

ClimateTrackSmart Using Blockchain

A Project report submitted in partial fulfillment of 7th semester indegree of
BACHELOR OF ENGINEERING IN COMPUTER SCIENCE AND
ENGINEERING

Team ID: NM2023TMID03965

Submitted by

Ahamed Haji Rajiya A	952720106001
Indhumathi S	952720106002
Karthika M	952720106003
Mohammed Sallick M	952720106004
Selina C	952720106005



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SARDAR RAJA COLLEGE OF ENGINEERING, TENKASI
ANNA UNIVERSITY: CHENNAI 600025

1. INTRODUCTION

- 1.1 Project Overview
- 1.2 Purpose

2. LITERATURE SURVEY

- 2.1 Existing problem
- 2.2 References
- 2.3 Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

- 3.1 Empathy Map Canvas
- 3.2 Ideation & Brainstorming

4. REQUIREMENT ANALYSIS

- 4.1 Functional requirement
- 4.2 Non-Functional requirements

5. PROJECT DESIGN

- 5.1 Data Flow Diagram & User Stories
- 5.2 Solution Architecture

6. PROJECT PLANNING & SCHEDULING

- 6.1 Technical Architecture
- 6.2 Sprint Planning & Estimation
- 6.3 Sprint Delivery Schedule

7. CODING & SOLUTIONING (Explain the features added in the project along with code)

- 7.1 Feature1
- 7.2 Feature2
- 7.3 Database Schema (if Applicable)

8. PERFORMANCE TESTING

- 8.1 Performance Metrics

9. RESULTS

- 9.1 Output Screenshots

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

- Source Code
- GitHub & Project Demo Link

1.INTRODUCTION

1.1 Project Overview: ClimateTrackSmart Using Blockchain

The system monitors weather using temperature, humidity and rain sensors and provides live reports of weather statistics. Constantly monitor temperature with a temperature sensor, humidity with a humidity sensor, rain, etc.

1.2 Purpose

Having the right weather data can drive significant benefits: Predict upcoming storms: With a high-quality weather radar system, it can detect hazardous weather like tornadoes, hail or flooding as well as locate and calculate the speed of precipitation to support accurate arrival times.

2. LITERATURE SURVEY

2.1 Existing problem

The satellite weather reporting system provides the current condition that does not give the exact location condition.

2.2References

1. Andrews, J.W. 1993. Impact of weather event uncertainty upon an optimum ground-holding strategy. Air-Traffic Control Quarterly 1(1): 59-8
2. Belair, S., and LKaihot. 2001. Impact of horizontal resolution on the numerical simulation of a midlatitude squall line: Implicit versus explicit condensation. Mon. Weather Rev. 129:2362-2376.
3. National Academies of Sciences, Engineering, and Medicine. 2003. Weather Forecasting Accuracy for FAA Traffic Flow Management: A Workshop Report. Washington, DC: The National Academies Press.
4. Beguin, D. and J.L. Plante. 1998. Critical technology requested by fast scanning radar. COST 75 Final International Seminar on Advanced Weather Radar Systems, Locarno, Switzerland, 645- 657.
5. Benjamin, S.G., J.M.Brown, K Brundage, B.E.Schwartz, T.G. Smimova, and T.L Smith. 1998. The operational RUC-2. Preprints, 16th Conference on Weather Analysis and Forecasting, Phoenix, AZ, American Meteorological Society, pp. 249-252.

6. Baldwin, M.P. and T.J.Dunkerton. 2001. Stratospheric harbingers of anomalous weather regimes. Science 294:581-584.

7. Balsey, B.B., and K.5.Gage. 1980. The MST radar technique: Potential for middle atmospheric studies. Pure and Applied Geophysics 118:452-493.

