Technical Project Report - Android Module

FaturasUA - Invoice Management App

Subject:	Computação Móvel
Date:	Aveiro, 7 de novembro de 2023
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Project abstract:	FaturasUA is an invoice management Android app to help the user keep track of their expenses and register their invoices digitally, by scanning and parsing the QR code available in them.

Report contents:

1 Application concept

FaturasUA is a expenses-registration tool to help the user keep track of their expenses and register their invoices digitally, by scanning and parsing the QR code available in them.

This app is designed with two personas in mind: the employee of an enterprise that is asked to keep track of their expenses in the name of said company, so they use FaturasUA to register their purchases and analyze them; and the everyday layman who'd like an easy-to-use and intuitive app to keep track of their receipts without having to keep their paper counterparts in storage.

2 Implemented solution

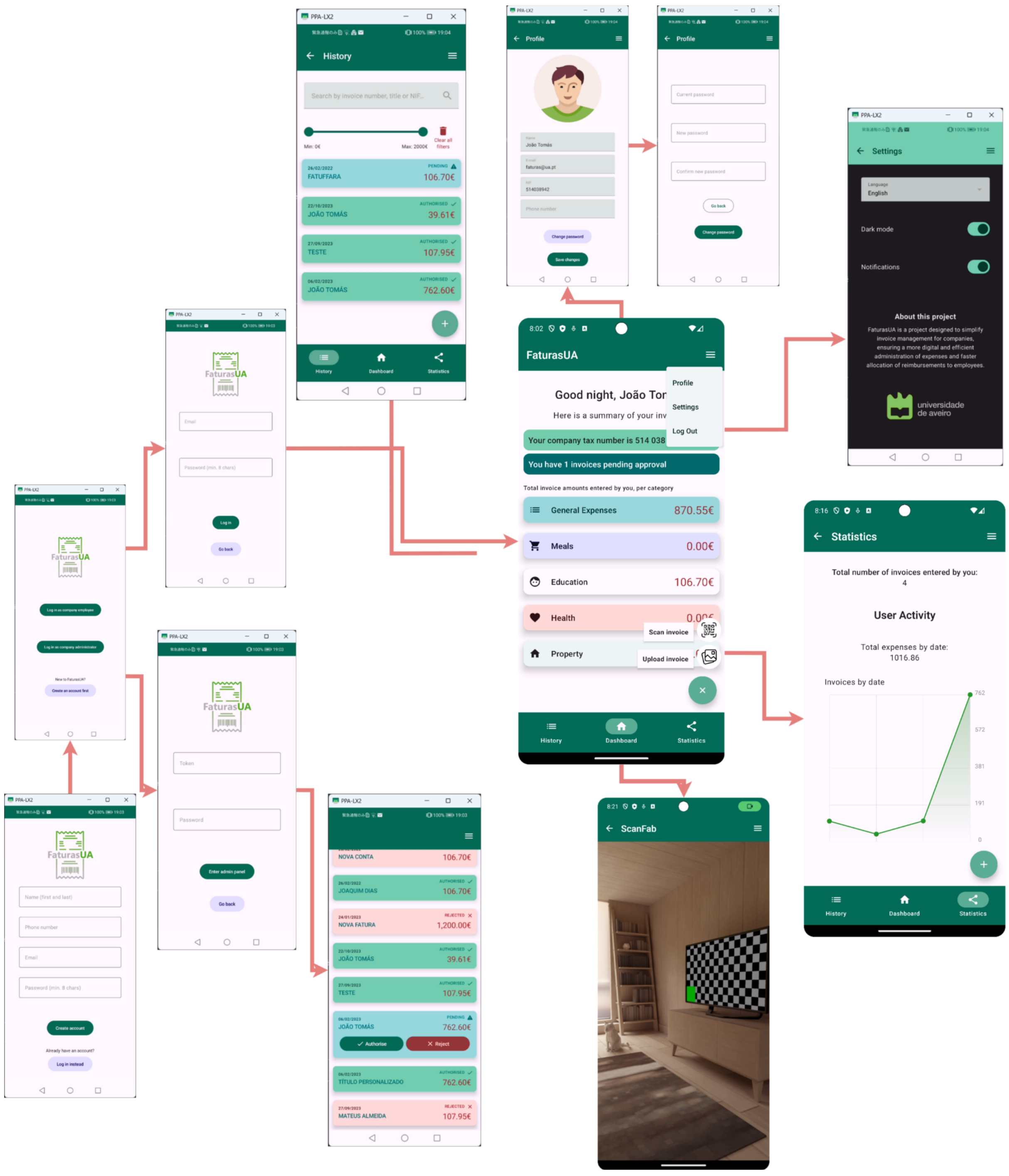
Architecture overview (technical design)

The app is composed of one MainActivity that displays the authentication screen, *AuthScreen*, depending on whether the user is currently signed in to their account or not. This state is registered through a callbackFlow in the method *isUserSignedIn()* that returns that state.

The app's UI Layer is displayed through a ViewModel, UserViewModel. The scanning of QR Code uses the camera and Google's MLKit library to recognise and interpret the QR Code. The QR code string is parsed, all the details are shown and the user can give a name/title to the invoice and also assign a category to it. After that, the user can confirm if all data is correct and add the invoice to the database. A notification is sent with the success result.

User Authentication is handled through Firebase Authentication and storage of registered receipts is done in the Realtime Database. Other user data, such as profile pictures, is stored in Firebase Storage.

