

MOBILE BASED APPLICATION FOR VACCINATION SEARCHING AND SCHEDULING

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Abstract

The goal of this thesis is to produce a mobile application which works on both Android and iOS devices to help people to find information about vaccination places and do the registration process in the chosen place. This application is expected to create vaccination places which follows currently applied health protocol by limiting the number of people who are going to take a vaccine. In addition, users can also view vaccination certificates as proof that they have been vaccinated through the application. The application development process uses waterfall method. Evaluation is done by distributing questionnaires and drawing conclusions based on the results of the questionnaire

Keywords: vaccination, registration, vaccine location, Android, iOS

Introduction

Starting in the first quarter of 2020, the world was shocked by the emergence of the *coronavirus*, which spreads very quickly throughout the world. Covid-19 (*coronavirus* disease 2019) is a disease caused by a new type of coronavirus, namely Sars-CoV-2, which was first reported in Wuhan, China, on December 31, 2019. This virus is considered very dangerous because it can cause death. Not only that, this virus is also a virus that is easy to spread. Until early 2022, it has been recorded that the number of people infected with the Covid-19 virus has almost reached 5,000,000 cases in Indonesia, and nearly 150,000 people have died from contracting the virus.

Following up on the pandemic that occurred, the government began to implement various kinds of preventive measures, such as limiting community activities, issuing health protocol rules, and starting to provide vaccines. When the vaccine arrived in Indonesia for the first time, people could take the vaccination based on priority. A few months later, the government tried to increase the availability of vaccines so that people can get the vaccine, so that more people could register themselves for vaccination. When the vaccination is open to the public, the risks from the vaccination process itself also increase. Also, due to the increasing number of cases of new variants of the virus, *omicron*, the government has taken various anticipatory actions, and of course among these steps is to promote the importance of getting vaccinated immediately, as well as accelerating the achievement of vaccination targets in each

region. It is clear that if people get both the vaccine and the booster in crowds, it can cause long queues. One example of such case can be seen in 2021 yesterday in Bogor, which was published in the Tempo newspaper. Therefore, to avoid crowds and queues, a solution is needed so that people can register to get vaccines more effectively and efficiently, a system is needed to regulate so that there is no accumulation at one time to reduce the risk of spreading the Covid-19 virus. Therefore an application, namely a vaccination registration mobile application, is proposed as a solution.

Based on the data provided from the Indonesian Telecommunications Statistics 2020, it is stated that the development of internet use in households reached 78.1%. This growth in household use of the internet is also followed by the growth of the population using cellular phones in 2020 reaching 62.8%. In 2020, household computer ownership increased to 18.83%. The population using the internet also experienced an increase during the period 2016-2020, as indicated by the increase in the percentage of the population who accessed the internet in 2016 from around 25.37% to 53.73% in 2020. An internet analyst named Meeker predicts that internet use through mobile will surpass the use of the internet via computers in the next five years.

Mobile applications are applications that are built to be accessible to users via smartphone. The mobile application needs to be installed via the Google Play Store for Android and the App Store for iOS. In the development process, application developers will register their applications on the two platforms so that the app can be installed by all mobile users.

The characteristics of internet users on mobile are different from the characteristics of internet users on computers. Mobile phones enable their users to access mobile applications anywhere and anytime. The characteristics of mobile applications also tend to be more interactive and have real-time integration of the user's location.

The condition of vaccination and the tendency of people to seek information using mobile applications are factors that encourage the development of vaccine registration applications that can be accessed via smartphone, which is easy to do. This application is expected to help to reduce the risk of spreading the virus because this application will reduce the need for people to register directly at the vaccination site and allow online registration. It is enough for the public to come at the scheduled time to get the vaccine, so it will not cause crowds or long queues. In addition, with a scheduling system, vaccine participants can come according to the time that has been obtained without having concern about vaccination time.

