



LifeLink Birmingham

A Smart Blood Donor Alert System for Emergency Road Traffic Accidents Using Geolocation and Real-Time Notifications

Interim Viva Presentation
Level 6 Computer Science
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1. Project Overview

Why I chose this project and what I want to achieve

Problem

After a serious road accident, blood may be needed urgently. Even if people are willing to donate, they may not know that their blood type is needed or where they should go.

Proposed Solution

My idea is to create a prototype app that finds suitable registered donors using their blood type, location and availability, and then sends them an alert.

Who Benefits

The main users would be registered blood donors and authorised staff. The idea is to make communication quicker and easier when blood is urgently needed.

I chose Birmingham because it is a large and busy city, so it gives the project a realistic setting for testing location-based alerts.

This is only an academic prototype. It will not connect to real NHS, ambulance or patient systems.

2. Aim, Research Question & Objectives

Aim

My aim is to design and develop a prototype mobile app that uses location and real-time notifications to contact registered donors when their blood type may be urgently needed after a serious road accident in Birmingham.

Research Question

How can a mobile app using geolocation and real-time notifications help contact suitable blood donors more quickly during emergency road traffic accident situations in Birmingham?

Research existing blood donation and emergency response apps and identify what could be improved.
Design a secure registration process and database for donor information.
Create a matching process based on blood type, distance and donor availability.
Develop real-time alerts and a simple dashboard for authorised admin users.
Protect user information through consent, secure login and controlled access.
Test the prototype to see if it works correctly, responds quickly and is easy to use.

3. Literature & Research to Date

Main research that is helping me make design decisions

Blood Donation Context

NHS Blood and Transplant gives reliable UK information about blood donation and blood types. This is useful for the background of my project, but it does not show whether my proposed donor-matching system would work.

Privacy & GDPR

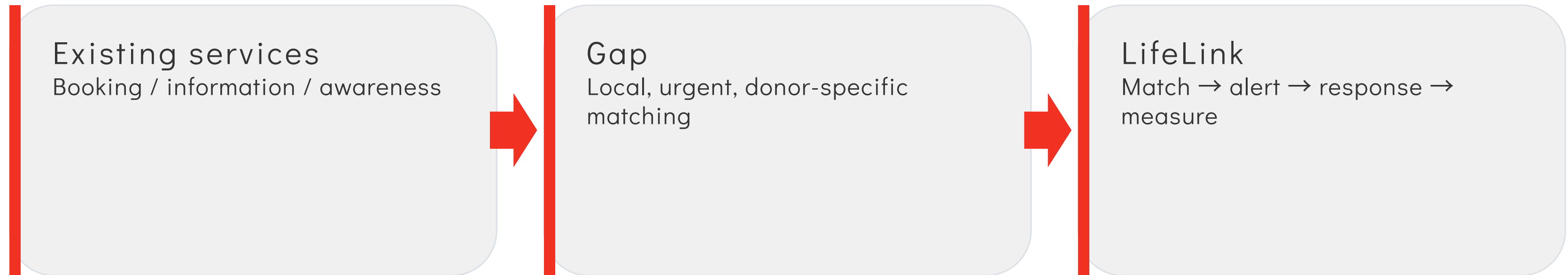
ICO guidance is important because the app may handle sensitive health-related information such as blood type. It helps guide my decisions about privacy, consent, collecting only necessary data and keeping information secure.

Technical Guidance

Firebase documentation will guide the notification feature, Google Maps will support location functions, and OWASP guidance will help me consider common mobile security risks.

The main gap I want to explore is whether combining blood-type matching, location, availability and quick alerts can make it faster to contact suitable donors in a simulated emergency. For my final report, I still need to add recent academic papers about donor apps, emergency notifications, location-based matching and trust in digital health systems, and compare their strengths and weaknesses.

4. Problem Formulation & Research Gap



My project is not designed to replace existing blood donation services. I am using a simulation to test whether the technical idea is practical.

I plan to measure matching accuracy, notification speed, donor response time, whether tasks are completed successfully, and user feedback.