Implemented interactions


History
Search by invoice number, title or NIF...
Min: 0€
Max: 2000€
Clear all filters
26/02/2022 FATUFFARA PENDING 106.70€
22/10/2023 JOÃO TOMÁS AUTHORISED 39.61€
27/09/2023 TESTE AUTHORISED 107.95€
06/02/2023 JOÃO TOMÁS AUTHORISED 762.60€
History
Dashboard
Statistics
Profile
João Tomás
faturas@ua.pt
514038942
Phone number
Change password
Save changes
Current password
New password
Confirm new password
Go back
Change password
Settings
Language
English
Dark mode
Notifications
About this project
FaturasUA is a project designed to simplify invoice management for companies, ensuring a more digital and efficient administration of expenses and faster allocation of reimbursements to employees.
universidade de aveiro
FaturasUA
Email
Password (min. 8 chars)
Log in
Go back
Log in as company employee
Log in as company administrator
New to FaturasUA?
Create an account first
FaturasUA
Good night, João Tor
Here is a summary of your inv
Profile
Settings
Log Out
Your company tax number is 514 038
You have 1 invoices pending approval
Total invoice amounts entered by you, per category
General Expenses 870.55€
Meals 0.00€
Education 106.70€
Health 0.00€
Property
Scan invoice
Upload invoice
History
Dashboard
Statistics
Statistics
Total number of invoices entered by you: 4
User Activity
Total expenses by date: 1016.86
Invoices by date
762
572
381
191
0
Token
Password
Enter admin panel
Go back
Name (first and last)
Phone number
Email
Password (min. 8 chars)
Create account
Already have an account?
Log in instead
NOVA CONTA 106.70€
26/02/2022 JOAQUIM DIAS AUTHORISED 106.70€
24/01/2023 NOVA FATURA REJECTED 1,200.00€
22/10/2023 JOÃO TOMÁS AUTHORISED 39.61€
27/09/2023 TESTE AUTHORISED 107.95€
06/02/2023 JOÃO TOMÁS PENDING 762.60€
Authorise
Reject
06/02/2023 TÍTULO PERSONALIZADO AUTHORISED 762.60€
27/09/2023 MATEUS ALMEIDA REJECTED 107.95€
ScanFab

When the user opens the app, they will be prompted to login, if they already have an account, or to create one otherwise. They have the option to sign in using email, phone number of a Google account. If no account is recognized, they will automatically be taken to a sign up screen, where they will be prompted to insert their name, email and password. Afterwards, they are taken to the main application itself.

The user is taken to their dashboard, where they can see their most recent registries and general status per category/sector. When the user wants to see their previously registered receipts, they can navigate to the History screen, and filter through the receipts by NIF, title, number or total amount. When the user wants to see relevant data in regards to their receipts, they can go to the Statistics screen and observe the analyzed data displayed in charts.

When the user wants to register their receipts, they can expand the Floating Action Button (plus icon at the bottom right corner) and choose to scan a QR code using their camera or scan a QR code from a picture in their gallery. If they choose to scan using the camera, they'll be prompted for permission to use the camera and taken to the Scan Screen where, after scanning the QR code, the invoice details are displayed in a AlertDialog, for the user to confirm them, and the user is also prompt to give a title to the invoice and associate a category/sector to it. After all of that, the invoice is added to the user's registered receipts storage. On a successful registry, a push notification is shown. If the user chooses to scan from the gallery, their new invoice is analyzed, a similar AlertDialog is shown with all the details and, if the user confirms, the invoice is added to the history.

When expanding the topbar menu, the user can navigate to their profile screen, where they can update personal information. In that same menu, the user can also go to the settings and set their preferences on the app theme and language or toggle the permission for notifications. Finally, there the user can log out of the application too.

Project Limitations

It was intended to communicate with an portuguese tax identification number ("*NIF*") API (www.nif.pt/api/) that would return relevant information (business address, business name, etc.), in regards to the business tax number present in the scanned receipt and display that information on registering a new one. However, the API proved to be incomplete for almost all of the businesses searched and so implementing that feature was discarded in exchange for other priorities. In addition to that, the API had a limit of 1 request per minute and 10 per hour, which is extremely limited.

A map component was also initially developed (*MapsScreen*), but was abandoned due to the API mentioned above almost never providing a location for the tax identification number queried (example of null geolocation for University of Aveiro). Unfortunately, we didn't find any other use cases where it made sense to use the user's location.

New features & changes after the project presentation

Fixed some problems that arose during the presentation, such as self-updating counter for pending invoices due to *mutableIntStateOf()*. Fixed a small bug causing StatisticsScreen to crash when dealing with a null value as an argument on *round()* function.

3 Conclusions and supporting resources

Lessons learned

The biggest problem we encountered was the discontinuation/migration of Material Design

3 properties, components and APIs, which proved frustrating because various documentations stated different things. This is probably because most of the components of this design system are still in an experimental version.

We recognize that during the course of the project, too much time was wasted on less priority aspects of the front-end, such as color fixes on the dark mode, application translation, notifications, etc. In future, priority should be given to implementing the application's fundamental functions and only then focusing our attention on graphic, aesthetic and less crucial aspects.

Finally, as the project progressed, we learned more about Android Studio and Kotlin and, as a result, we began to enjoy programming in Android more and more. We would have liked to have had more time to develop our application further and better, as it would have been a useful application to use in a personal context.

Work distribution within the team

Taking into consideration the overall development of the project, the contribution of each team member was similar and therefore evenly distributed: Mateus Almeida did 50% of the work, and João Simões contributed also with 50%.

Project resources

Resource:	**Available at:**
Code repository:	https://github.com/UA-MEI-Projects/FaturasUA
Ready-to-deploy APK:	https://github.com/UA-MEI-Projects/FaturasUA/blob/main/pt.cm.faturasua.apk
App Store page:	-
Demo video:	-

Reference materials

- NIF.PT API - www.nif.pt/api/
- Material Theme 3 documentation - https://developer.android.com/jetpack/compose/designsystems/material3
- Google MLKit - https://developers.google.com/ml-kit