

## **WEATHER FORECASTING WITH AUGMENTED REALITY**

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### **ABSTRACT**

Weather forecasting is the attempt by meteorologists to predict the weather conditions at some future time and the weather conditions that may be expected. The climatic condition parameters are based on the temperature, wind, humidity, rainfall, and size of data set. The data is collected from the temperature and humidity sensor called DHT11 sensor, which helps in detecting the temperature and humidity values of a particular region or location. Augmented reality (AR) is the integration of digital information with the user's environment in real time. Augmented reality is used to either visually change natural environments in some way or to provide additional information to users. The primary benefit of AR is that it manages to blend digital and three-dimensional (3D) components with an individual's perception of the real world. Our project is about integrating weather forecasting API with augmented reality to present the user with 3d graphics, which helps them learn about their local city weather conditions in a better and effective way.

**Keywords:** Android Application, Augmented Reality, Google AR Core, Kotlin, Open Weather API, Real-Time Forecasting, Weather Forecasting

### **I. INTRODUCTION**

Weather Forecasting

Weather is the condition of air on Earth. It is a continuous, data intensive, multidimensional, dynamic, and chaotic process. These properties make weather forecasting a formidable challenge.

Forecasting is the process of estimation in unknown situations from the historical data.

Augmented Reality

Augmented reality (AR) is the real-time use of information in the form of text, graphics, audio, and other virtual enhancements integrated with real-world objects. It is this "real world" element that differentiates AR from virtual reality. AR integrates and adds value to the user's interaction with the real world, versus a simulation.

### **II. METHODOLOGY**

Firstly, we use Android Studio IDE to start making our project with Kotlin as the language, we had also use JSON file to integrate API to our project and then XML is used to create user interface for making the app interactive.

To start with the project, we first got done with permissions from the user, i.e., to enable internet, location, and camera permission for the app to become functional.

In order to get all the three permissions from user, we create an androidmanifest.xml file where we enable all these services to start getting data from user.

Second thing we did is to get the data extracted from OpenWeather API using JSON.

Then the JSON data extracted from the API is stored into Kotlin class.

The JSON data stored in the Kotlin class is invoked using getter and setter function.

Third step we performed is to integrate the android library 'Volley.'

Volley library is called in the build.gradle file.

Current weather data from OpenWeather API is displayed using volley library.

Using the Google Scene Form library, AR Core package is selected for the purpose of displaying 3d graphics on user's screen.

In build.gradle file google AR Core package is installed.

This package helps in rendering 3d graphics on user's screen in real time.

Further, user's camera is used to provide the 3d interactivity for better visualization and analysis of weather report.

### III. MODELING AND ANALYSIS

Developer's Requirement Analysis: -

Hardware:

A computer with Android Studio

Must be optimized for running Kotlin and XML

Software:

Permission for user location

Permission to use camera for augmented reality features

User's Requirement Analysis: -

Hardware:

An android phone

An internet connection

Software:

Android version 5.0 (Lollipop)

### IV. RESULTS AND DISCUSSION

In our project, the method of creating a weather forecasting app is quite simple. First, user is requested to give three permissions of its device namely: camera, location, and internet. The user is then required to type the name in search box, of the place for which the weather report is required. The user is displayed with required data about the searched location. The user is also able to navigate to another page for viewing the AR models to check weather report.



Figure 1: Outcome of Project

### V. CONCLUSION

Weather plays a major role in our daily life, and without the meteorologist and forecaster we would have difficulty planning our daily activities. As we can see, the weather is not a simple subject like we may have been thinking. The study of weather phenomenon requires the use of science, math, and different types of equipment

and technology and data. Even with all these equipment, data, and observation tools, the weather continues to be a topic to study because it is constantly changing. Meteorologist and forecasters predict the weather and its possible changes, but weather is still unpredictable. Further, technology like augmented reality helps us visualize complex data clearly, effectively, and efficiently. Thus, an application for weather forecasting with augmented reality is a must need for our future, trips, our tours.

### **ACKNOWLEDGEMENTS**

The authors wish to thank Professor Mrs. Preeti Shukla.

### **VI. REFERENCES**

- [1] Philippe Meister, Jack Miller, Kexin Wang, Michael C. Dorneich, Eliot Winer, "Using Three-Dimensional Augmented Reality to Enhance General Aviation Weather Training".
- [2] Aruna R., Vasuki S., Dhanya M. R., Divya V., Gopika G. S., Harini M., Haritha P., "Weather Forecasting and Its Visualizations Using AI".
- [3] Marko Heinrich, Bruce H. Thomas, Stefan Mueller, Christian Sandor, "An Augmented Reality Weather System".
- [4] Stephan Rasp, Peter D. Dueben, Sebastian Scher, Jonathan A. Weyn, Soukayna Mouatadid, Nils Thuerey, "WeatherBench: A benchmark dataset for data-driven weather forecasting".