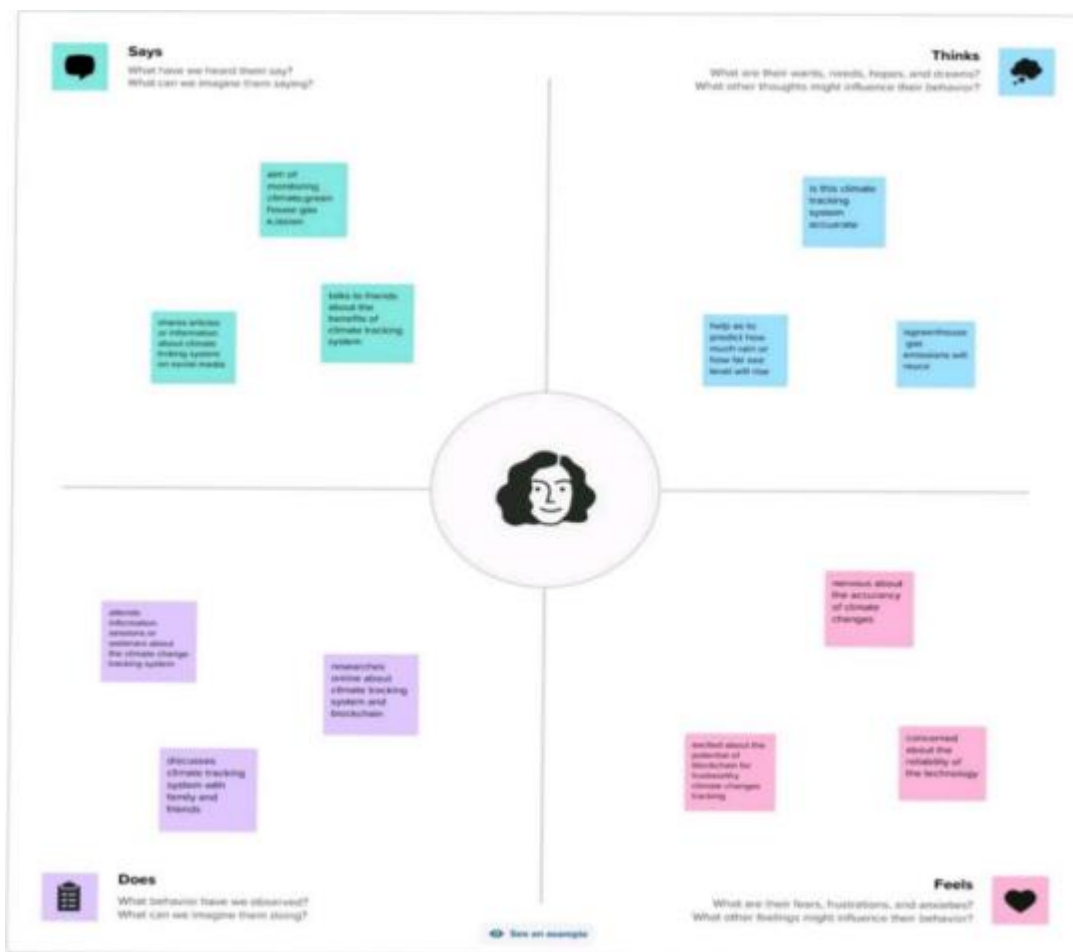
2.3 Problem Statement Definition

The satellite weather reporting system provides the current condition that does not give the exact location condition.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.



3.2 Ideation and Brainstorming

A group problem-solving technique that involves the spontaneous contribution of ideas from all members of the group.

RULES:

1.Lay out the problem you want to solve. ...


2.1Identify the objectives of a possible solution. ...

3.Try to generate solutions individually. ...

4.Once you have gotten clear on your problems, your objectives and your personal Solutions to the problems, work as a group.

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Template



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

🕒 10 minutes to prepare
🕒 1 hour to collaborate
👥 2-8 people recommended

➡

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

➡

Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

➡

Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

➡

Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) ➡

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

How might we [your problem statement]?

🔄

Key rules of brainstorming

To run a smooth and productive session

1

Stay in topic.

2

Defer judgment.

3

Go for volume.

4

Encourage wild ideas.

5

Listen to others.

6

If possible, be visual.



Need some inspiration?

See a finished version of this template to inspire your work.

[Open examples](#) ➡

Step-2: Brainstorm, Idea Listing and Grouping

2 Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Person 1

- enabling transparent and verifiable carbon credit trading platforms
- reducing their carbon footprint through offsetting
- ensure the accurate tracking and validation of emission reduction

Person 2

- easier to track and report emission reduction
- smart sensor and blockchain technology work together
- carbon emissions are converted into carbon credits

Person 3

- is immutability, accountability and transparency make it possible to track carbon balances
- blockchain can bring transparency and trust to the carbon markets
- it help to identify an reduce environmental aspects

TIP
You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

TIP
Add a customer story to sticky notes to make it easier to find. Name, age, gender, and company (important cases as barriers within your market).

- enabling transparent and verifiable carbon credit trading platforms
- reducing their carbon footprint through offsetting
- smart sensor and blockchain technology work together
- blockchain can bring transparency and trust to the carbon markets
- is immutability, accountability and transparency make it possible to track carbon balances
- blockchain can bring transparency and trust to the carbon markets
- it help to identify an reduce environmental aspects

Step-3: Idea Prioritization

4

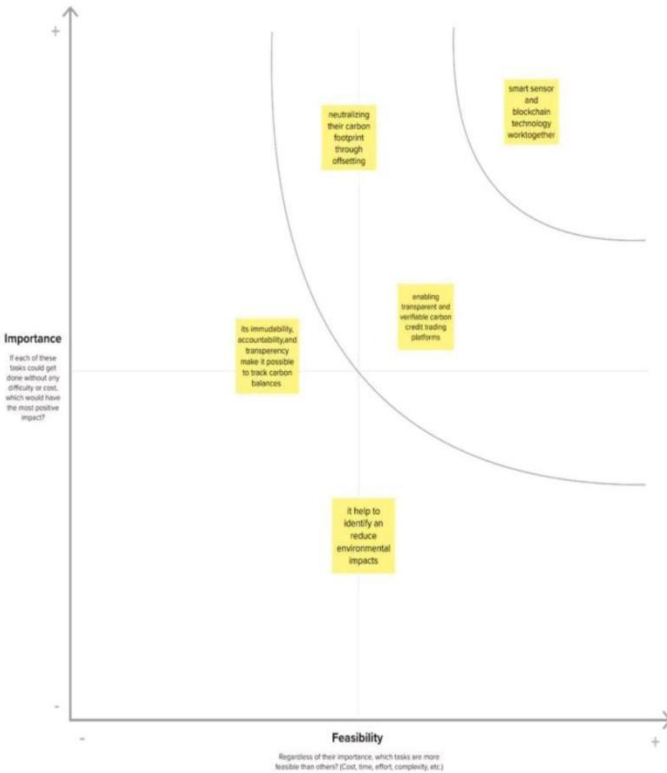
Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

TP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.



5

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

- Strategy blueprint**
Define the components of a new idea or strategy.
[Open the template](#)
- Customer experience journey map**
Understand customer needs, motivations, and obstacles for an experience.
[Open the template](#)
- Strengths, weaknesses, opportunities & threats**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the template](#)

[Share template feedback](#)



4. REQUIREMENT ANALYSIS

4.1 Functional requirements

The system shall be able to produce minimum, maximum and the average data of a particular weather parameter when it is requested by an operator.

The system shall provide the following weather parameters: temperature, pressure, wind speed & direction, rainfall, and humidity.