Research Method

The method used in the development of mobile applications is the Waterfall model. The stages that will be used are requirements definition, system and software design, implementation and testing, and integration and system testing. In the requirements definition stage, research will be conducted in the form of a questionnaire distributed online. The results of the questionnaire obtained will be used as a basis and

further analyzed to obtain requirements. At the system and software design stage, a model will be designed in terms of data, actors, business processes, functional using UML (Unified Modeling Language) and user interface design of the application using Figma tools. In the implementation and testing phase, the application will begin to be made. The outputs produced at this stage are the mobile app, backend, and web dashboard. In the integration and testing stage, the three outputs produced in the previous stage will be integrated and tested.

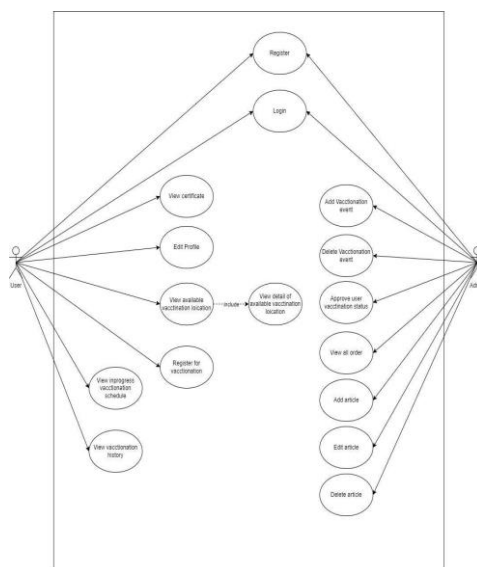
Result And Discussion

The application developed is a mobile application based on Android and iOS that can be used to register and schedule vaccinations. Users can choose the available vaccine place and vaccination time. After vaccinating the user can see a certificate as a proof that the user has been vaccinated on the application.

Application feature

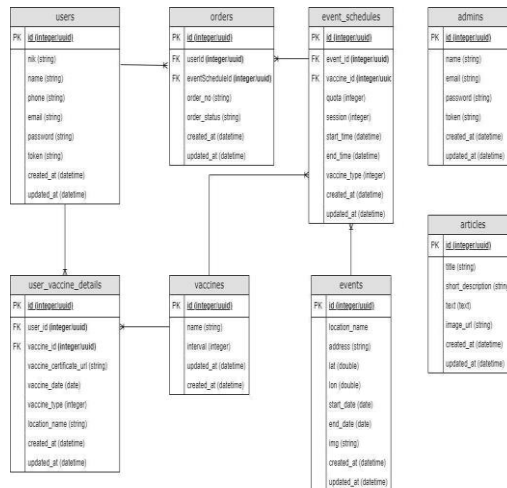
1. Register
2. Login
3. Displays a list of the closest available vaccination locations
4. Displays detailed information from available vaccination locations
5. Choose the desired vaccination location
6. Choose the available time schedule at the selected place
7. Register at the selected location and time
8. Viewing the certificate indicating that the vaccination has been carried out

System Design



Picture 1
Use case diagram

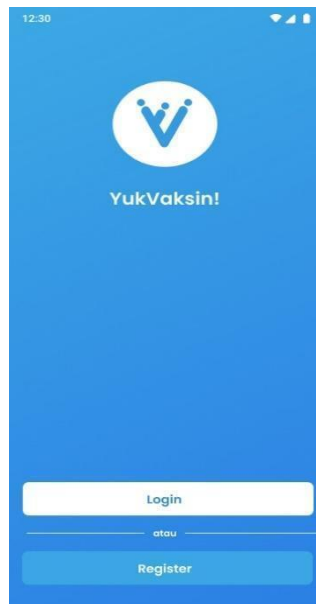
Mobile Based Application For Vaccination Searching and Scheduling



