

# ClimateTrackSmart Using Blockchain

Team ID: NM2023TMID10013

*Submitted by*

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# **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.

### **2.2 References**

1. Andrews, J.W. 1993. Impact of weather event uncertainty upon an optimum ground-holding strategy. *Air-Traffic Control Quarterly* 1(1): 59-8
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4. Beguin, D. and JL. Plante. 1998. Critical technology requested by fast scanning radar.  
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6. Baldwin, M.P. and T.J.Dunkerton. 2001. Stratospheric harbingers of  
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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.

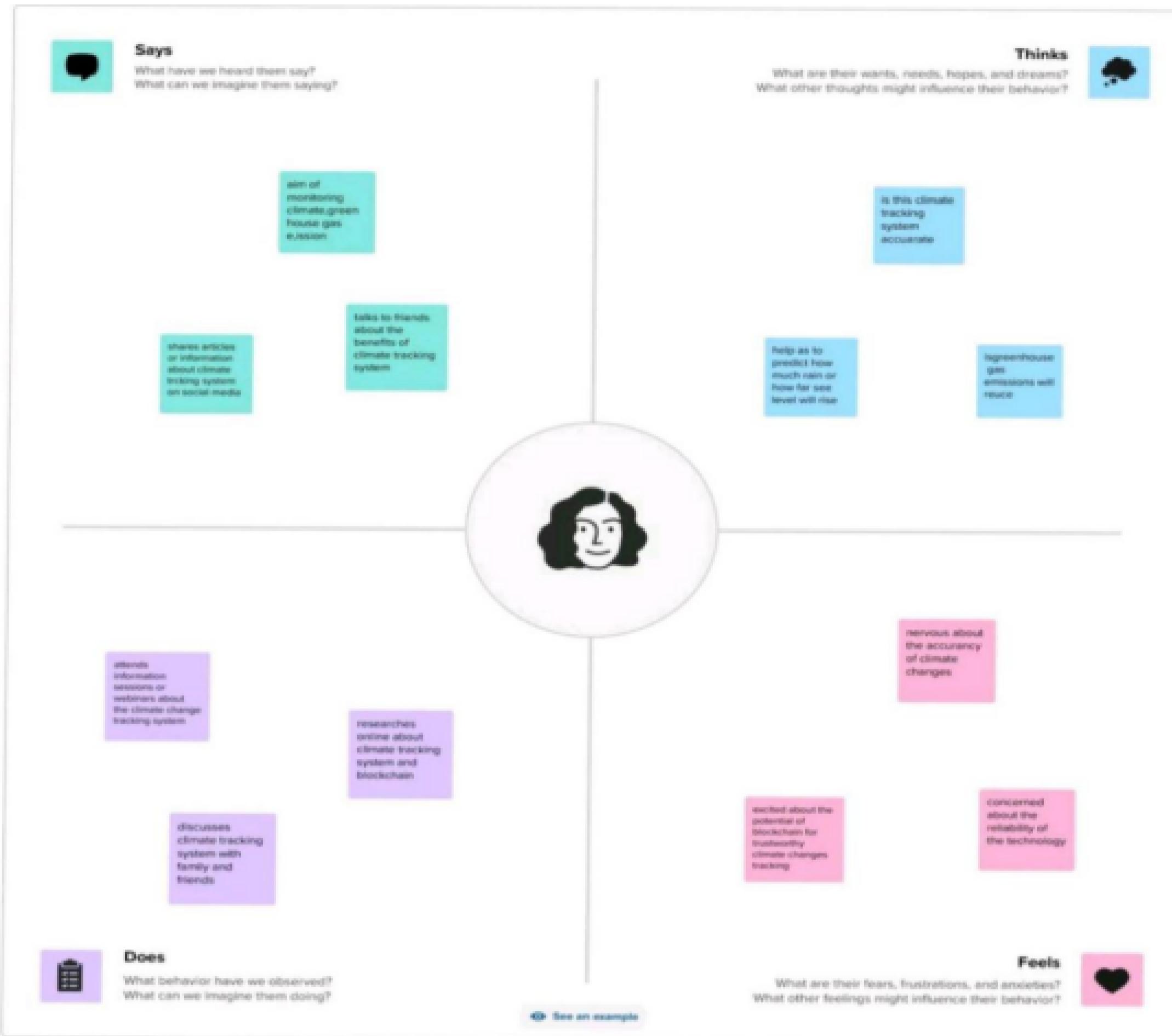
## 2.3 Problem Statement Definition

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. Identify 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 →

#### 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.

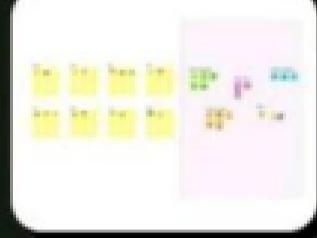
5 minutes

PROBLEM  
How might we [your problem statement]?

#### Key rules of brainstorming

To run a smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.



Need some inspiration?  
See a finished version of this template to kickstart your work.  
Open example →

## Step-2: Brainstorm, Idea Listing and Grouping

**2**

**Brainstorm**

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

⌚ 10 minutes

**TIP**  
You can select a sticky note and tap the pencil [switch to sketch] icon to start drawing!

**Person 1**

- existing  
marketplace and  
verifiable carbon  
credit-trading  
platforms
- neutralizing  
their carbon  
footprint  
through  
offsetting
- ensure the  
accuracy,  
tracking and  
validation of  
emissions  
reduction

**Person 2**

- easier to track  
and import  
emission  
reduction
- smart sensor  
and  
Blockchain  
technology  
worktogether
- carbon  
emissions are  
converted into  
carbon credits

**Person 3**

- its immutability,  
accountability and  
transparency make it possible  
to track carbon  
balances
- Blockchain can  
bring  
transparency  
and trust to the  
carbon markets
- it helps to  
identify and  
reduce  
environmental  
impacts

**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 can break it up into smaller sub-groups.

⌚ 20 minutes

**TIP**  
Add a number to each sticky note to make it easier to find, group, organize, and categorize important ideas in themes within your mind!

**existing  
marketplace and  
verifiable carbon  
credit-trading  
platforms**

**smart sensor  
and  
Blockchain  
technology  
worktogether**

**Blockchain can  
bring  
transparency  
and trust to the  
carbon markets**

**neutralizing  
their carbon  
footprint  
through  
offsetting**

**It helps to  
identify and  
reduce  
environmental  
impacts**

## 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

TIP

Participants can use their cursor 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.

