CODE Challenge - Spring 2023

AirRate - Air Quality Reporting App

submitted on 05.04.2023

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by

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Omsk, 05.04.2023

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Problem description

The first time I looked at the CODE Challenge, various ideas came to my mind - from the difficulties of digitalization at charity organizations to the uncontrolled dumping of plastic into water bays. To organize my thoughts, I decided to take a walk around my neighbourhood. However, as soon as I opened the door, the smell of chemicals in the air hit me in the nose. I have to admit that, unfortunately, this situation is not an exception in my city. Citizens often complain about the fact that it is impossible to breathe freely. Everyone tries to reach out to the government to help with this issue, but the local authorities either ignore the requests or provide the laboratory results that found nothing.

So what is the reason for this bad air quality? On the one hand, my hometown Omsk is a large industrial centre with many factories, plants and production facilities. One of the local "points of pride" is a massive oil refinery with several chemical enterprises. On the other hand, many landfills around the city (including illegal ones) exist. Only recently, the government has started taking active anti-rubbish steps, e.g. through waste-sorting and incineration plants, but the first tangible results are still a long way off. On top of the points mentioned above, it should be noted that the city is currently home to more than 1 million people, which directly affects the amount of (both private and public) transport on the streets. Furthermore, a few coal-fired heating boilers inside the city are the icing on the cake. This situation is far more dangerous than discomfort in everyday life, as permanently polluted air causes a high incidence of illness in the city, including a higher chance of stroke, lung cancer and cardiovascular disease. The most vulnerable categories are children, the elderly and people with chronic illnesses. The topic of bad air has already become commonplace among my relatives and friends, and the chances of somehow affecting it without general support have become comparable to winning a lottery.

To change this situation, I decided to develop an easy-to-use mobile app where citizens could report poor air quality in their area and monitor other notifications. Before starting to create it, a more detailed look at the target audience is required.

Market research

Target Audience Analysis

The potential audience for the app would be the people living in my hometown Omsk, but this is still a broad definition. Therefore, I have divided them into three main categories:

- Young people (15 - 24) - active users of smartphones and mobile services, looking for new and exciting applications for communication, entertainment, education and self-development. Care about environmental topics.

- Adults (25 - 60) are busy people who need mobile apps to make everyday life easier. They prefer apps for financial management, health and fitness, travel, business communications and other services. The biggest group.

- Aged people (60+) - although this group is less active in mobile technology, they may still be interested in apps to help them communicate with loved ones and manage their health and household issues.

To better address the needs and concerns of my target audience, I created two personas out of the biggest group - male and female.

Personas

Male

The male persona's name is Anthony. He is 42 and works as a director in a small paper company. He lives with his family in the central district of Omsk. He always looks for ways to make their children's lives safer and more fulfilling. In his spare time, he enjoys playing football or hockey with his fellow mates, spending time with his family and exploring the city. He is concerned about the environment in the town he was born in, as he has two young children whose health worries him the most. Antony is well aware that the current environmental situation is hazardous for his children, and he tries to raise awareness of the problem as much as he can and educate his children about it. He tries to express his position on various forums and websites but has not achieved the desired results. His most used apps are Whatsapp, Facebook and Twitter.

Female

The female persona's name is Anna. She is 37 and works as an accountant in an office in Omsk, Russia. She's always looking for ways to improve her work and engage with her clients, and she relies heavily on her smartphone and mobile apps to accomplish that. She enjoys taking photos with her smartphone, shopping, and trying out new vegan recipes in her spare time. She is concerned about the environment in the town she has lived in all her life because she cares for her aged mother, who has difficulty breathing this air. Anna is fully aware that the situation with chemicals in the air is very dangerous for her mother and is trying to do something about it. She uses apps like Whatsapp, Telegram, Instagram and Facebook.

Similar Offerings (Competitors)

As a next step, I decided to analyze similar ideas to mine, which are already on the market, and separately highlight their functionality.

Russian market

AccuWeather

- Purpose: weather forecasts for different regions of Russia and keeping a weather radar;
- Features available: Clean Air Index for the region, current pollutant statistics, air quality scale, air quality forecast for the next 24 hours, daily weather forecasts and hazard warnings (such as freezing rain, etc.).

Other offerings in Russia deal with similar issues, including Gismeteo, Rambler and Meteoinfo, as they only offer an air quality index for the past day.

Worldwide

TWC (The Weather Channel)

- Purpose: air quality indexing;
- Functions available: List of air polluting chemicals, hourly air quality forecast. Forecast for ten days, weekends and months, weather forecast and weather radar.

IQAir

- The primary purpose of this company is to protect people at risk from the danger of chemicals being released into the atmosphere;
- On the IQAir website, you can track your city's air quality and pollution index, find out which chemical pollutant prevails, and see the percentage of its concentration in the air. You can also research air quality and buy an air purifier for your car or home or read health tips and instructions on adequately purifying your home's air. In addition to a real-time air quality index, the website also has an Air Quality Chronology Chart, where you can see the air quality index hourly and daily and yearly statistics of deaths in each city caused by air pollution;
- IQAir has a mobile application (AirVisual) full of features such as air quality alerts, health tracking, news and rating of the most polluted cities according to the air quality index, and IQAir cleaning machines shop. The company gets all its air quality data from AQI modeling using satellite data rather than from local laboratories.