Picture 2
Entity Relationship Diagram

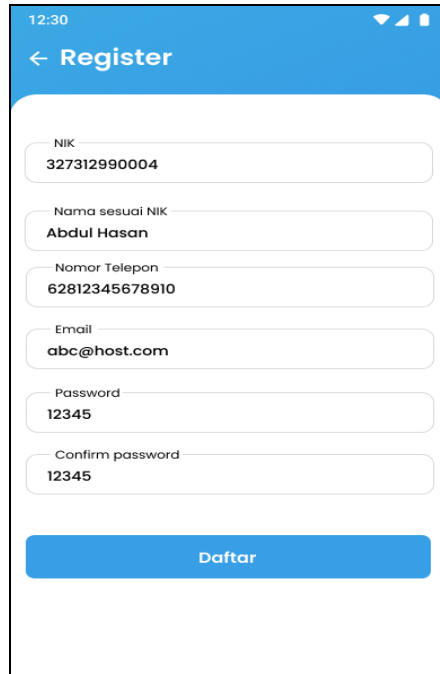
From the results of the design, application development using Golang as a programming language and Postgresql as a database management system. As for the mobile application itself, Flutter is used as a framework. Here's how to use the application that has been made:

1. If the user is not logged in yet, the first page that appears is the splash screen that displays the option to register or login.



Picture 3
Application View

2. If the user does not have an account, the user must register first by pressing the "Register" button and the application will display a registration form.



12:30

← Register

NIK
327312990004

Nama sesuai NIK
Abdul Hasan

Nomor Telepon
62812345678910

Email
abc@host.com

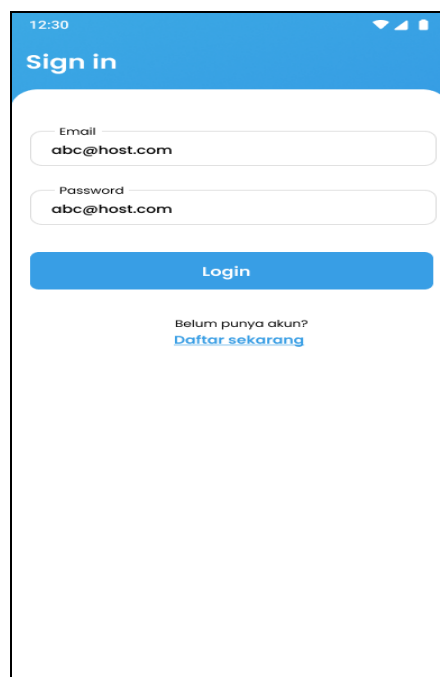
Password
12345

Confirm password
12345

Daftar

Picture 4
Register view

3. If the user already has an account, then the user can press the “Login” button and the application will display a login form. After filling in the required data, press the "Login" button to enter the application's home page.



12:30

Sign in

Email
abc@host.com

Password
abc@host.com

Login

Belum punya akun?
[Daftar sekarang](#)

Picture 5
Login view

4. On the main page, there are articles about *coronavirus*, data on cases of contracting Covid-19, a button to find the nearest vaccination location and a button to view a history of vaccinations that have been done or in progress.

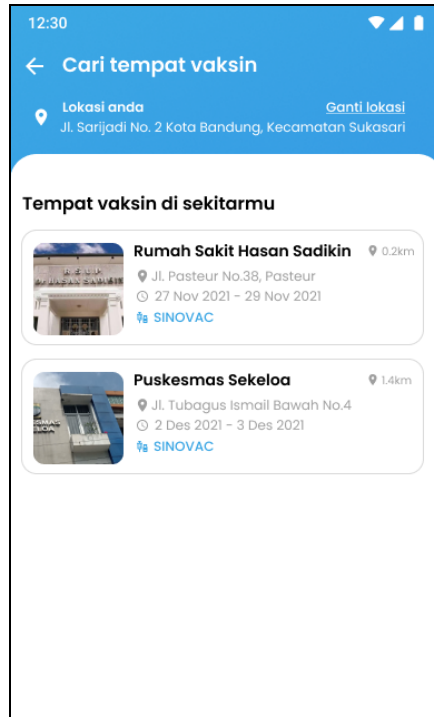


Picture 6
Main page



Picture 7
Main page (have been vaccinated)

5. When the user selects the menu to search for the nearest vaccination location, a list of available locations will appear with some information related to the place.