4.2 Non-Functional requirements

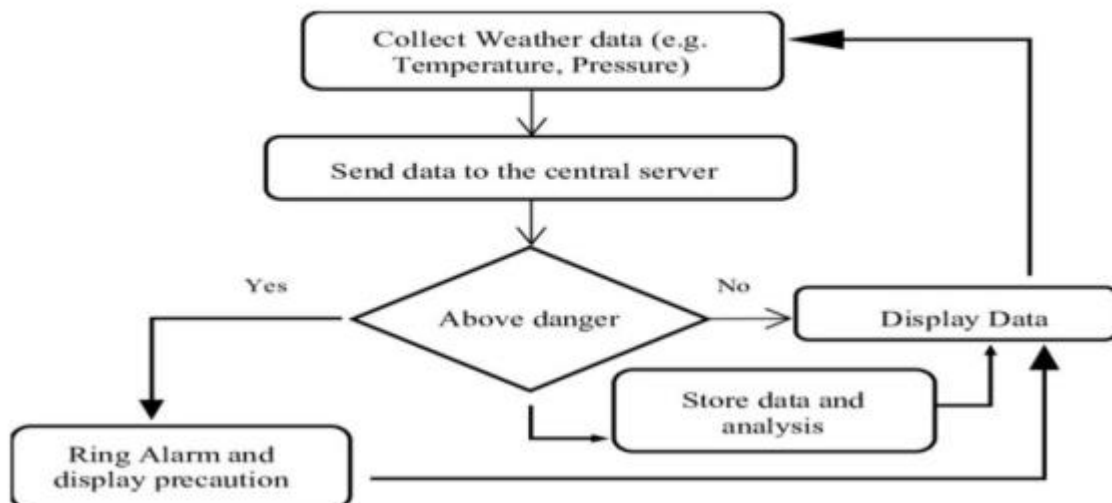
System's operational and location of remote station and central station shall not violate the current Government regulations of environment.

The weather sensors shall be able to be upgraded every 5 years.