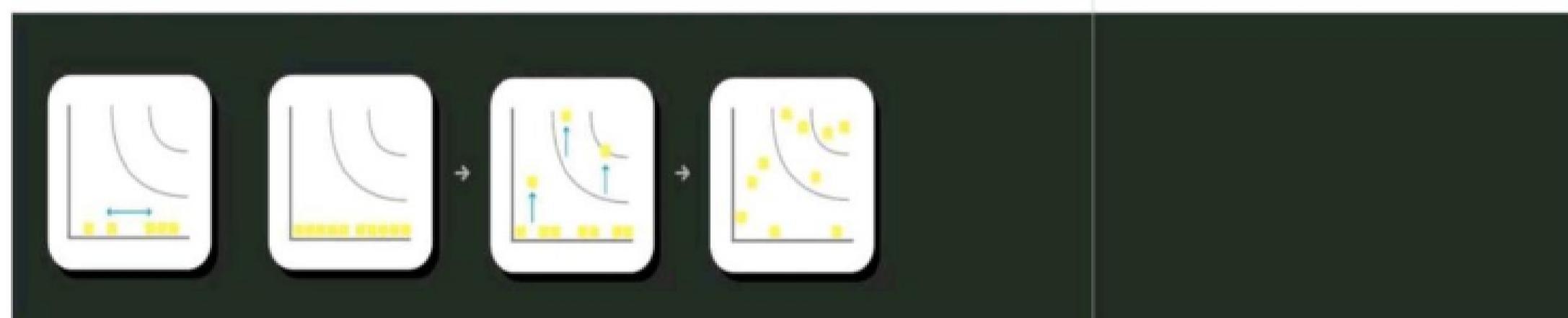
#### Keep moving forward

 **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

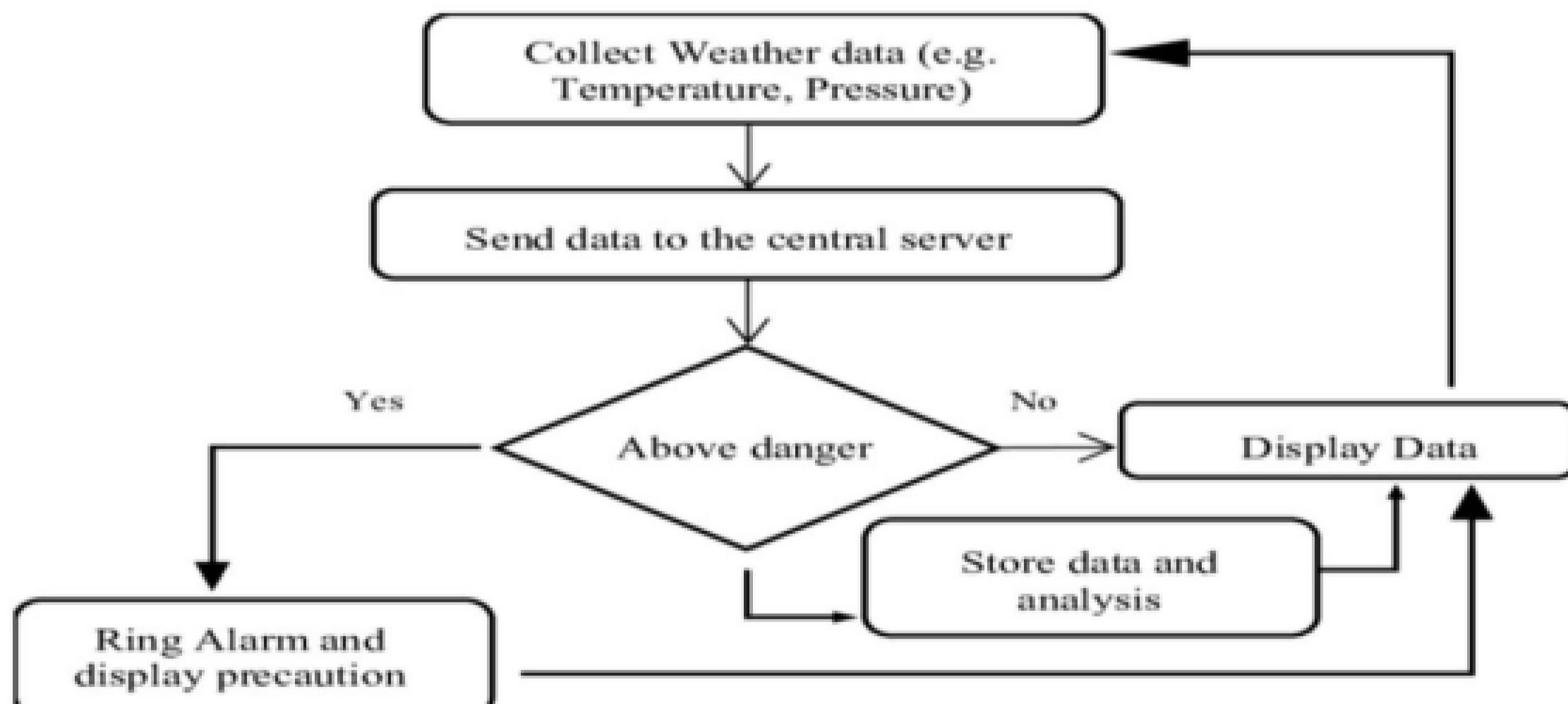
System's operational and location of remote station and central station shall not violate the current Government regulations of environment.

