

Eco-Sustain

A sustainable decentralised solution for socio-environmental problems of the surroundings

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Problem Statement

Develop an application to address the socio-environmental issues like garbage dumps and wastage, community health, safety and security.

Causes of this problem -

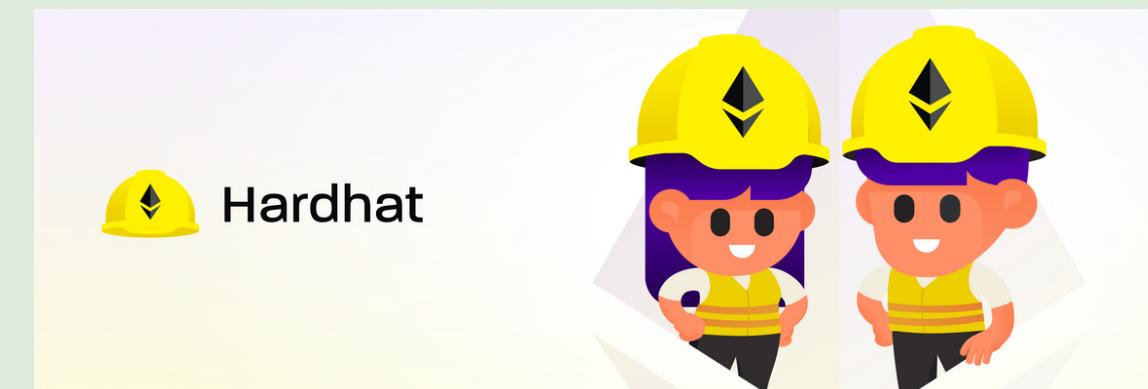
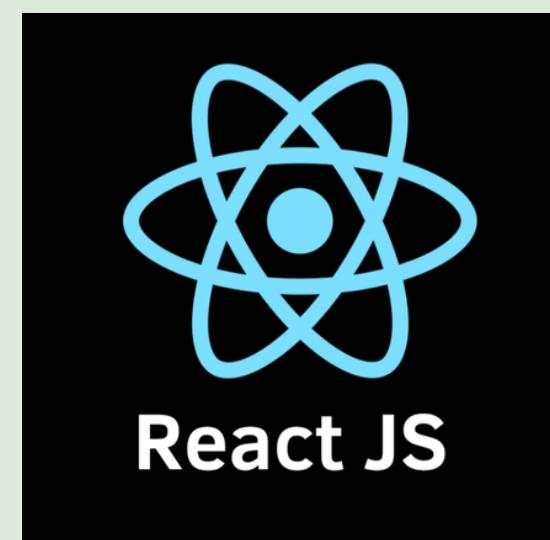
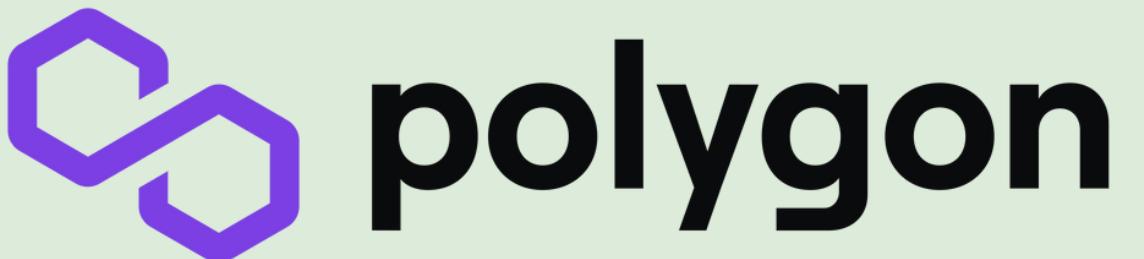
- the lack of a proper system for reporting these issues anonymously and the fear of reprisals from local authorities
- No proper SOP for the authorities due to a lack of proper documentation or proof of the complaints.
- Rapid population growth
- Lack of infrastructure

Statistics: civic body has identified **102 dumping sites** in Mumbai last year (src - TOI)