5.PROJECT DESIGN

5.1 Data Flow Diagrams & User Stories

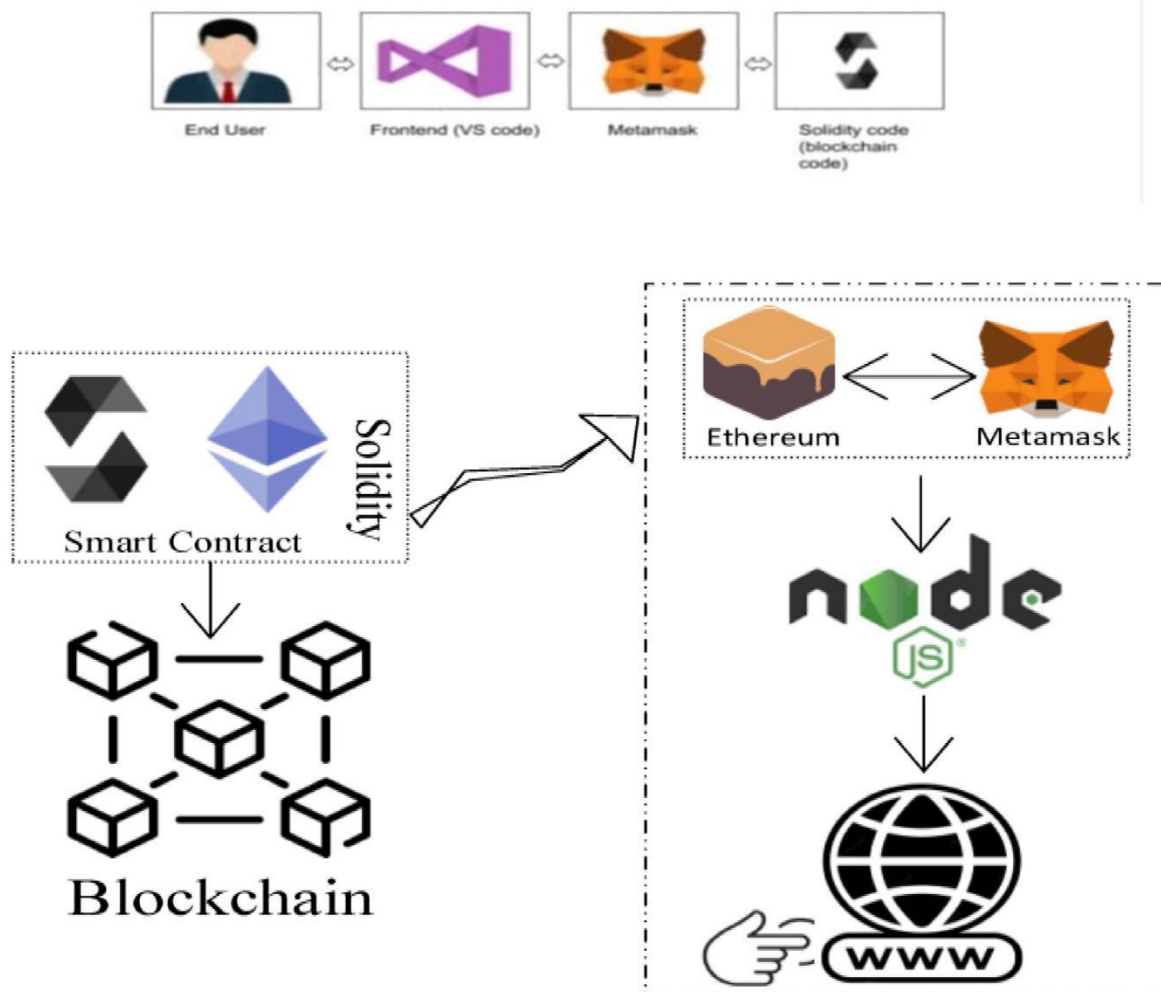
Data flow diagram



User Stories

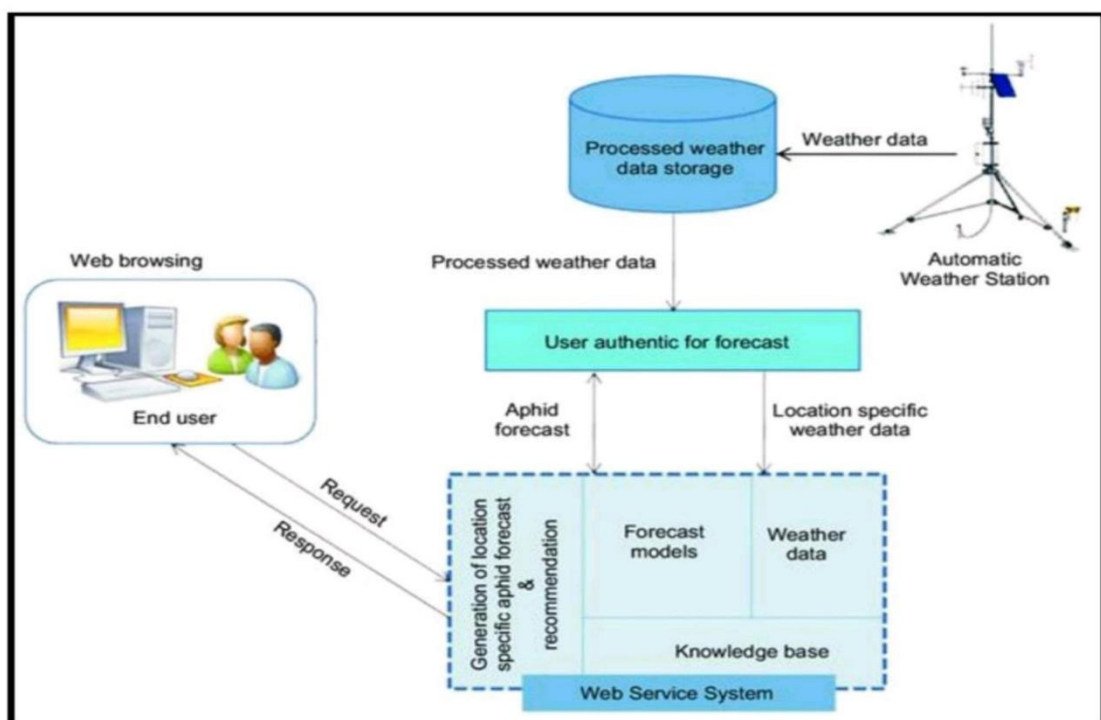
User Story Number	User type/tak	Priority
USN-1	I can see the weather in my current location	High
USN-2	I can see a different icon or background image (e.g. snowy mountain, hot desert) depending on the weather.	High
USN-3	I can push a button to toggle between Fahrenheit and Celcius.	Medium
USN-4	Observational data collected by doppler radar, radiosondes, weather satellites, buoys and other instruments are fed into computerized NWS numerical forecast models.	Medium
USN-5	he measurement of hotness or coolness is temperature. It can vary significantly from place to place and day to day and usually measures in degrees Celsius (°C) or Fahrenheit (°F). the temperature impact.	Medium

5.2 Solution Architecture

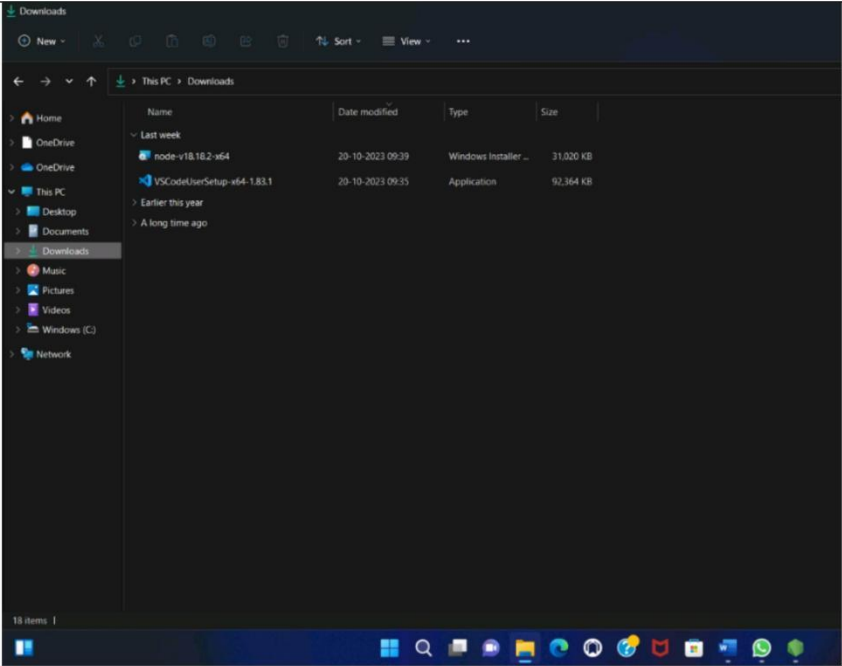
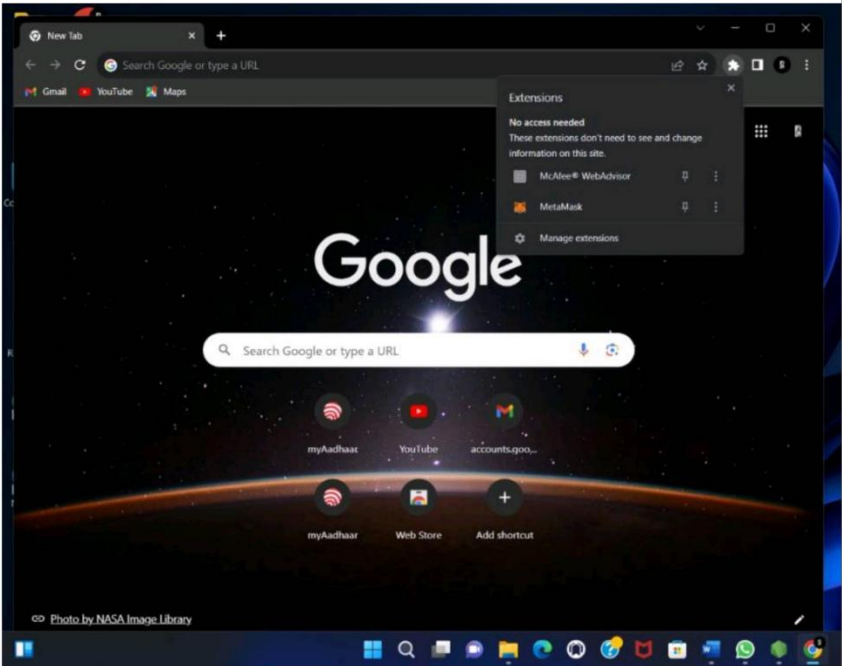


