

## An Android-based mobile application giving information for weather in real-time

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Nowadays mobile devices are very popular in the work and life of people. Many software applications of various mobile operating systems like Android, Symbian, and iPhone are available in online software stores. The most widely used mobile operating system is Android. It is a very popular open-source system for mobile phones and tablet personal computers. The Android Studio Integrated Development Environment is used for the development of the Android application. In the present work, we focus on designing a new smart Android-based mobile application giving information for weather in real-time. This application is expected to be useful for customers in terms of time and cost.

**Keywords:** Android, Mobile operating system, Mobile device, Software

### INTRODUCTION

Nowadays, smartphones are some of the most popular devices used by humans, with each user using different types of smartphones with different functions. Mobile operating systems (MOS) are a software interface that is responsible for managing the hardware units and assisting the user in their use. MOS are designed to allow users to use phones as they do personal computers [1, 2]. The most popular MOS are Android, iOS and Windows phone. According to Market Share Worldwide - October 2021 [3] the ratio of these MOS is as follows: Android 71.09%, iOS 28.21%, Samsung 0.38%.

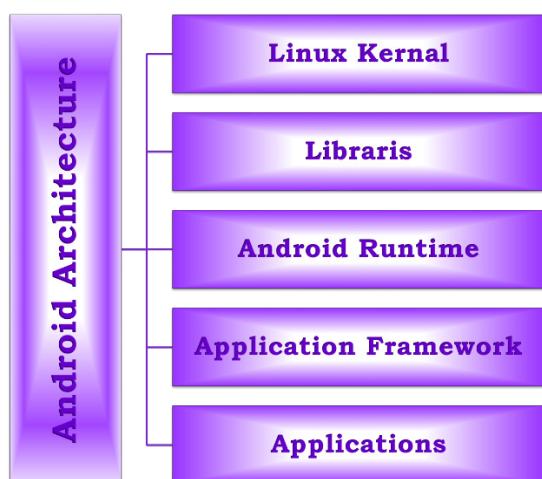


Fig. 1. Android architecture [4].

Android is an open-source mobile OS developed by an Open Handset Alliance consortium and commercially sponsored by Google in 2008. Android source code is known as the Android Open Source Project (AOSP), which is primarily licensed under the Apache license [5-7].

In the present work we focus on designing a new smart Android-based mobile application giving information for weather in real-time. This application is expected to be useful for customers in terms of time and cost.

The aim of this study is to develop a mobile application that will allow the user to check the weather or available restaurants for a city or a specifically populated place.

### METHODS

The mobile application which is discussed in the current paper is called "COMPASS". The technologies used to develop the mobile application "COMPASS" are the following:

- ✓ Android Studio version 10.0;
- ✓ Java and XML programming languages;
- ✓ Volley and JSON;
- ✓ AsyncTask Library;
- ✓ OpenWeatherMap and Google API for Restaurant Places.

Today, the most popular and used languages for developing Android applications are Java and Kotlin programming languages [7]. Kotlin is a new programming language representing an alternative to Java. The developed Android application was written in the Java programming language using an IDE called Android Studio version 10.0 and Nexus 5X with API 29. Based on JetBrains' IntelliJ IDEA software, Android Studio is an IDE created specifically for Android development.

XML (eXtensible Markup Language) is used for 'drawing' the interfaces of the developed application. Java is used for writing the backend codes while frontend codes are written in XML.

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Volley is an HTTP library that makes networking for Android applications easier and faster. It offers automatic scheduling of network requests, multiple concurrent network connections, memory response caching with standard HTTP cache coherence, request prioritization, ease of customization, debugging and tracing tools, etc. [8]. JSON (JavaScript Object Notation) is an open standard file format and data exchange format which is the best alternative for XML. Android provides four different classes to manipulate JSON data: JSONArray, JSONObject, JSONStringer and JSONTokenizer [9].

AsyncTask (asynchronous task) is designed to enable proper and easy use of the user interface thread. It allows us to run the instructions in the background and then synchronize again with our main thread [10].

The data about the weather in the developed mobile application are taken from online service OpenWeatherMap which provides information through an Application Programming Interface [11].

#### MOBILE APPLICATION

The mobile application gives up-to-date weather information in a city or town that a user has entered and also provides information about the restaurants in the area specified by the user. When we start the application, on the first page we see 2 buttons below the text, giving information about what each of the buttons does.