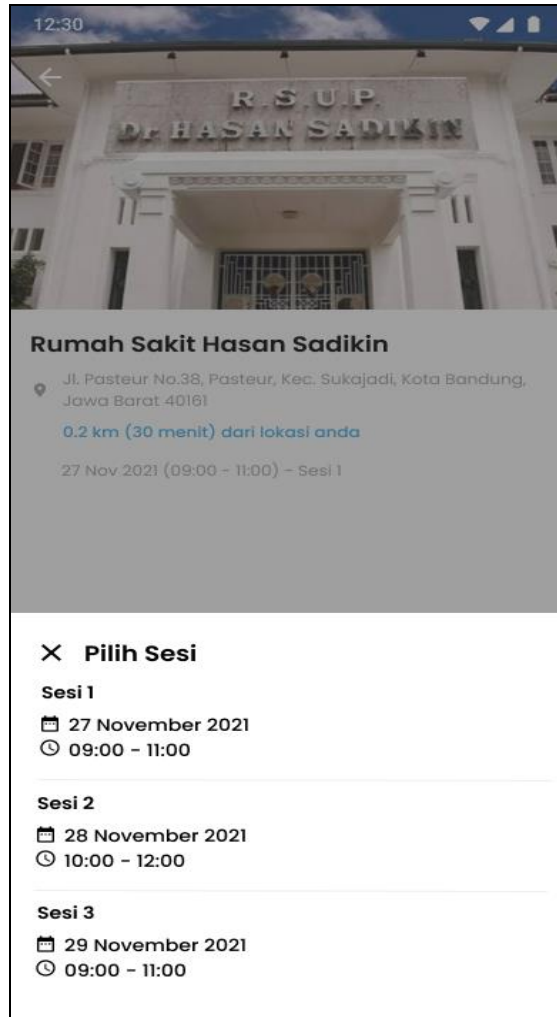


Picture 8
View List of Available Vaccination Locations

6. When the user selects a location, a new screen will appear. It provides detailed information regarding the selected location including the available schedule. The user selects the desired schedule and presses the "Register" button, then the user will be registered on the chosen schedule.

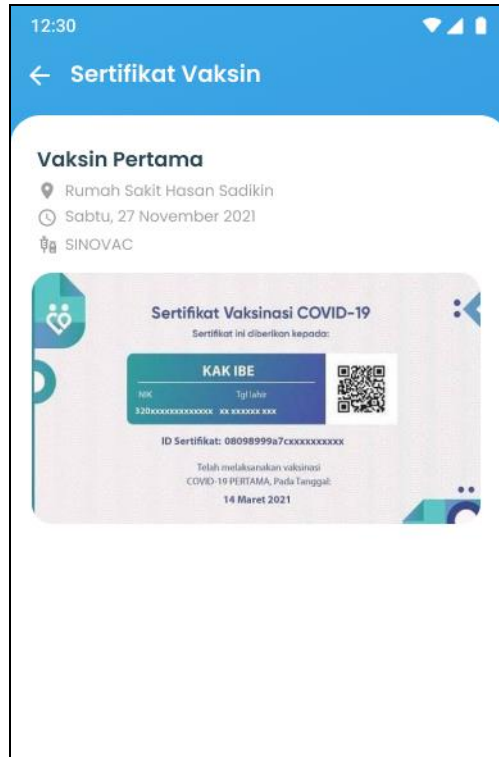


Picture 9
Detailed view of vaccination locations



Picture 10
Display Selecting Session When Registering

7. The user can select finished vaccine schedule displayed on the main page to view the certificate and vaccination history.