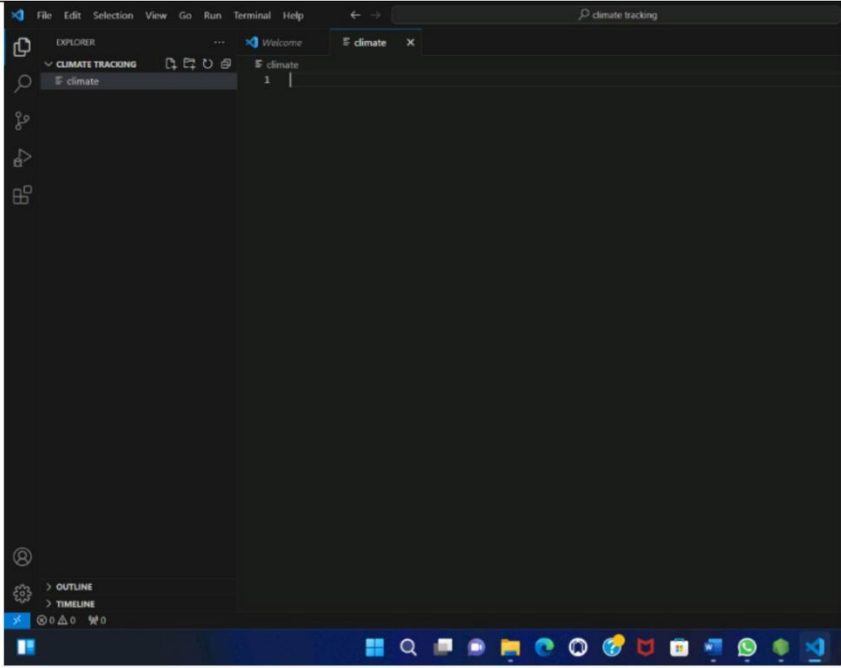
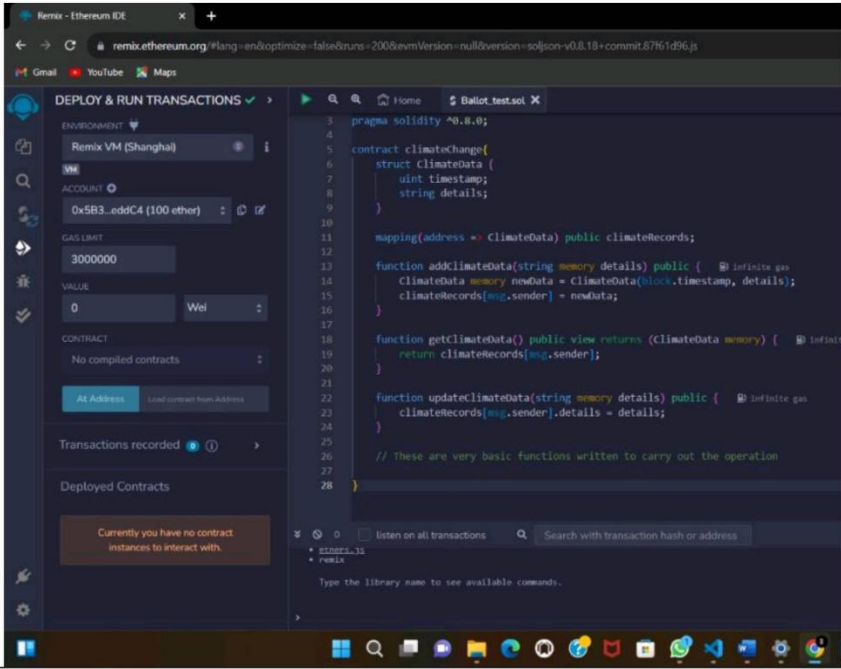
6. PROJECT PLANNING & SCHEDULING

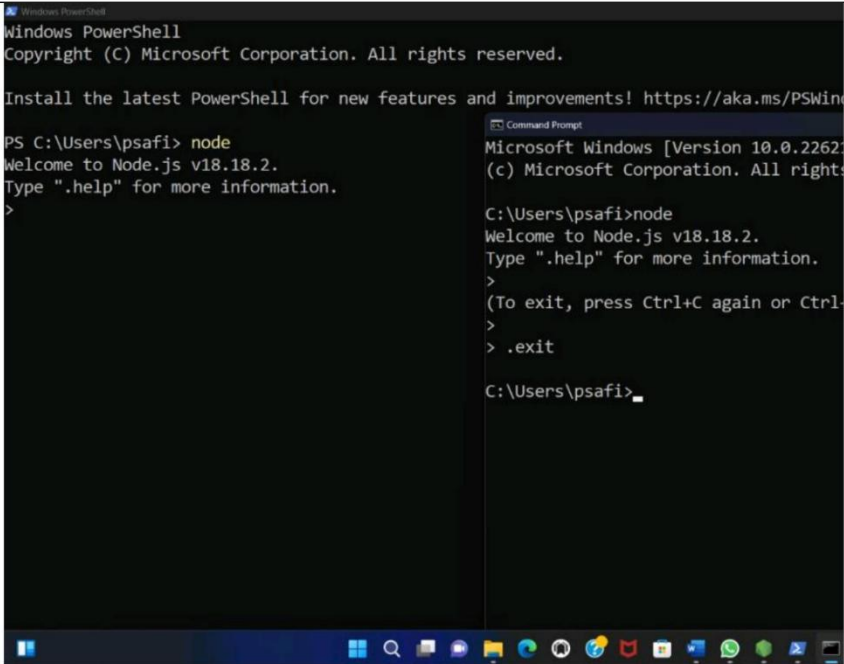
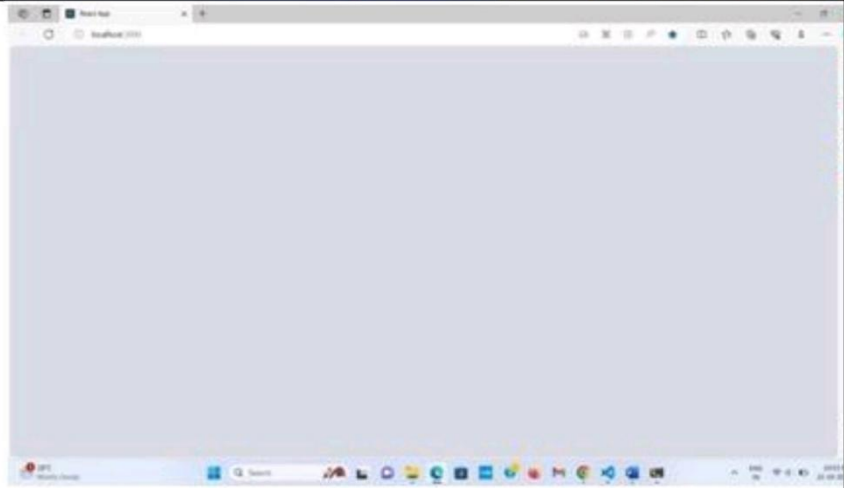
6.1 Technical Architecture