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

## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams & User Stories

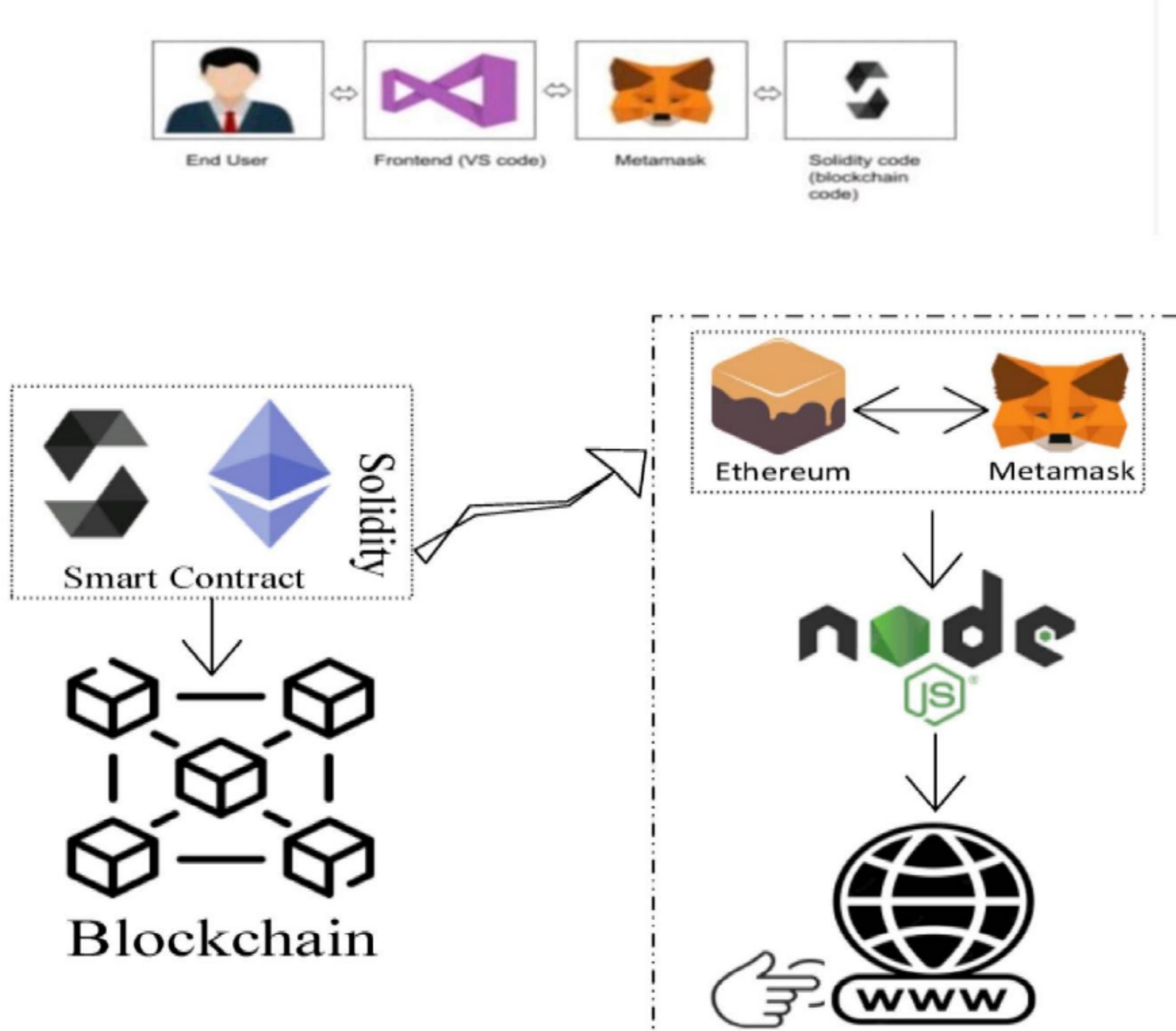
#### Data flow diagram



## User Stories

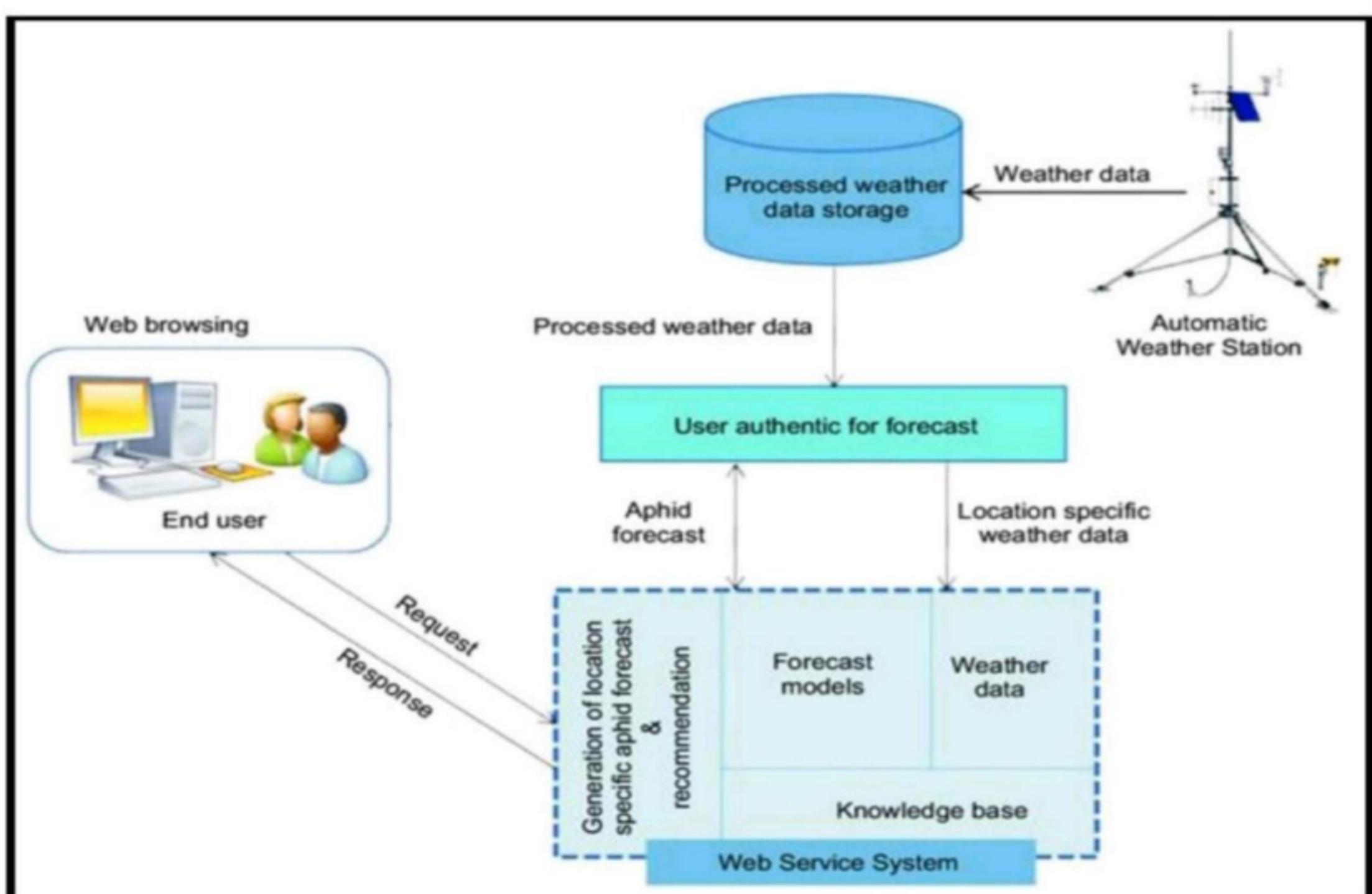
User Story Number	User type/tak	Priority
USN-1	I can see the weather in my current location	High
USN-2	I can see a different icon or background image (e.g. snowy mountain, hot desert) depending on the weather.	High
USN-3	I can push a button to toggle between Fahrenheit and Celcius.	Medium
USN-4	Observational 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

