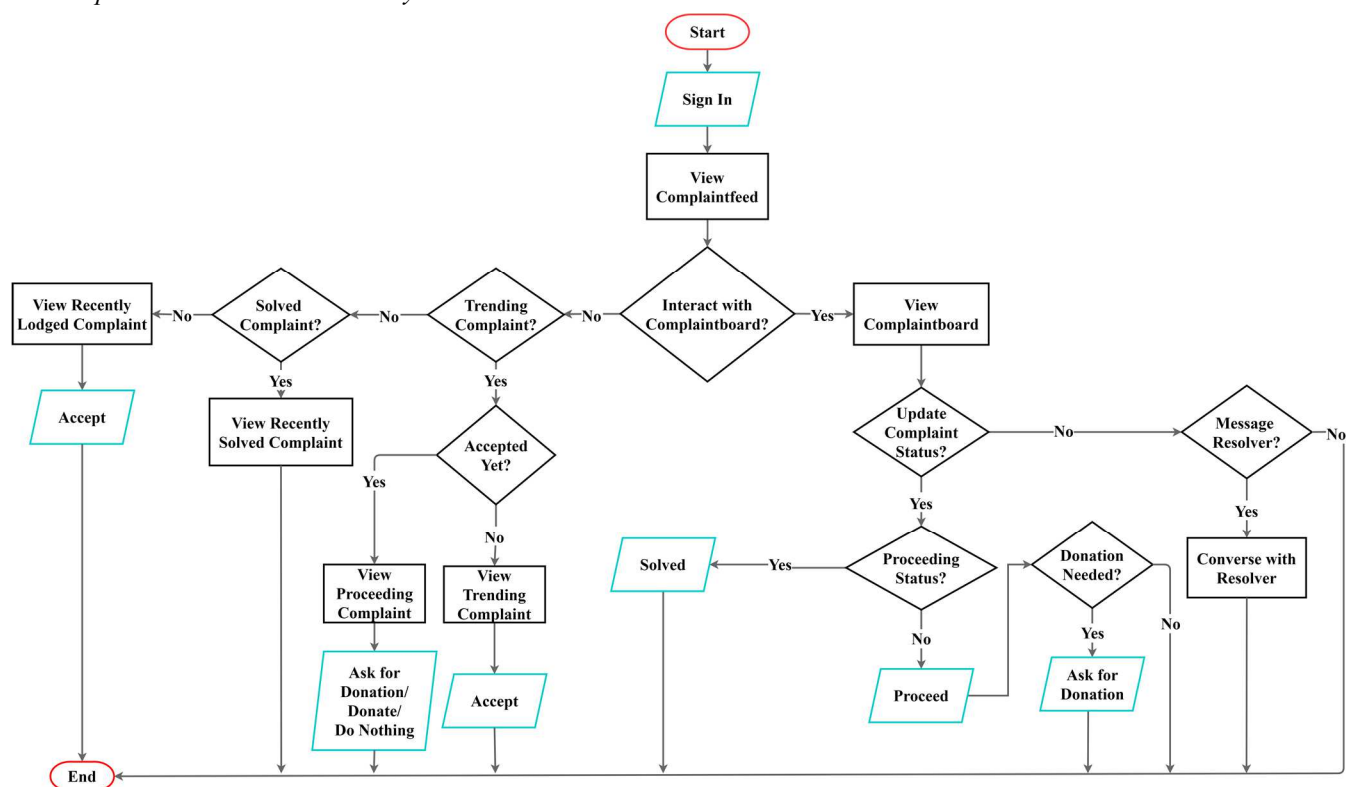


Fig. 7. Flowchart of Complaint Resolver Interaction System

The following section describes the process of complaint resolver interaction System (Fig. 7) –

*Complaintfeed:* After signing in, complaint resolvers can view their complaintfeed the same as complainants. But instead of supporting or opposing, they accept complaints based on categories.

*Accept:* Complaint resolvers accept complaints from trending complaints and recently lodged complaints. The accepted complaints show "Accepted" status.