Project Development Phase:

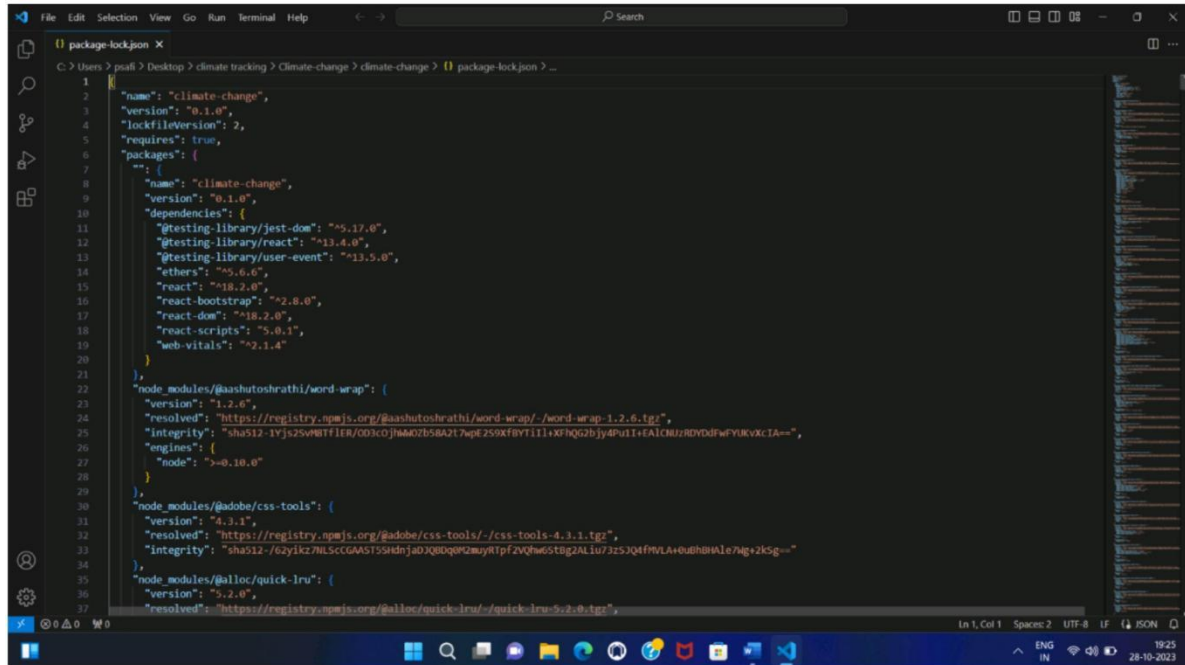
1.	Information gathering	Setup all the prerequisite	<div></div> <div>JS&VS code</div> <div>mmm</div> <div></div> <div>Metamask</div>
----	-----------------------	----------------------------	--

2.	Extract zip file	Open to vs code	
3.	Remixide platform exploring	Deploy the smart contract code and run the transaction. By selecting the environment - inject the MetaMask.	
4.	Open file explorer	Open the extracted file and click on the folder. Open src, and search	

		<p>for utils. Open cmd enter command s 1.npm install 2.npm bootstrap 3. npm start</p>	
5.	Local host Ip address	<p>copy the address and open it to chrome so you can see the front end of your project</p>	