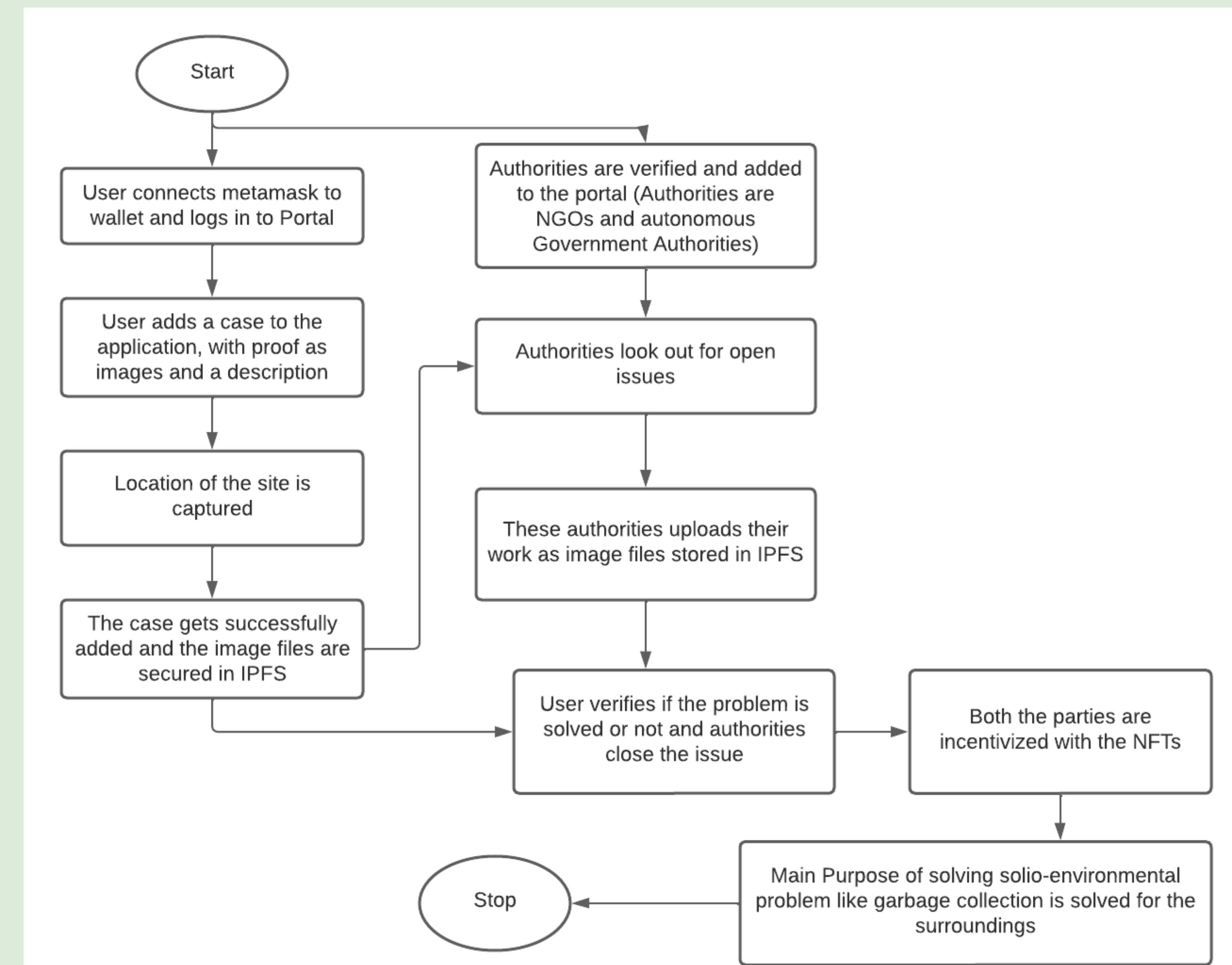
Our Proposed Solution

- 1) We propose the development of an application that enables individuals to register complaints anonymously using blockchain technology.
- 2) Ensure that data is stored on a decentralized blockchain network and cannot be tampered
- 3) Proof as images, will be secured and resistant from tampering by storing it in an InterPlanetary File System (IPFS) powering the Distributed Web.
- 4) NGOs and autonomous government authorities shall be incentivized with NFTs (Non Fungible Tokens) upon solving the problem

Tech Stack



Data Flow Diagram



Our Implementation so far...