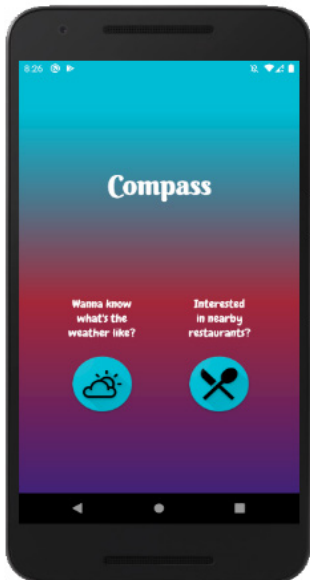


Fig. 2. Application activities.

If the user clicks on the right button of the application, a window appears in which the user can enter the name of the city and region where he wants to view the available restaurants, their exact address

and rating for them in google reviews. Also, the user can write the name of the restaurant, or part of the name to see its exact name and exact address.

When we start the application, on the first page we see 2 buttons below the text, giving information about what each of the buttons does (Fig. 3).

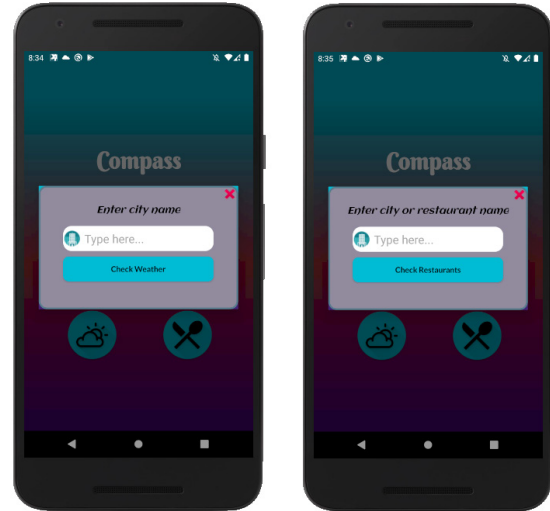


Fig. 3. Search for city and restaurant.

The user can enter the name of a given town or village to check the weather information (Fig. 4). This activity shows the name of the city that enters the user and the country in which the city is located. The weather is also displayed on the screen of the mobile phone, with updated information. Below this information you can see an icon that visualizes the weather and the general description of it at the moment. More important weather information such as the humidity, the air pressure and the exact Celsius temperature is then displayed.

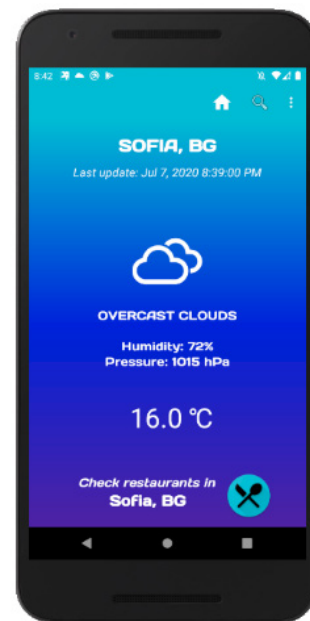


Fig. 4. Activity with weather information.

An activity button has been added showing data on the available restaurants in the city where we are viewing the weather at the moment (Fig. 5).

Fig. 5A shows restaurants in a certain neighborhood in a city. In the specific case, the Elenovo district, Blagoevgrad, Bulgaria, has been set. Fig. 5B shows a list of restaurants containing the keyword "Carski". The information displayed for the restaurants is the name of the restaurant, its exact address and the rating from google reviews [12-22]. The limit of the displayed restaurants is twenty. When we enter only the name of the city or the name of the neighborhood in which there are more than twenty restaurants, as a result the application will show a list of the most popular restaurants in the searched place.

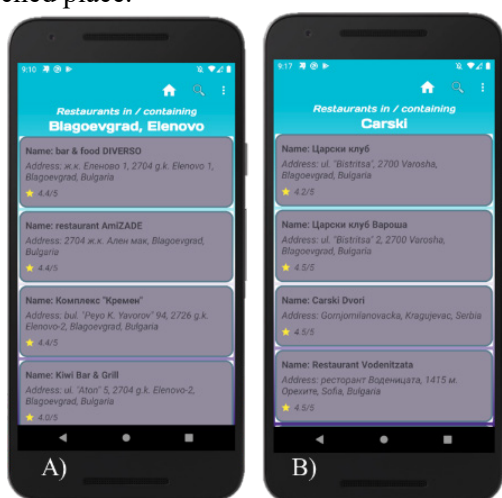


Fig. 5. Activity with information about the restaurants.

## CONCLUSIONS

In the last few years Android is one of the leading operating systems in the field of mobile devices, making it the first choice of any user who would like to use such a device. The fact that Android is an open source operating system makes it an ideal platform for creating a wide variety of applications and using all the functionalities offered by the latest technologies.

In the present work a mobile application based on Android has been developed and tested, which permits the user to check in real-time the weather or available restaurants for a given city or a specifically populated place.

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