*Donate:* Complaint resolvers can donate the same way as complainants.

*Complaintboard:* Here, complaint resolvers can see their accepted, proceeding, and solved complaints and can perform actions like update complaint status, ask for a donation, and message a complainant.

complaints, update complaints, message complaint resolver, and cancel complaints.

*Lodge Complaints:* If a complainant wants to lodge a new complaint, he has to provide complaint details, set location, and pick the complaint category. He can add images or any evidence if he wishes.

*Update Complaints:* Complainants can update their complaints to add more details but under the condition that the complaints have not yet been proceeded with.

*Message Complaint Resolvers:* Complainants can message a complaint resolver through a private channel about their lodged complaints. If needed, they can share their identity with a resolver.

*Cancel Complaints:* A complainant can cancel his lodged complaint anytime if he wishes. In this case, it will be shown as solved.

*Update Complaint Status:* After accepting a complaint, complaint resolvers update a complaint's status.

*Proceed:* When a complaint resolver starts investigating a complaint issue, he updates the status of the complaint as "Proceeding".

*Solved:* When the investigation is done and the issue is solved, the complaint resolver changes the status of the complaint into "Solved".

*Ask for Donation:* There might be a situation when some financial support is needed for a complaint. In this case, a complaint resolver can ask the complainants for a donation.

*Message Complainant:* Complaint resolvers can message complainants to interrogate them about their complaints.

## V. IMPLEMENTATION

Our proposed platform uses Hyperledger Aries and Hyperledger Indy to build a public permissioned blockchain for complaint management. The pseudocode of our proposed platform is given below –

*signupComplainant()*: It waits for a signup invitation from a complainant's agent, i.e., an app wallet, and after receiving, makes a connection with them. Then it asks for proof of any credential with a given schema from the complainant. It checks the proof and, if valid, creates a new unique DID to establish a relationship with the complainant for two-way verification.

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### ALGORITHM 1: SIGNUP FOR COMPLAINANT

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```

Function signupComplainant() \accept invitation and make
connection
  AWAIT connection_invitation(agent) \complainant's agent
  IF connection_invitation RECEIVED then
    SET connection_ID

  connection_ready.set_result(True) or connection DONE \request
  proof of any credential with a given schema from complainant
  proof_attrs = [
    {"name": "name", "restrictions": [{"issuer_did": agent.did}]},
    {"name": "reg_number", "restrictions": [{"issuer_did": agent.d
id}]},
    {"name": "date", "restrictions": [{"issuer_did": agent.did}]}
  ]
  proof_preds = [
    {"name": "age",
     "p_type": ">=",
     "p_value": 13,
     "restrictions": [{"issuer_did": agent.did}],}
  ]
  indy_proof_request = {
    "name": "Proof of any Credential", \example:Birth
    Certificate
    "version": "1.0",
    "nonce": int,
    "requested_attributes": {proof_attr},
    "requested_predicates": {proof_pred},}
  SEND indy_proof_request to connection_ID
  proof = AWAIT indy_proof_request(agent)
  IF proof is VALIDATED then \creates a DID to establish a
  relationship with complainant
    comp = indyCreateAndStoreMyDid(cWallet, "seed": null)
    cDID = comp.getDid()
    cVerkey = comp.getVerkey()

```

*signin()*: Complainant or resolver and our platform exchange encrypted messages with each other using their endpoint and public key. If they both can decrypt the messages with their *signinKey* or private key, authentication from both side is ensured.

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### ALGORITHM 2: SIGN IN

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```

Function signin()
  EXCHANGE encrypted_msg
  DECRYPT encrypted_msg with signinKey
  IF encrypted_msg is DECRYPTED then
    LET SIGN IN
  ELSE
    LET NOT SIGN IN

```

*lodgeComplaint()*: Complainant inputs their complaint category, location, and details and if necessary, adds images to lodge their complaint.