- Developed an end to end IPFS system to add and retrieve image files
- Developed and deployed smart contracts on Polygon Mumbai Testnet
- Created NFTs, with image stored on IPFS, for users and authorities upon completion of the task
- Implemented full end to end system to onboard user, connecting their metamask wallet and creation of case by the user
- Authority sign-in and update the completion status of task

Screenshots/Demo

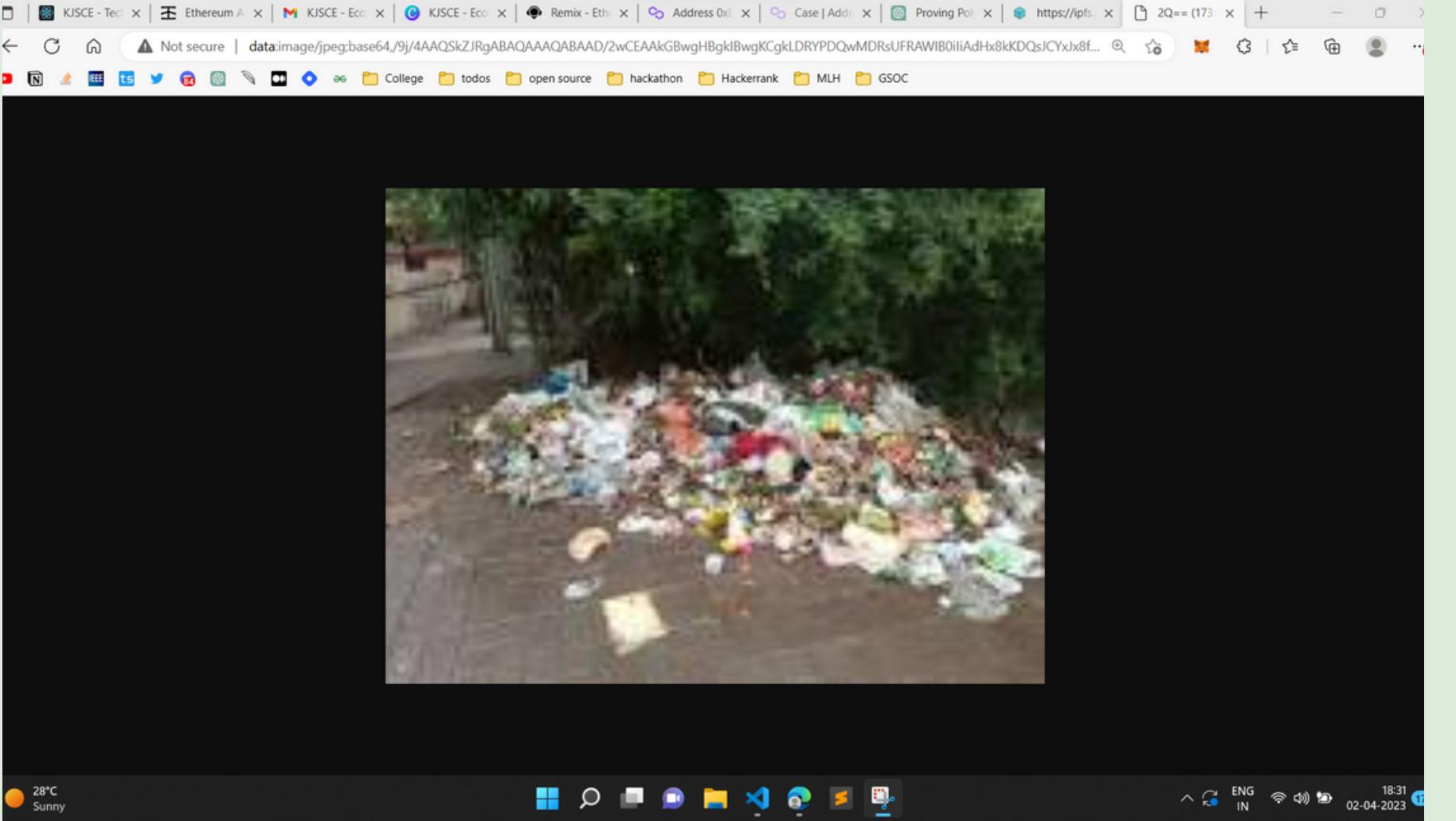
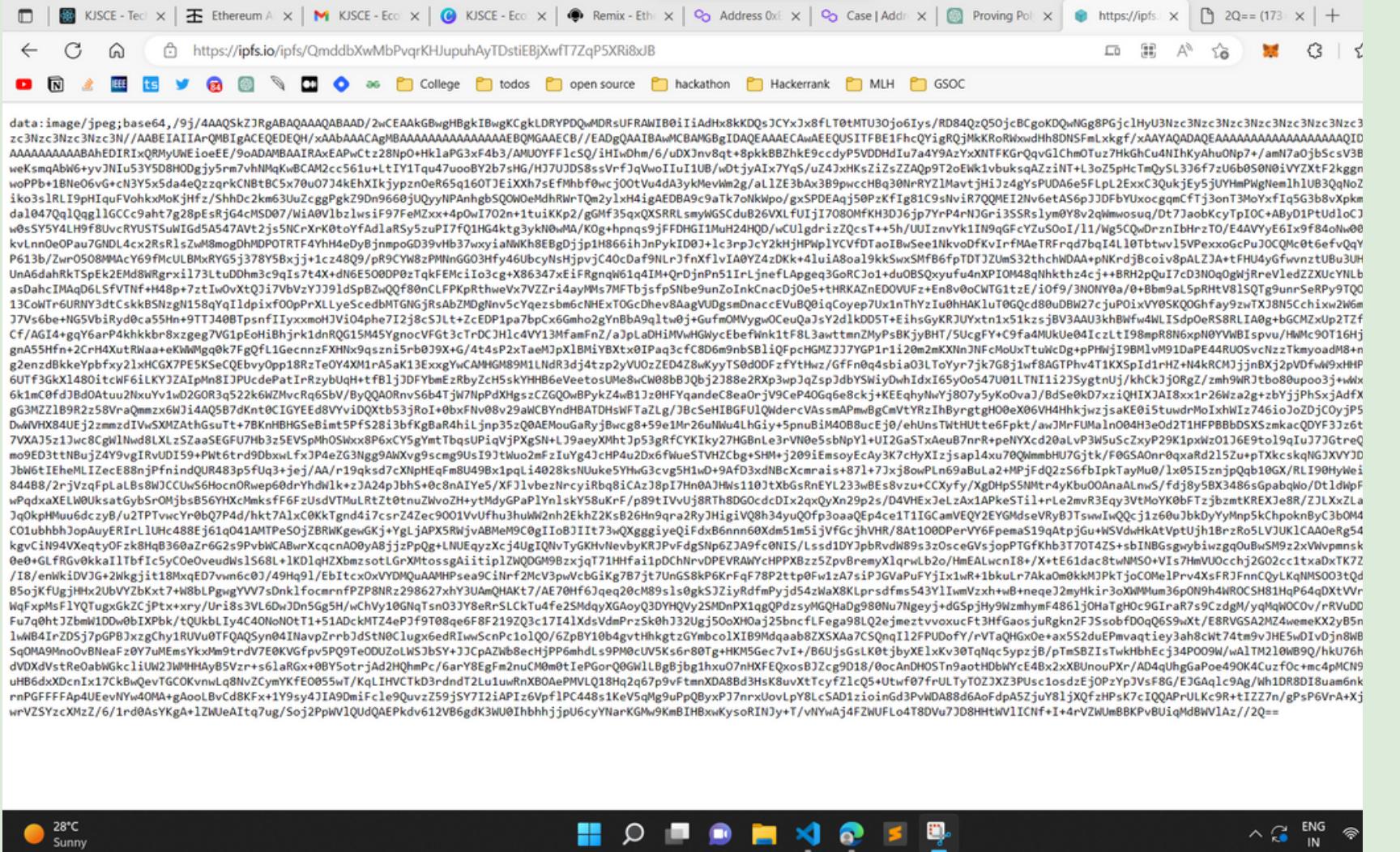
IPFS - Infura Dashboard Page