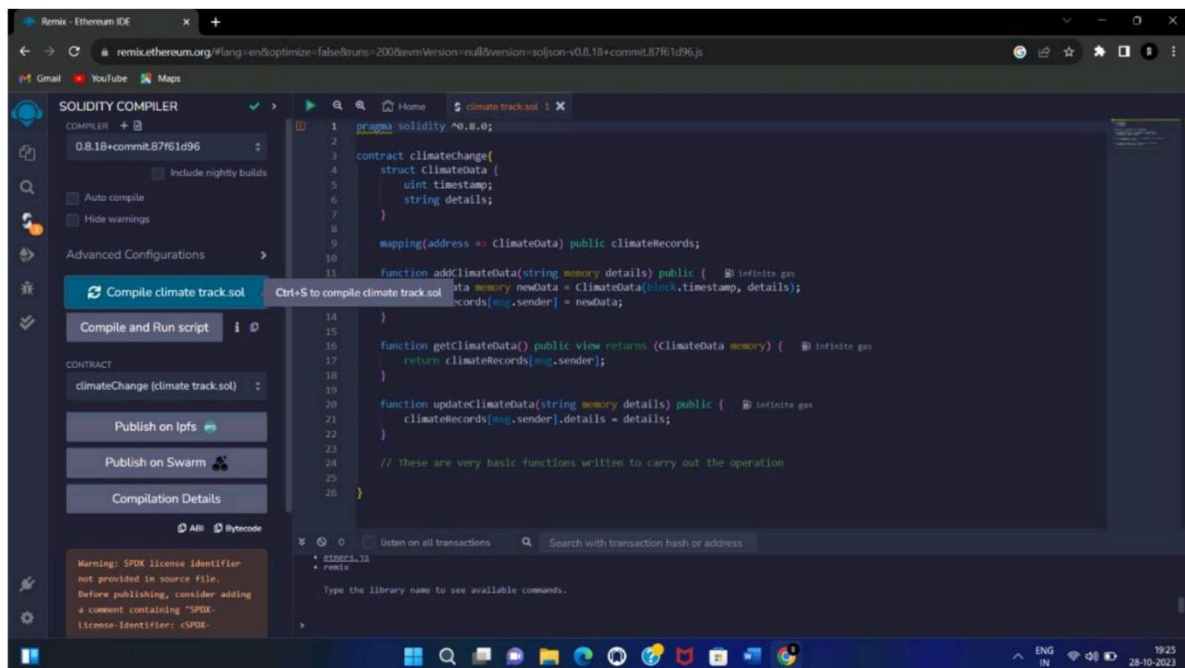
9.RESULT

Output Screenshots



A screenshot of a code editor window displaying a `package-lock.json` file. The file is located at `C:\Users> psali > Desktop > climate tracking > Climate-change > climate-change > package-lock.json > ...`. The JSON content includes the following details:

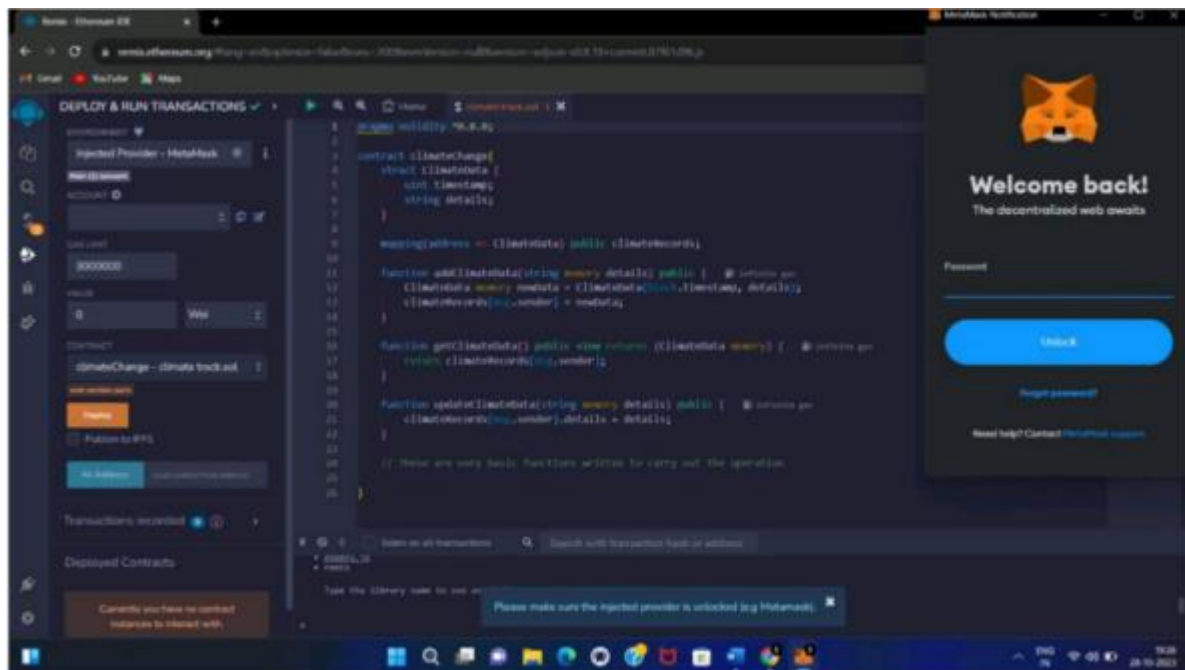
- `"name": "climate-change",`
- `"version": "0.1.0",`
- `"lockfileVersion": 2,`
- `"requires": true,`
- `"packages": {`
- `"": {`
- `"name": "climate-change",`
- `"version": "0.1.0",`
- `"dependencies": {`
- `"@testing-library/jest-dom": "~5.17.0",`
- `"@testing-library/react": "~13.4.0",`
- `"@testing-library/user-event": "~13.5.0",`
- `"ethers": "~5.6.0",`
- `"react": "~18.2.0",`
- `"react-bootstrap": "~2.8.0",`
- `"react-dom": "~18.2.0",`
- `"react-scripts": "5.0.1",`
- `"web-vitals": "~2.1.4"`
- `},`
- `},`
- `"node_modules/@aashutoshrathi/word-wrap": {`
- `"version": "1.2.6",`
- `"resolved": "https://registry.npmjs.org/@aashutoshrathi/word-wrap/-/word-wrap-1.2.6.tgz",`
- `"integrity": "sha512-1YJ5Z5vHTI1ER/OD3cojYH6Q2B5A217wP259XFBY11L1XfH9G2Bjy4PuII+EA1C8UzRDYDfWfYU9vXcIA==",`
- `"engines": {`
- `"node": ">=0.10.0"`
- `},`
- `},`
- `"node_modules/@adobe/css-tools": {`
- `"version": "4.3.1",`
- `"resolved": "https://registry.npmjs.org/@adobe/css-tools/-/css-tools-4.3.1.tgz",`
- `"integrity": "sha512-/62yilkz7MLScGAAS75SHdnjADQ8BQ9m2uYRTPf2VQhw6StB2ALiU73253Q4FHVLA+ouhBHWL67lg+2K5g==",`
- `},`
- `"node_modules/@alloc/quick-lru": {`
- `"version": "5.2.0",`
- `"resolved": "https://registry.npmjs.org/@alloc/quick-lru/-/quick-lru-5.2.0.tgz",`
- `},`
- `}`