5. Proposed System & Key Features

Donor App

Register/login • blood type • availability • location range • alert response

Matching Engine

Filter by blood type, distance, availability and notification preference

Admin Dashboard

Create simulated requests • view request status • monitor donor responses

Real-Time Alerts

Push notification with request information and response options

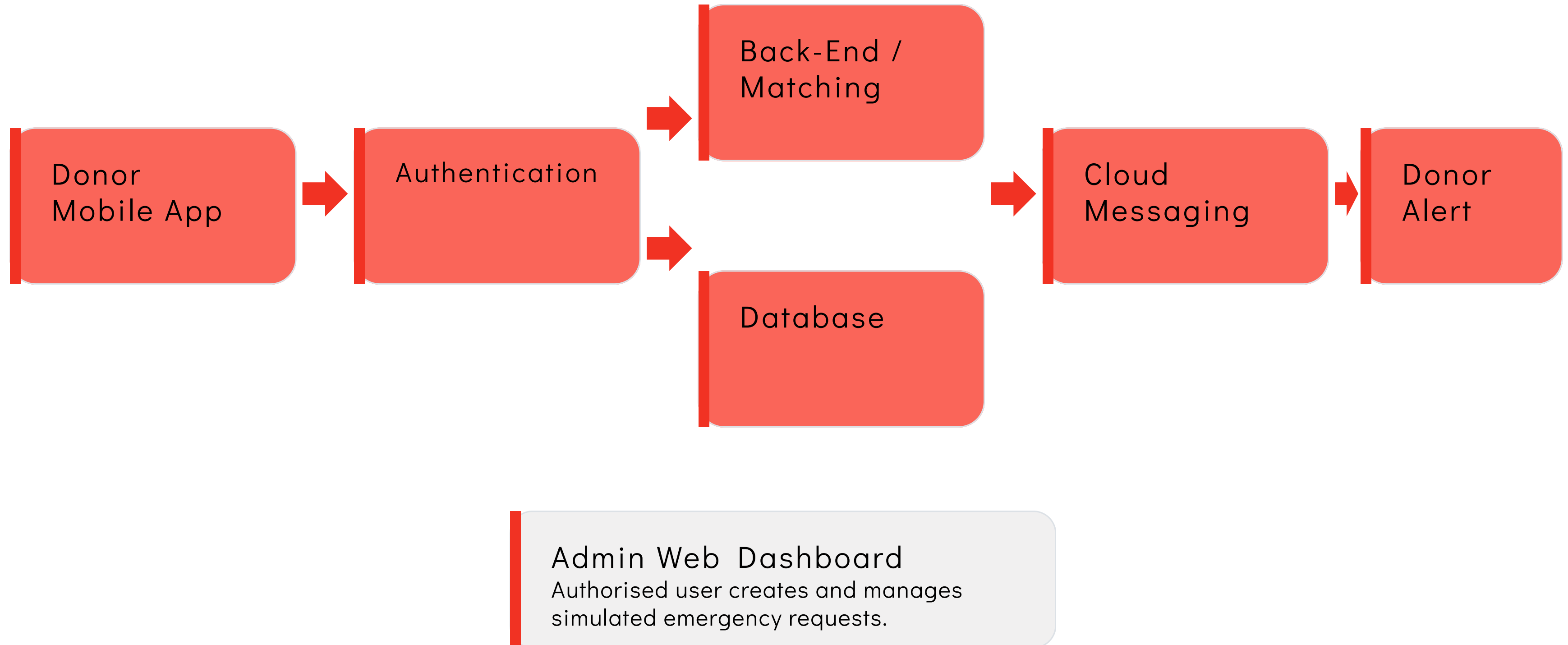
Evaluation Data

Alerts sent • delivery time • response time • matching result • usability feedback

Prototype data only: no real patients and no real emergency alerts.

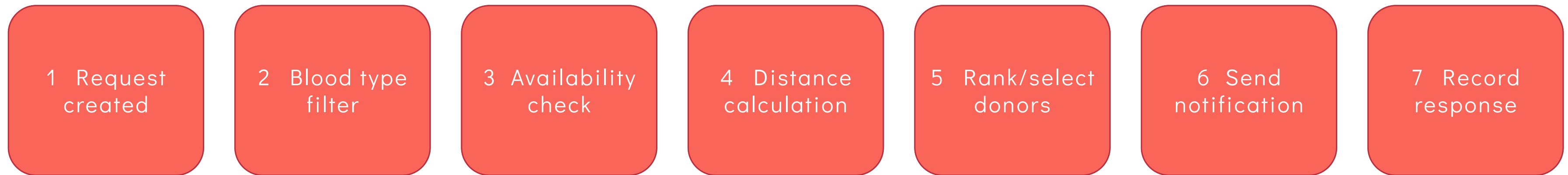
6. System Architecture

Client-server prototype with controlled access



7. Donor-Matching Logic

A key technical part of the project that I can test and evaluate



I can test the matching process using prepared test cases and measure processing time, notification delivery time and donor response time.

The matching rules will be clear and testable. The app will only support communication and will not make medical or clinical decisions.

8. Methodology

How I plan to develop, test and improve the project

Agile Development

I will use an Agile approach: gather requirements, design the system, build a small part, test it and improve it. This should help me find problems early instead of waiting until the end.

Primary Evidence

My primary research will come from testing the prototype, measuring its performance and collecting feedback through a short usability questionnaire using simulated scenarios.

Secondary Evidence

My secondary research will include academic papers, NHS and NHS Blood and Transplant information, ICO guidance, technical documentation and mobile security guidance.

I will produce a use-case diagram, ERD, system architecture, user-flow diagram, test cases and evaluation results.