The screenshot shows a web browser window with multiple tabs open, including Ethereum API, KJSCE - EcoSu, and Remix - Ethereum. The main content is the Infura Dashboard Explorer for the 'Blockchain-project' key. The interface includes a sidebar with pinned items like College, todos, open source, hackathon, Hackerrank, MLH, and GSOC. The main area displays 'My Pinned Content' with a table of pinned files. The table columns are NAME, DATA SIZE, and LAST PINNED. The table lists several files with their respective details.

NAME	DATA SIZE	LAST PINNED
QmbGcNaNGvkKmY5sTYdXc4HUW2WPUDxsAx5bZ64eLXu2U	1.50 MB	2023-04-02 at 1:48 AM GMT+5:30
QmeRaAmYPJW9987DWxNC9NzgHqBSeTZrbxoLpDqSZfpJk8	739.64 KB	2023-04-02 at 1:25 AM GMT+5:30
QmRhDmw6jcqMgorZVzrYgR8CHiX81Wn3LtDTzmxNTXp17m	377.58 KB	2023-04-02 at 1:39 AM GMT+5:30
QmVNJk8gWcpE2SQk5xpiBw6xBhRhVLdDS8TXWsp5J9Sr1N	82.20 KB	2023-04-01 at 6:00 PM GMT+5:30
QmddbXwMbPvqrKHJupuhAyTDstiEBjXwfT7ZqP5XRi8xJB	8.46 KB	2023-04-02 at 10:52 AM GMT+5:30
QmRnddfDwyRVaCMtNzNT6GTwaBBepZVbnKmNTrk95P1ykc	5.39 KB	2023-04-02 at 1:53 AM GMT+5:30
QmbW9XC3WCeUTpPruNBhvYhP8JZFPZA6Qx7Xd8AkcNSsFt	338.00 B	2023-04-01 at 5:38 PM GMT+5:30
QmfJG8Kjs0HDP2R2B1WdkcGsaoTJQubg7HLW6Dguz2nsC1	71.00 B	2023-04-02 at 1:01 AM GMT+5:30
QmbdHnI63cILgeorgiDYLKNhACM8fiHiHeHHoAZwi93zKu	71.00 B	2023-04-02 at 1:04 AM GMT+5:30

At the bottom, there is a system tray showing weather (28°C, Sunny), system icons, and a taskbar with various application icons.