A screenshot of the Remix Ethereum IDE interface. The main editor displays a Solidity contract named `climateChange` with the following code:

```
1 pragma solidity ^0.8.0;
2
3 contract climateChange{
4   struct climateData {
5     uint timestamp;
6     string details;
7   }
8
9   mapping(address => ClimateData) public climateRecords;
10
11   function addClimateData(string memory details) public {
12     // infinite gas
13     ClimateData memory newData = ClimateData(block.timestamp, details);
14     climateRecords[msg.sender] = newData;
15   }
16
17   function getClimateData() public view returns (ClimateData memory) {
18     // infinite gas
19     return climateRecords[msg.sender];
20   }
21
22   function updateClimateData(string memory details) public {
23     // infinite gas
24     climateRecords[msg.sender].details = details;
25   }
26
27   // these are very basic functions written to carry out the operation
28 }
```

The left sidebar shows the "COMPILER" section with the version `0.8.18+commit.87f61d96` and buttons for "Auto compile", "Hide warnings", "Advanced Configurations", "Compile climate track.sol", "Compile and Run script", "Publish on Ipfs", "Publish on Swarm", and "Compilation Details". A warning message at the bottom left states: "Warning: SPDX license identifier not provided in source file. Before publishing, consider adding a comment containing 'SPDX-License-Identifier: <SPDX-License-Identifier>'".



10. ADVANTAGES & DISADVANTAGES

Advantages

Blockchain and Web 3.0 can facilitate the collection and secured sharing of large amounts of environmental data, and allow researchers and institutions to collaborate on a global level.

Being able to forecast and plan for the future when it comes to the local climate.

Disadvantages

Cannot detect fog: Weather radar has the limitation of not being able to detect fog. This creates a gap in weather forecasting where an area that is likely to receive fog is not properly profiled.

The main disadvantage of an automatic weather station is that it removes the observer from the real elements being measured, and so the experience of what -5°C temperatures or 30 knot winds feel like, is lost.

11. CONCLUSION

Weather and climate are different, yet related concepts. One involves the atmospheric condition and current zone. The other involves the atmospheric condition of a larger area and for a more extended time.

12. FUTURE SCOPE

The future of weather applications is promising, with the increasing demand for real-time and accurate weather information. One potential development is the improvement in accuracy through the use of advanced data collection and analysis techniques, as well as sophisticated algorithms.

12. APPENDIX

13.1 Source code:

```
pragma solidity ^0.8.0;
contract climateChange{
    struct ClimateData {
    }
    uint timestamp;
    string details;
    mapping(address => ClimateData) public climateRecords;
    function addClimateData(string memory details) public {
    ClimateData memory newData = ClimateData(block.timestamp, details);
    climateRecords[msg.sender] = newData;
    }
    function getClimateData() public view returns (ClimateData memory) {
    }
    return climateRecords[msg.sender];
    function updateClimateData(string memory details) public {
    climateRecords[msg.sender].details = details;
    }
    {
        "short_name": "React App",
        "name": "Create React App Sample",
        "icons": [
            {
                "src": "favicon.ico",
                "sizes": "64x64 32x32 24x24 16x16",
                "type": "image/x-icon"
            },
            {
                "src": "logo192.png",
                "type": "image/png",
                "sizes": "192x192"
            },
            {
                "src": "logo512.png",
```

```

        "type": "image/png",
        "sizes": "512x512"
    }
],
"start_url": ".",
"display": "standalone",
"theme_color": "#000000",
"background_color": "#ffffff"
}
const { ethers } = require("ethers");

const abi = [
    {
        "inputs": [
            {
                "internalType": "string",
                "name": "details",
                "type": "string"
            }
        ],
        "name": "addClimateData",
        "outputs": [],
        "stateMutability": "nonpayable",
        "type": "function"
    },
    {
        "inputs": [
            {
                "internalType": "address",
                "name": "",
                "type": "address"
            }
        ],
        "name": "climateRecords",
        "outputs": [
            {
                "internalType": "uint256",
                "name": "timestamp",
                "type": "uint256"
            },
            {
                "internalType": "string",
                "name": "details",
                "type": "string"
            }
        ],
    },

```

```

    "stateMutability": "view",
    "type": "function"
  },
  {
    "inputs": [],
    "name": "getClimateData",
    "outputs": [
      {
        "components": [
          {
            "internalType": "uint256",
            "name": "timestamp",
            "type": "uint256"
          },
          {
            "internalType": "string",
            "name": "details",
            "type": "string"
          }
        ],
        "internalType": "struct climateChange.ClimateData",
        "name": "",
        "type": "tuple"
      }
    ],
    "stateMutability": "view",
    "type": "function"
  },
  {
    "inputs": [
      {
        "internalType": "string",
        "name": "details",
        "type": "string"
      }
    ],
    "name": "updateClimateData",
    "outputs": [],
    "stateMutability": "nonpayable",
    "type": "function"
  }
]

```

```

if (!window.ethereum) {
  alert('Meta Mask Not Found')
  window.open("https://metamask.io/download/")
}

```

```
}
```

```
export const provider = new ethers.providers.Web3Provider(window.ethereum);  
export const signer = provider.getSigner();  
export const address = "0x9Fd67609Bd692f21ac5eCC8e4CF07961f3587026"  
  
export const contract = new ethers.Contract(address, abi, signer)
```

13.2Github& Project Demolink:

Github link:

<https://github.com/shuttersalih/climateChange.git>

Demolink:

https://drive.google.com/file/d/1ql06WX6xi_vq3-Rbz35yWHuwzh55YRoP/view?usp=drive_link