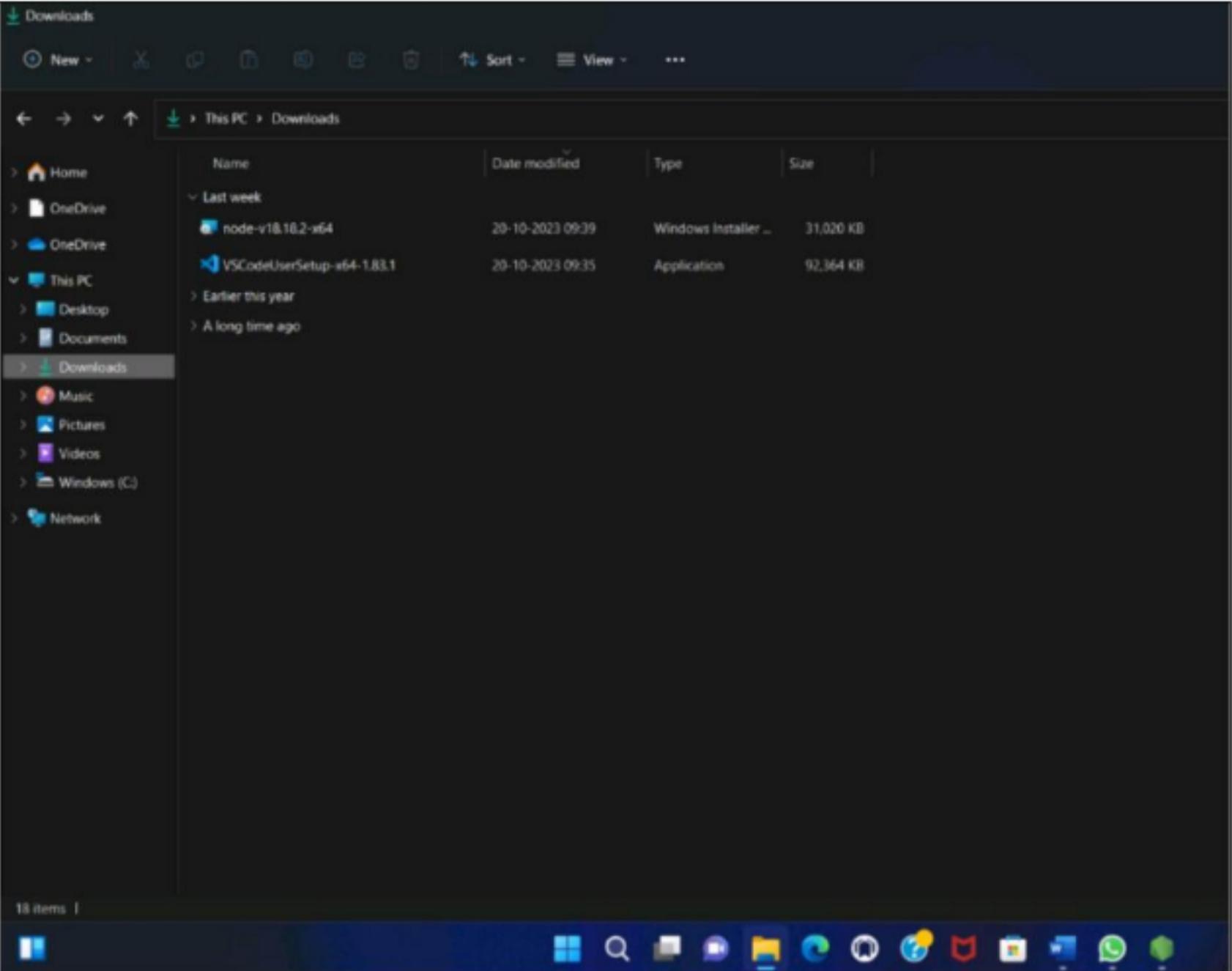
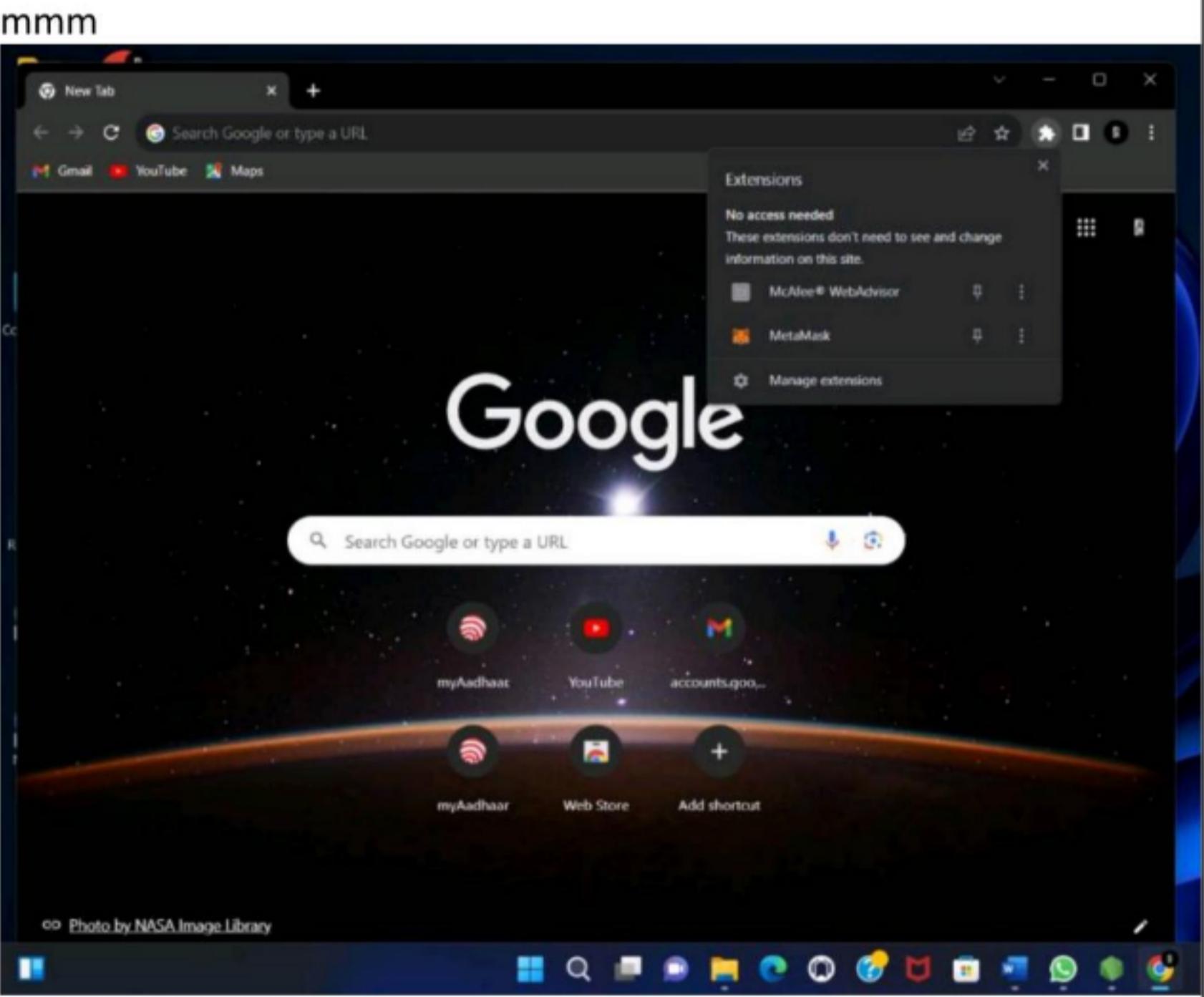