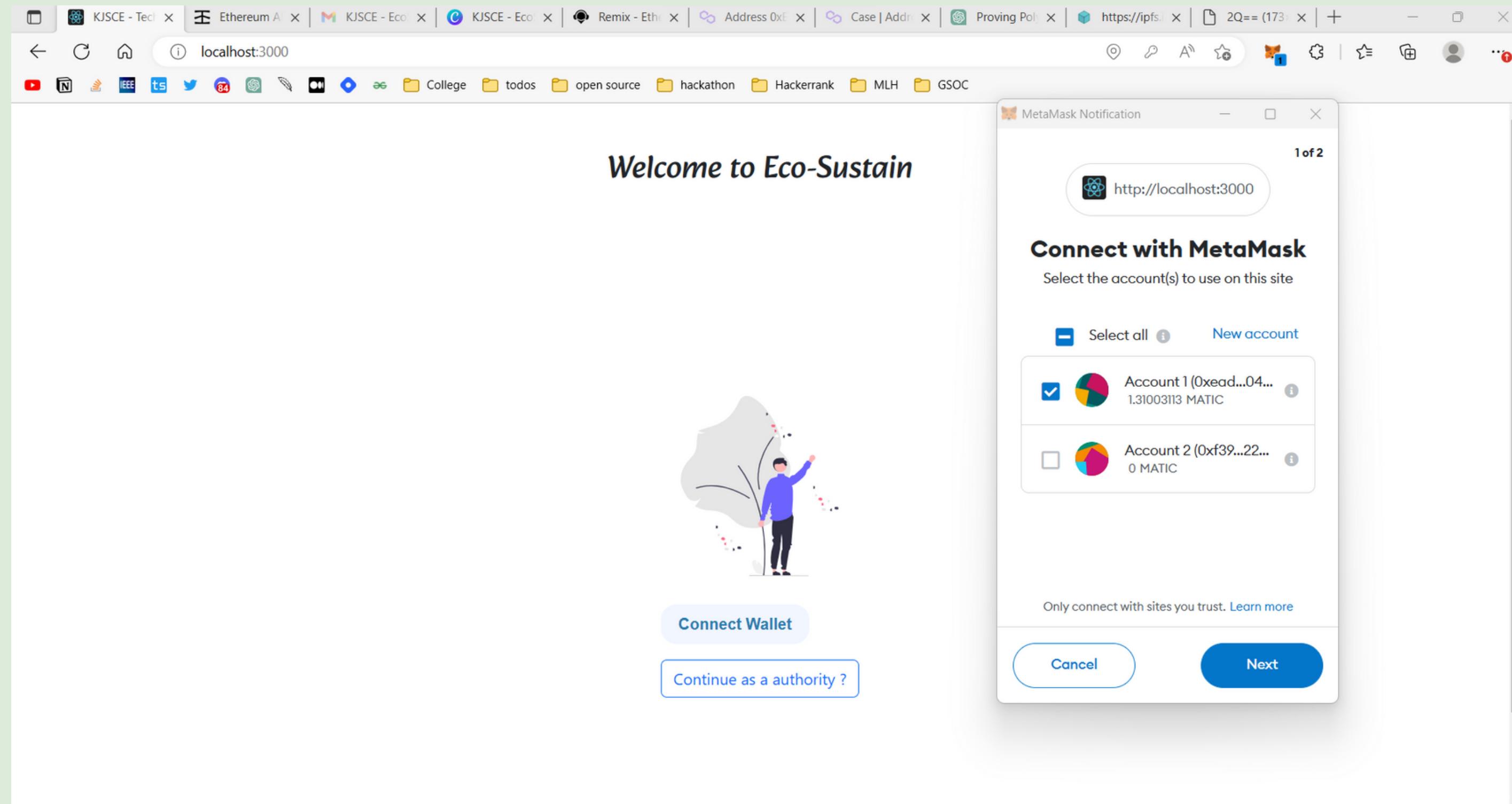
IPFS Gateway Page to Retrieve Image



28°C Sunny

28°C Sunny ENG IN 18:31 02-04-2023

Login of User with Connection to Wallet



Creation of Case By the User

Screencap of a web application for registering complaints. The page is titled "Register Complaint".

Issue Type: Garbage

Image Proof: Choose File garbageSeen.jpg

Description: garbage here

Address: Vidya Vihar East, N Ward, Mumbai, Mumbai Suburban, Maharashtra, 400077, India

Your Current Location: A map showing the location of the complaint. The map includes labels for Somaiya College, Somaiya Grounds, Somaiya Sports Complex, Somaiya Gymkhana Court, Somaiya Vinay Mandir, KJ SOMAIYA POLYTECHNIC COLLEGE, Old Engineering Building, Play park, Inglewadi Lane, Somaiya Nalla, Tu Road, Line 4, Line 5, and Dhavaligiri.

Date: 02-04-2023

Submit

System tray icons include: Weather (28°C, Sunny), Task View, Search, File Explorer, Visual Studio Code, Edge browser, Taskbar, and a battery icon.

System status bar shows: ENG IN, 18:35, 02-04-2023, 17 notifications.