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### ALGORITHM 3: LODGE COMPLAINT

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```

Function lodgeComplaint()
  Category: Complainant's Input
  Location: Complainant's Input

```

| Complaint Details: Complainant's Input

*cancelComplaint()*: If complainant intends to cancel a previously lodged complaint, this function is called.

---

### ALGORITHM 4: CANCEL COMPLAINT

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```

Function cancelComplaint()
  ComplaintCancel: Complainant's Input
  IF (ComplaintCancel==True) then
    ComplaintStatus="Solved"

```

---

### ALGORITHM 5: SEARCH COMPLAINT

---

```

Function searchComplaint(Complaint_No : string)
  IF Complaint_No==True then
    Show Related Complaint
  ELSE
    Complaint Not Found

```

---

### ALGORITHM 6: VIEW COMPLAINTFEED

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```

Function viewComplaintfeed()
  View Recently Lodged Complaints: System Output
  View Trending Unsolved Complaints: System Output
  View Recently Solved Complaints: System Output
  View Proceeding Complaints up For Donation: System Output

```

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### ALGORITHM 7: SUPPORT COMPLAINT

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```

Function supportComplaint(Complaint)
  GET SUPPORT VALUE
  GET OPPOSE VALUE
  \0 Defines "Not Supported yet" & 1 Defines "Supported
  Already"
  IF (OPPOSE==0 && SUPPORT==0) then
    SUPPORT=SUPPORT+1

```

---

### ALGORITHM 8: OPPOSE COMPLAINT

---

```

Function opposeComplaint(Complaint)
  GET SUPPORT VALUE
  GET OPPOSE VALUE
  \0 Defines "Not Supported yet" & 1 Defines "Supported
  Already"
  IF (SUPPORT==0 && OPPOSE==0) then
    OPPOSE=OPPOSE+1

```

*donateProcComplaint()*: Complainant donates for a proceeding complaint that is up for a donation. Complainant gives the address of the complaint and donates using their wallet.

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### ALGORITHM 9: DONATE

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```

Function donateProcComplaint()
  GET Public Address
  Donate using your wallet

```

---

### ALGORITHM 10: ACCEPT COMPLAINT

---

```

Function acceptComplaint()
  AcceptComplaint : Resolver's Input
  IF (AcceptComplaint==True) then
    ComplaintStatus="Accepted"

```

---

### ALGORITHM 11: PROCEED COMPLAINT

---

```

Function proceedComplaint()
  ProceedComplaint : Resolver's Input
  IF (ProceedComplaint==True) then

```

ComplaintStatus="Proceeding"

---

**ALGORITHM 12: REQUEST A DONATION**

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**Function** requestDonation()

```
NeedDonation: Resolver's Input
IF (NeedDonation ==True) then
    Donation details will be SHARED
```

---

**ALGORITHM 13: SOLVE COMPLAINT**

---

**Function** solveComplaint ()

```
ComplaintSolved: Resolver's Input
IF (ComplaintSolved ==True) then
    ComplaintStatus ="Solved"
```

## VI. CONCLUSION

In this paper, we have shown how people are constantly facing various problems while complaining. Most people think it is a hassle to complain because there is no secure, anonymous, and transparent platform. As a result, these allegations are getting bigger than resolved. So, to solve these problems, this paper proposes a public permissioned blockchain-based secure, anonymous, and interaction-supported complaint platform. Our platform uses self-sovereign identity with zero-knowledge proof to assure the anonymity of our user's identity while lodging complaints to avoid their vulnerability to threats. Concurrently, it assists the officials to handle the complaints in a more efficient way. As a storage and sharing scheme, this platform uses Interplanetary File System that also ensures tamper resistance and more security like blockchain. Furthermore, we have discussed different blockchain mechanisms for users and authorities. Since there are a handful of papers focusing on the same issue, we think our paper will make a great impact on the current complaint handling procedures.

In our future work, we plan to introduce an anonymous phone call mechanism in our platform so that complainants can communicate to the resolver in a reliable and faster way.

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