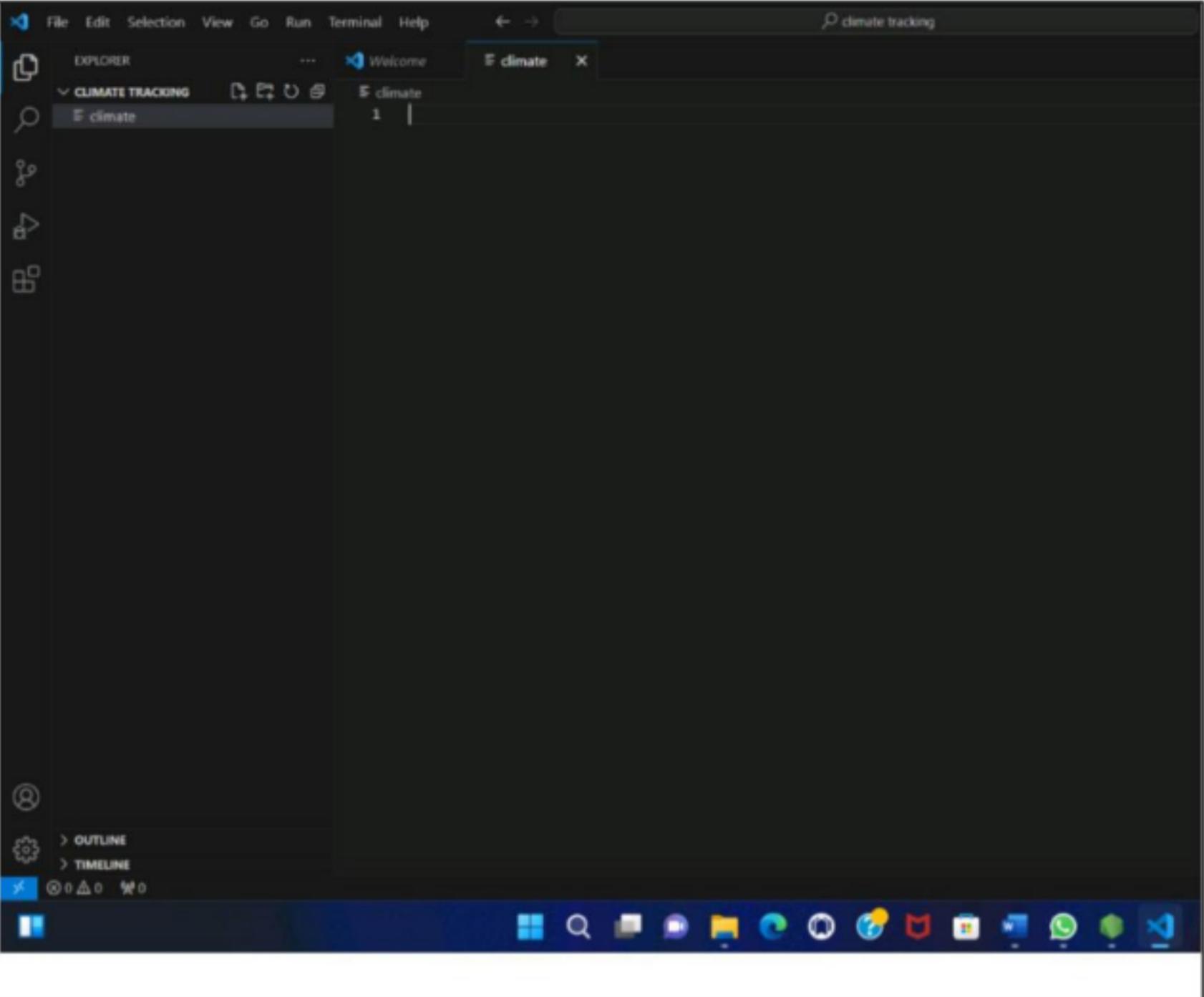
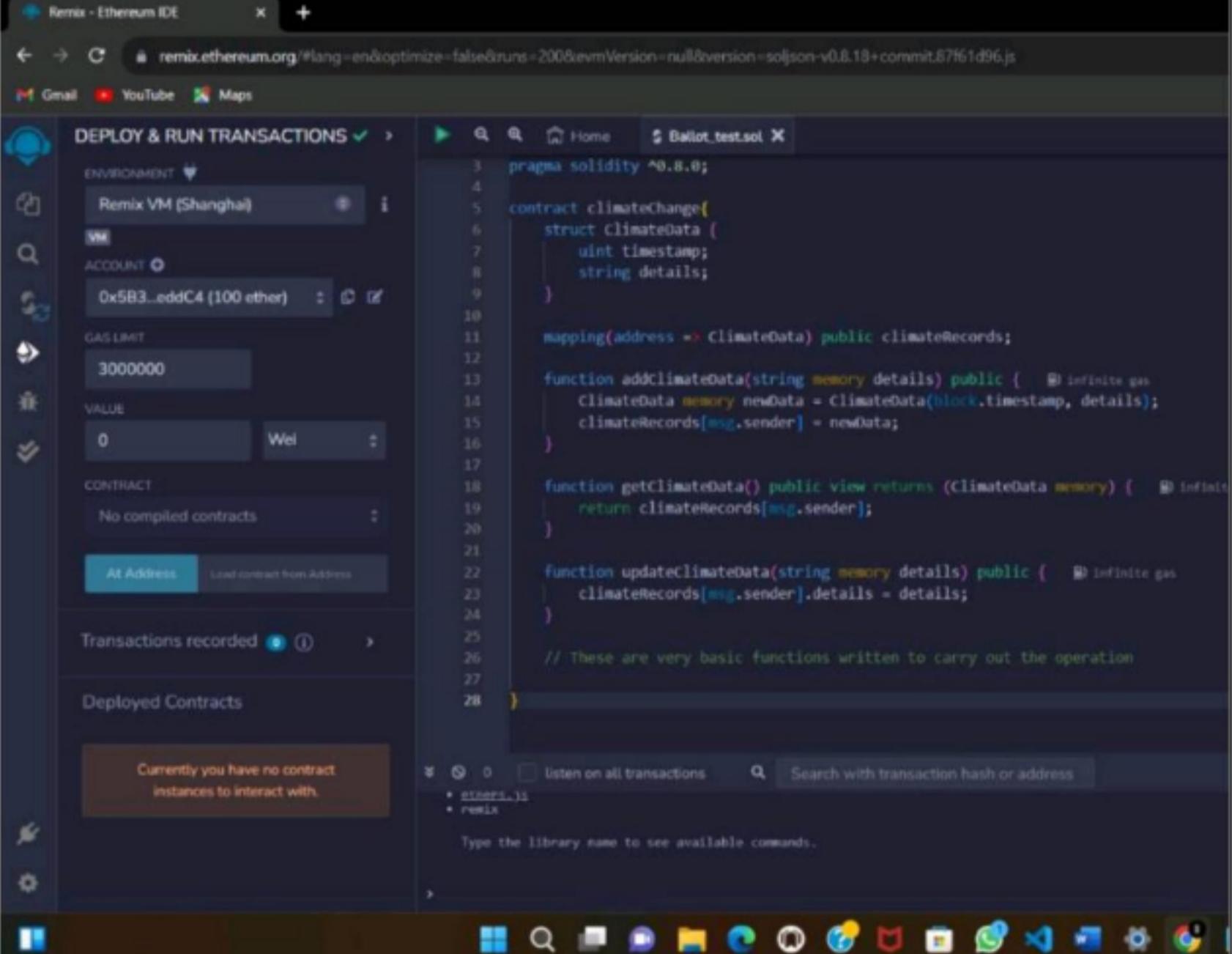
## 6. PROJECT PLANNING & SCHEDULING