Login of Authority to the Portal

Along with open cases

The screenshot shows a web browser window with two main panels. The left panel displays the 'Welcome to Eco-Sustain' page, which includes a 'Connect Wallet' button and a 'Continue as a authority ?' button. A MetaMask notification dialog is overlaid on this page, prompting the user to 'Connect with MetaMask' and select an account. The dialog lists 'Account 1' (selected) and 'Account 2'. The right panel shows a table titled 'Complaints' with three entries:

ID	Name	Status
1	Potholes problem	pending
2	Env Problems	approved
3	Garbage accumulated Kandivali	pending

Contract Deployed In Polygon

The screenshot shows a web browser with multiple tabs open, including Ethereum API, Remix - Ethereum, Address 0xEaD, Case | Address, Proving Polygon, https://ipfs.io/, and 2Q== (173x13). The main content is the PolygonScan interface for the address `0xEaD06EA697194301050AE6fA8a70cE49BbD30401`.

Address Overview:

- Balance:** 1.310031128159634448 MATIC
- My Name Tag:** Not Available

Transactions: Latest 25 from a total of 35 transactions.

Txn Hash	Method	Block	Age	From	To	Value	[Txn Fee]
0xc1414243ab72aa92d1...	Create Campaign	33868963	4 hrs 7 mins ago	0xeada06ea69719430105...	OUT 0x63d4698c93c20fb5a8...	0 MATIC	0.009622539102 \$
0xf1b17a9b22192d1409...	Create Campaign	33864214	6 hrs 55 mins ago	0xeada06ea69719430105...	OUT 0x63d4698c93c20fb5a8...	0 MATIC	0.009701128421 \$
0xbc4a5906d45765abee...	Create Campaign	33863755	7 hrs 11 mins ago	0xeada06ea69719430105...	OUT 0x63d4698c93c20fb5a8...	0 MATIC	0.009622431109 \$
0x4a2e0272c42a74a23a...	Add Authority	33863016	7 hrs 37 mins ago	0xeada06ea69719430105...	OUT 0xaee7f6312f7948b4171...	0 MATIC	0.000180973982 \$
0xaed09f06d35066534a...	Add Authority	33863015	7 hrs 38 mins ago	0xeada06ea69719430105...	OUT 0xaee7f6312f7948b4171...	0 MATIC	0.000180973982 \$
0xc30ed47e557e5eaeee...	Create Campaign	33862936	7 hrs 40 mins ago	0xeada06ea69719430105...	OUT 0x63d4698c93c20fb5a8...	0 MATIC	0.006325114563 \$

System Status: 28°C Sunny

Taskbar Icons: File Explorer, Task View, Chat, File, VS Code, PowerShell, Edge, Taskbar settings.

System Bar: ENG IN, Wi-Fi, Battery, 18:41, 02-04-2023, 17 notifications.

Authority Verifies and User Receives NFT Token

The screenshot shows a web browser window with multiple tabs open, including Ethereum API, Remix - Ethereum, and Proving Polygon. The main content area displays the Solidity code for a DynamicNFT contract.

Code View:

```
24     bool authorityNFTClaimed,
25     uint nftTokenId;
26     uint userNFTClaimedAt;
```

File 13 of 13 : DynamicNFT.sol

```
1 // SPDX-License-Identifier: MIT
2 pragma solidity ^0.8.18;
3
4 import "@openzeppelin/contracts/token/ERC721/ERC721.sol";
5
6 contract DynamicNFT is ERC721 {
7     struct NFTMetadata {
8         string name;
9         string description;
10        string imageCID;
11    }
12
13    mapping(uint256 => NFTMetadata) public nftMetadata;
14
15    constructor() ERC721("DynamicNFT", "DNFT") {}
16
17    function mint(
18        uint256 tokenId,
19        string memory name,
20        string memory description,
21        string memory imageCID
22    ) public {
23        require(!_exists(tokenId), "Token already exists");
24        string memory ipfsBaseUrl = "https://ipfs.io/ipfs/";
25        nftMetadata[tokenId] = NFTMetadata(
26            name,
```

Settings:

```
1 {
2     "optimizer": {
3         "enabled": true,
4         "runs": 200
5     },
6     "outputSelection": {
7         "*": {
```

28°C Sunny 18:47 ENG IN 02-04-2023 17