# Setting up

First, Android Studio must be installed to begin developing an Android application. In addition, to connect the application to Firebase, a Firebase account and new project in the console must be created. Then, a project ID is generated based on the project’s name. The process of linking the Firebase project and Android application is described in a guide [document](https://firebase.google.com/docs/android/setup?authuser=1&hl=en).

## Firebase Authentication

Firebase Authentication is a backend service that provides a simple method for authenticating users in the application. In this application, an email address is an authentication credential for the user, and it is passed to the Firebase Authentication SDK to be verified.

The addition of Firebase Authentication to the Android Application was demonstrated in this [document](https://firebase.google.com/docs/auth/android/start?authuser=1).

A screenshot of a computer

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Figure 1: Firebase Authentication Sign-in Providers

Figure 1 shows that the email/password method is used for the application, and another method can be added.

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Figure 2: Firebase Authentication User Management

The above figure shows how user information is stored and managed. The user’s UID is automatically generated by Firebase Authentication. Furthermore, adding new users can be done manually by the administrator or owner of the application. The figure below shows three methods for managing an account: reset password, disabled account, and deleted account.

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Figure 3: Firebase Authentication Account Management

## Firebase Realtime Database

Firebase Realtime Database is a NoSQL cloud-hosted database that will store and sync all data from users in realtime.

To add the Firebase Realtime Database to the application, some steps are required, as shown in this [document](https://firebase.google.com/docs/database/android/start?authuser=1).

Figure 4 shows the rules for how the data are stored in the database. In this application, only students can write new data in the user-identification field.

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Figure 4: Firebase Realtime Database Rules

Figure 5 shows how a student’s information is stored in the database. All data will be stored in JSON and key-value formats.

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Figure 5: Database of Firebase Realtime Database

## Firebase Machine Learning

Firebase Machine Learning is a mobile SDK that brings Google's machine learning expertise to Android and Apple apps in a powerful yet easy-to-use package. The face detection API of the Machine Learning Kit is the main feature used in the application, and with it, the application can detect faces in an image.

Adding Machine Learning Kit face detection API to the application is guided by this [document](https://firebase.google.com/docs/ml-kit/android/detect-faces?authuser=1).

## Final

To run the entire project, any devices, such as virtual devices and physical devices, need to be created or paired. The guides for creating an Android virtual device and connecting a physical device are demonstrated in [the document for virtual device](https://developer.android.com/studio/run/managing-avds) and [the document for physical device](https://developer.android.com/studio/run/device), respectively. In this study, a virtual device, Pixel 4a, using Android 11, was used to install the application.