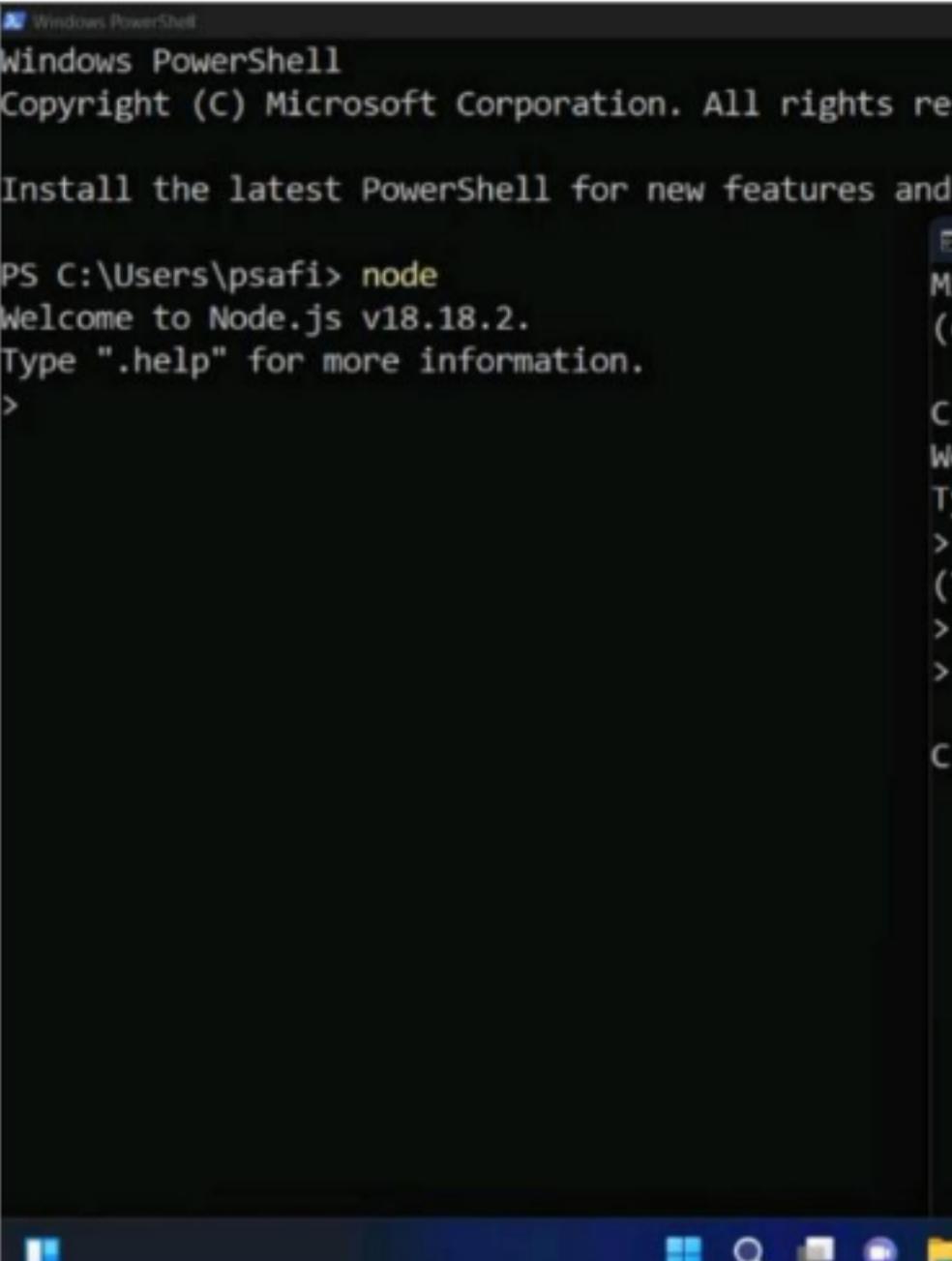
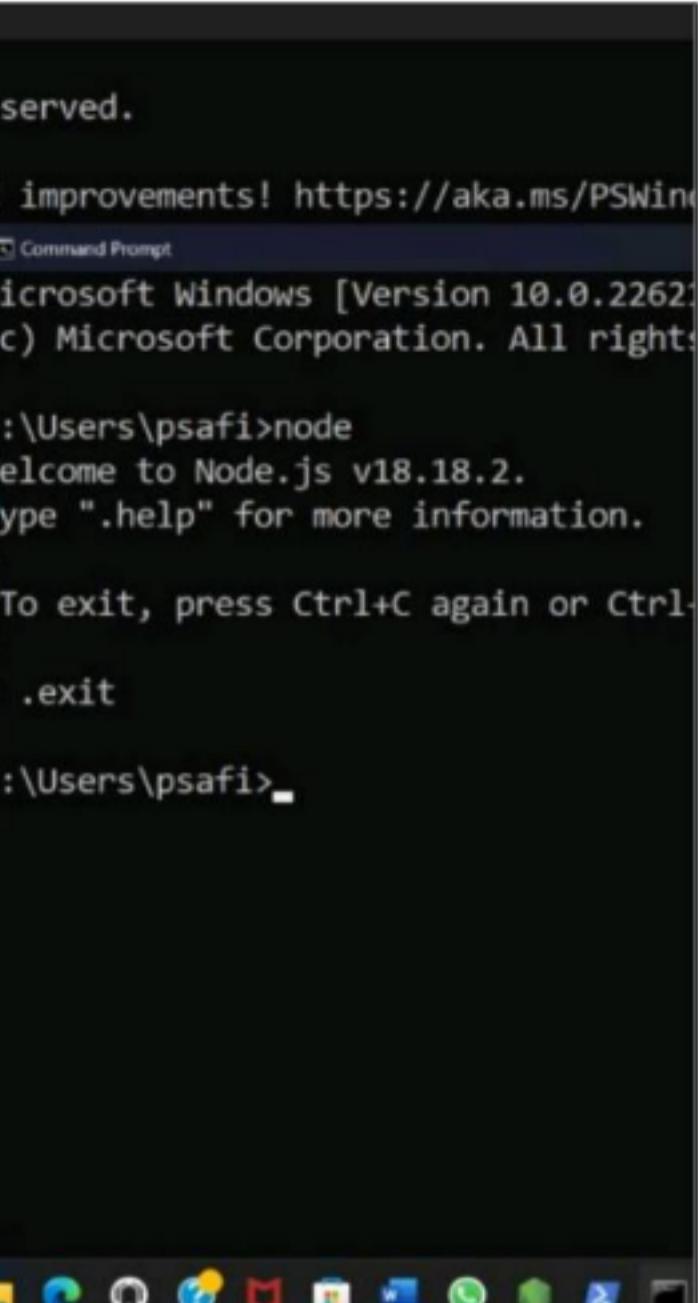
### 6.1 Technical Architecture