Application development process

Once I had decided on the idea and researched my potential audience, I started bringing my thoughts into digital reality. I divided this section into application functionality, frontend preparation and backend preparation.

Application functionality

I aimed to make the app as easy to use as possible while providing the necessary functionality. That is why I limited it to the four core items for the first iteration. After that, the possible add-ons are analyzed at a later point.

User registration

The motivation of the personas behind it is that they want to be part of an environmental initiative. So, after searching for options, they decided to sign up for the AirRate app. Alternatively, they have heard from friends about the AirRate app, which will help improve the environment in the city, and then signed up.

The registration screen should be minimalistic not to overload the potential user. Therefore, I have only included the logo, login (email, password), and register options.

Filing a complaint

This is the core function and simply the reason why this application exists. Users are motivated to share their feedback and warn others about the danger zones. I have pre-clustered the problems in categories available for the users but simultaneously provided the option to submit detailed feedback and images. As the final step, there is also a chance to give a subjective rating out of 5 stars possible for air quality.

Educational section

My intention was also to influence users in the long term. But, unfortunately, environmental issues still need to be at the forefront of my country, reflected in people's awareness of the topic. Therefore, I added a separate tab with educational

material to influence the situation positively. This section will provide essential information and details about global environmental projects and local initiatives where users can get personally involved.

This kind of experience and additional knowledge will encourage people to share information with their friends, increasing the number of active citizens.

Interactive map

An interactive map that will be updated in real-time by reports from users. It will allow previously discussed individuals to choose places to walk with their family members. Dangerous areas, on the other hand, will try to avoid contact with bad air. Functionality includes a full map of the city, zoom in and out buttons, map marker icons representing different problem categories and clickable map markers to display information about the problem.

Add-ons

As additional features for the app, I have added the ability to change data in the personal profile, to enable or disable alerts or warnings (user preferences), a notification list where users can see complaints across the city or district and a settings section.

In my opinion, the invisible functionality allows users to get the best experience while using the app.

Stack used

Figma

While preparing for this challenge, I had a chance to work with the Figma design application. This service was difficult to get acquainted with since I did not have much experience, but after I studied many aspects of it thoroughly and watched many video tutorials on many different topics. Afterwards, I created a working clickable mocap for my future application. I faced many difficulties, such as creating a dropdown, setting up links between frames, finding the icons I needed, choosing the right colours, and developing a unique design. Many of these problems were solved with the help of the great community of Figma, where I could find valuable

insights concerning any issue. Working with this resource was very interesting and allowed me to dive a little into the design world.

SQL

During the idea generation phase, I faced the challenge of storing the data recorded by users somewhere. This led me to the SQL language, which I found unique in the database handling. It looked like an obvious choice for my future application at that moment. As this was my first time working with this programming language, I had to learn its basics to create a simple database. In the process, I learned a lot about databases and SQL in general. For example, I discovered that each table cell must contain unique information and can never be empty. In addition, I learned a lot about operations such as projection, constraint, join, etc. I also used one of the most popular DBMSs - MySQL, based on the client-server principle. As for the SQL syntax, I found it not that difficult when analysing the capabilities of this language. I found it very inspring to work with the databases and will definetely use the new learnings in the future.

Next app development steps

I also reflected on what the next steps would be on my part in terms of developing the app, dividing my analysis into business goals, app development, testing and expansion. Steps are available for two planning horizons - short-term and long-term. I have compiled all the information in the table below for better readability.

	Short-term objectives	**Long-term objectives**
Business goals	- Expand the user list beyond family and friends; - Reach the milestone of 1,000 active users within the first three months after the official launch; - Proactively collect feedback and use it to improve the app.	- Establish relationships with key partners and investors; - Analyze different marketing strategies and select the most effective ones; - Reach a volume of 100,000 users, among which 20,000 are everyday users.
App development	- Define a list of priority features for each of the iterations; - Develop app structure	- Add new features after sufficient research on the users' actions; - Create a web version

	using Swift for iOS and Kotlin for Android; - Developing MVPs within a defined timeline and budget.	for PC users.
Testing	- Using mock-ups and MVPs to analyze user actions.	- Run A/B tests to study the user actions to get acquainted with the new features
Expansion	- Making sure the app covers the current areas of my hometown.	- Extend the application to the region and neighboring regions.

Links to submission sources

I have separately collected all the links to resources where I have prepared my submissions, in case something doesn't open properly:

- Github README: https://github.com/vladivolgin/CODE-Challenge#readme
- Github SQL: https://github.com/vladivolgin/CODE-Challenge/blob/main/AirRateSQL.sql
- Figma Mockup: https://www.figma.com/file/imd6YgYKK6VH4rSWyBBDJX/AirRate-Mockup?node-id=0%3A1&t=gkwOMPQLKhqVsKGm-1
- Figma Flow: https://www.figma.com/file/HwIx2l5rOGmYGR9jB3n555/CODE---Flow?node-id=0%3A1&t=PjwATzIGrAp5J0Sp-1