My final evaluation will check whether I achieved the objectives and will help me answer the research question.

9. Security, Privacy & Ethics

Privacy by Design

I will only collect information that is needed for the prototype, explain why it is needed, allow users to update or delete their profile, and use dummy data for testing.

Access & Security

I plan to use secure login, different permissions for donors and admins, protected database rules and secure communication between the app and server.

UK GDPR

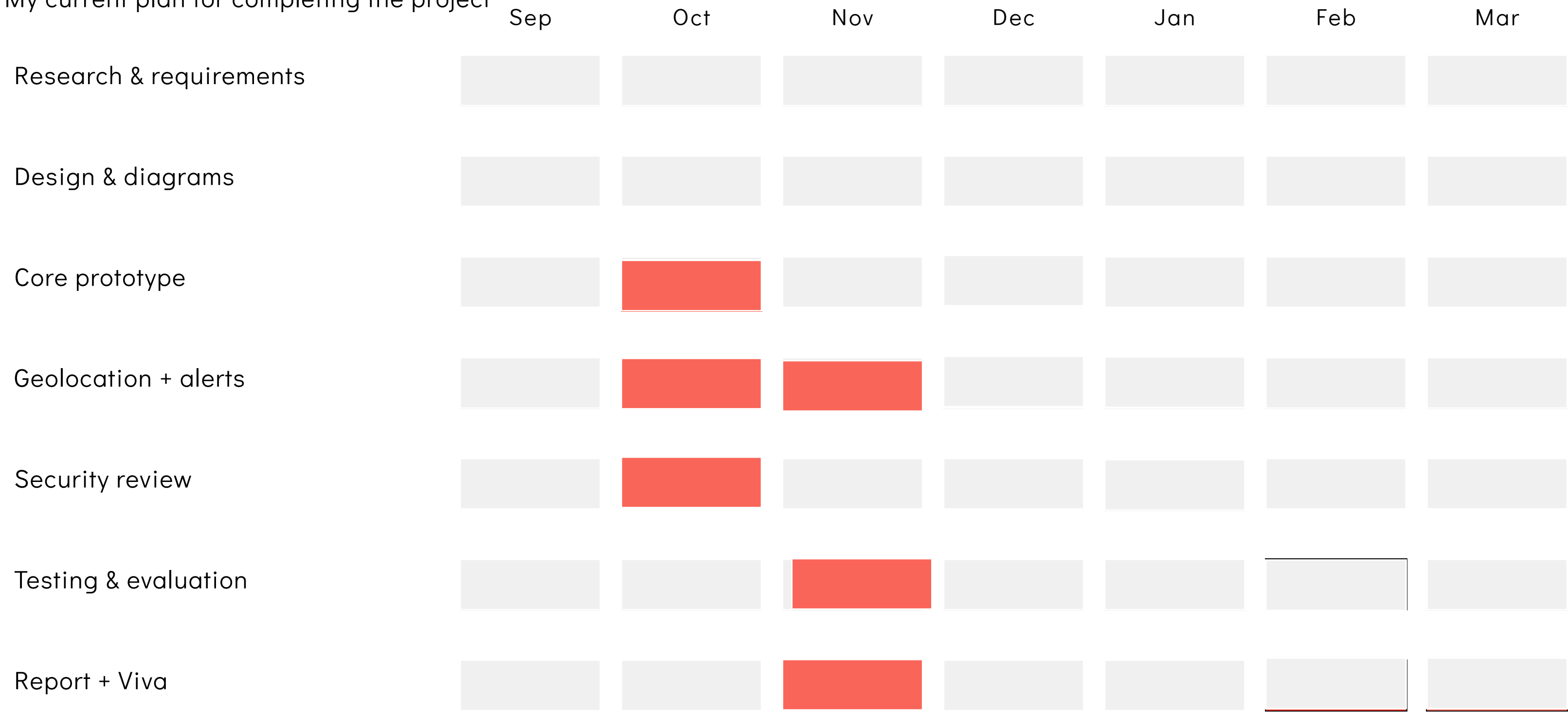
Because blood type is health-related information, privacy is very important. A real system would need to follow UK GDPR requirements and have the correct legal basis for processing this type of data.

For safety, I will not use real patient records, connect to live ambulance systems or send real emergency alerts.

If this idea was ever developed for real use, it would need much more legal, security and healthcare review before it could be used.

10. Project Timeline

My current plan for completing the project



11. Conclusion & Next Steps

What is being built

I am building a prototype that brings together mobile development, a database, geolocation, notifications, security and testing.

Level 6 Contribution

The project is more than just designing an app screen. I also need to develop and test the matching logic, system architecture, security and overall performance.

Next Steps

My next steps are to improve the literature review, finish the system diagrams, build the first working version, test it carefully and evaluate the results against my research question.

For me, success means producing a working and well-tested academic prototype and showing what works, what does not work and what would need to improve in the future.

12. Key References

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