## Project Development Phase:

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

2.	Extract zip file	Open to vs code	
3.	Remixide platform exploring	Deploy the smart contract code Deploy 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 utiles. Open cmd enter comman ds 1.npm install 2.npm bootstra p 3. npm start</p>	 <pre>Windows PowerShell Copyright (C) Microsoft Corporation. All rights reserved.  Install the latest PowerShell for new features and improvements! https://aka.ms/PSWin  PS C:\Users\psafi&gt; node Welcome to Node.js v18.18.2. Type ".help" for more information. &gt;</pre>	 <pre>Microsoft Windows [Version 10.0.22621] (c) Microsoft Corporation. All rights reserved.  C:\Users\psafi&gt;node Welcome to Node.js v18.18.2. Type ".help" for more information. &gt; (To exit, press Ctrl+C again or Ctrl+Break) &gt; &gt; .exit  C:\Users\psafi&gt;</pre>
5.	Local host Ip address	copy the address and open it to chrome so you can see the front end of your project		

## 9.RESULT

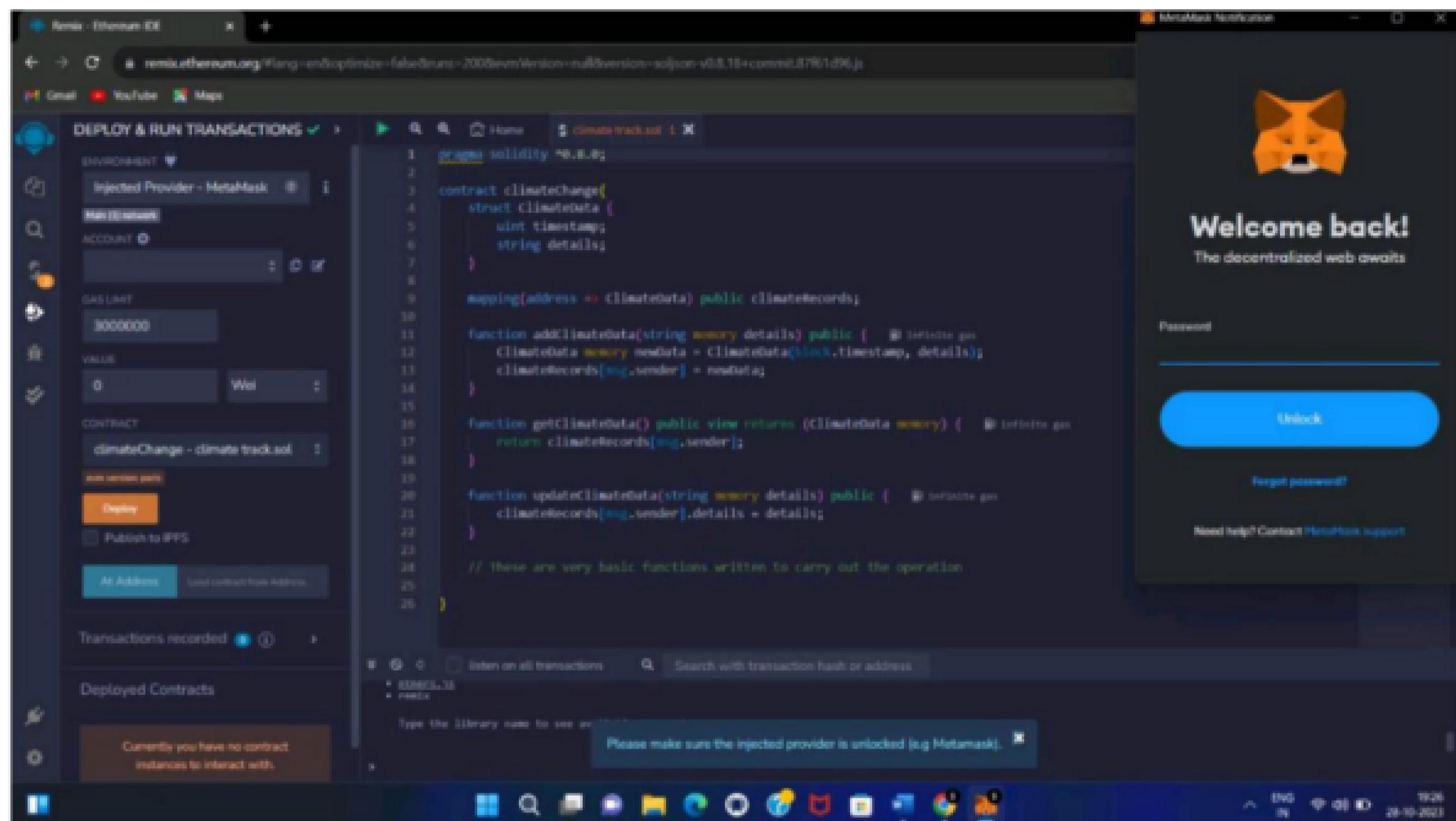
### Output Screenshots

The screenshot shows a code editor window with the file 'package-lock.json' open. The file content is a JSON object representing the dependencies and their versions for a project named 'climate-change'. The 'dependencies' section includes packages like '@testing-library/jest-dom', '@testing-library/react', '@testing-library/user-event', '@etherswap/sdk', 'react', 'react-bootstrap', 'react-dom', 'react-scripts', and 'web-vitals'. The 'resolutions' section shows the resolved URLs and integrity hashes for each dependency. The code editor interface includes a sidebar with icons for file operations, a search bar at the top, and various status indicators at the bottom.

```
1  "name": "climate-change",
2  "version": "0.1.0",
3  "lockfileVersion": 2,
4  "requires": true,
5  "packages": [
6    {
7      "name": "climate-change",
8      "version": "0.1.0",
9      "dependencies": {
10        "@testing-library/jest-dom": "^5.17.0",
11        "@testing-library/react": "^13.4.0",
12        "@testing-library/user-event": "^13.5.0",
13        "@etherswap/sdk": "^5.6.0",
14        "react": "^18.2.0",
15        "react-bootstrap": "^2.8.0",
16        "react-dom": "^18.2.0",
17        "react-scripts": "5.0.1",
18        "web-vitals": "^2.1.4"
19      }
20    },