Picture 12
Certificate display

Conclusion

Based on the results of the development, testing and evaluation of a mobile-based vaccination search and registration application with Android and iOS operating systems, the following conclusions were drawn: 1). The application has been successfully built on both platforms, Android and iOS. 2). The application can help users to find vaccines. 3). The application can help users to register at the nearest vaccine place and let the users have more flexibility choosing a vaccination schedule. 4). The application enables the users to see a vaccine certificate as a proof that the user has been vaccinated. 5). The application can provide the users with statistical information about the total amount of positive, recovered, and dead people and education-related to the *coronavirus*. After evaluating, there are several suggestions for a mobile-based vaccination scheduling application and can be considered for future application development. The suggestions that can be given include: 1). The application can be enhanced with a reminder feature which notifies the users about the incoming vaccine schedule and the user can set how many days counted from the vaccine day the vaccine schedule should appear. 2). The application can be extended in web version (currently only limited to Android and iOS operating systems). 3). The application can be further developed to be able to register family members (register more than one person with one account). 4). The application can be enhanced so that it can handle all of the vaccine activities at the vaccine location, such as screening which is usually done before carrying out vaccinations.

BIBLIOGRAFI

- Kementrian Kesehatan Republik Indonesia. (2020). *Hindari Lansia Dari Covid 19*. (Online). Diakses 14 Juli 2021 dari <http://www.padk.kemkes.go.id/article/read/2020/04/23/21/hindari-lansia-dari-covid-19.html>
- Kementrian Kesehatan Republik Indonesia. (2021). *Program Vaksinasi COVID-19 Mulai Dilakukan, Presiden Orang Pertama Penerima Suntikan Vaksin COVID-19*. (Online). Diakses 14 Juli 2021 dari <http://p2p.kemkes.go.id/program-vaksinasi-covid-19-mulai-dilakukan-presiden-orang-pertama-penerima-suntikan-vaksin-covid-19/>
- Kementerian Dalam Negeri Republik Indonesia. (2021). *Pencegahan dan Penanggulangan Corona Virus Disease 2019 Varian Omicron Serta Penegakan Penggunaan Aplikasi PeduliLindungi*. (Online). Diakses 28 Desember 2021 dari <https://www.menpan.go.id/site/berita-terkini/mendagri-terbitkan-edaran-pencegahan-dan-penanggulangan-varian-omicron>.
- Al Murtadho, Mahfuzulloh. (2021). *Berebut Vaksin Covid-19: Dulu Ditolak Kini Diantre Warga di Bogor*. (Online). Diakses 24 November 2021 dari <https://metro.tempo.co/read/1483427/berebut-vaksin-covid-19-dulu-ditolak-kini-diantre-warga-di-bogor>
- Hadianti, Dian Nur dkk. (2014). *Buku Ajar Imunisasi*. Jakarta: Pusat Pendidikan dan Pelatihan Tenaga Kesehatan.
- Gandryani, F., & Hadi, F. (2021). Pelaksanaan Vaksinasi Covid-19 di Indonesia: Hak atau Kewajiban Warga Negara. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, 10(1), 23-41.
- Anderson, R. M., Vegvari, C., Truscott, J., & Collyer, B. S. (2020). Challenges in creating herd immunity to SARS-CoV-2 infection by mass vaccination. *The Lancet*, 396(10263), 1614-1616.
- Makarim, F. R. (2017). Kewajiban Imunisasi Dasar, Manfaat Dan Keamanan. *Jurnal Riptek*, 2(2), 87-96.
- Pang, T. (2009). Vaccination in Developing Countries: Problems, Challenges and Opportunities. *Jurnal Global Perspectives in Health*. 2
- Direktorat Statistik Keuangan, Teknologi Informasi, dan Pariwisata. (2020). *Statistik Telekomunikasi Indonesia*. Jakarta: Badan Pusat Statistik.
- Sipayung, E. M., Maharani, H., & Gunawan, E. (2018). Pengembangan Reminder System Imunisasi Berbasis SMS Gateway. *Jurnal Telematika*, 13(2), 127-134.

Febriadi, B. (2016). Efektifitas Sistem Informasi Berbasis Online Dalam Pengurusan Vaksin Calon Keberangkatan Jemaah Umrah Di Kantor Kelas II Pekanbaru. *Digital Zone: Jurnal Teknologi Informasi dan Komunikasi*, 7(2), 75-81.

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