21    "node_modules/@aashutoshrathi/word-wrap": {
22      "version": "1.2.6",
23      "resolved": "https://registry.npmjs.org/@aashutoshrathi/word-wrap/-/word-wrap-1.2.6.tgz",
24      "integrity": "sha512-1Yjs2SvMBTfIER/OD3cOjHMM2b58A2t7wpE259XFBYTII+XFhQ2bjy4PuII+EAICNU2RDYDdFwFYUKvXcIA==",
25      "engines": {
26        "node": ">0.10.0"
27      }
28    },
29    "node_modules/@adobe/css-tools": {
30      "version": "4.3.1",
31      "resolved": "https://registry.npmjs.org/@adobe/css-tools/-/css-tools-4.3.1.tgz",
32      "integrity": "sha512-6zy1kz7NL5CGAASt5SHdnjaD3Q8DqM2muyRtpF2vQhw65t8g2ALiu73zSJQ4fMVLA+Bu8h0MAle7Wg+2k5g=="
33    },
34    "node_modules/@alloc/quick-lru": {
35      "version": "5.2.0",
36      "resolved": "https://registry.npmjs.org/@alloc/quick-lru/-/quick-lru-5.2.0.tgz",
37    }
38  }
```

The screenshot shows the Ethereum IDE (Remix) interface. On the left, the 'SOLIDITY COMPILER' panel is visible, showing the version '0.8.18+commit.B7f61d96' and options for 'Auto compile' and 'Hide warnings'. A button 'Compile climate track.sol' is highlighted. Below it, there are buttons for 'Compile and Run script', 'CONTRACT', 'climateChange (climate track.sol)', and publishing options like 'Publish on IPFS' and 'Publish on Swarm'. The main area displays the Solidity source code for a contract named 'climatechange'. The code defines a struct 'ClimateData' with fields 'timestamp' and 'details', and a mapping from address to ClimateData. It includes functions for adding new data, getting data, and updating data. At the bottom of the code, a note states: '// These are very basic functions written to carry out the operation'. The bottom right corner shows the system tray with network and battery status.

```
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         ClimateData memory newData = ClimateData(block.timestamp, details);
13         climateRecords[msg.sender] = newData;
14     }
15
16     function getClimateData() public view returns (ClimateData memory) {
17         return climateRecords[msg.sender];
18     }
19
20     function updateClimateData(string memory details) public {
21         climateRecords[msg.sender].details = details;
22     }
23
24     // These are very basic functions written to carry out the operation
25
26 }
```



## 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)
```



