

6COSC023W
Computer Science Final Project

Project Proposal and Requirements Specification (PPRS)
Handout

Lufyco: A Mobile-First, AI-Powered Fashion App for Image-Based
Discovery, Context-Aware Outfit Recommendations, and Digital
Wardrobe Management

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Degree: BEng (Hons) Software Engineering

School of Computer Science & Engineering
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University of Westminster

10/11/2025

Declaration

This document has been prepared based on my own work. Where other published and unpublished source materials have been used, these have been acknowledged in references.

Student Name: Dunithi Nihinsa Saruwa Bandara

Date of Submission: 13/11/2025

1. Definition of the Problem

Problem Description: People have difficulty finding the right clothing online. Search is very basic, recommendations are general, and images from users do not match images from the studio. This creates time-consuming and confusing decisions which abandon the cart.

Significance: An improvement in the user's experience will be advantageous to the seller's bottom line. The mobile AI also represents the potential to be private, speedy, and useful.

2. Aims, Objectives, and Scope

Aim:

Build Lufyco, a mobile app for image-based search, a context-aware stylist, and a digital wardrobe with clear, fast recommendations.

Objectives:

- Create a simple React Native app with secure login.
- Add image search using visual embeddings and fast vector lookup.
- Provide an AI Stylist with short “why this” messages.
- Auto-tag wardrobe items with manual edits.
- Meet latency and accessibility targets.

Scope:

- Inclusions: Photo search; plan look (mood/occasion/weather); wardrobe; browse/filter; wishlist; style cards; basic APIs.
- Exclusions: Merchant dashboards, payments, multi-seller marketplace, web app, AR/3D try-on, global rollout, advanced moderation.

3. Background Review

Key Findings (Literature / Systems):

- Photo-to-product works but struggles on real user photos.

- Popularity-based recommenders miss context.
- Gaps: speed on phones, clear explanations, wardrobe-aware styling, and fairness.

Comparison with Similar Products:

- **App A:** Good filters, weak photo search, no reasons.
- **App B:** Nice feed, low personalisation, slow.
- **App C:** Advice only, no wardrobe, black box.

Differentiation: Lufyco combines photo-first search, context outfits, wardrobe, and short explanations with sub-second goals.

4. Tools (Hardware/Software)

Hardware:

- Test phones (low/mid/high), laptop (i7/Ryzen 7+), optional GPU, broadband.

Software:

- React Native (Expo): App UI.
- Node.js/Express or Python/FastAPI: APIs.
- PyTorch/TensorFlow: Models.
- FAISS/ScaNN: Vector search.
- MongoDB/PostgreSQL: Data.
- Redis: Cache.
- S3/Firebase + Firebase Auth: Storage + auth.
- Docker, CI, Postman, Figma, Zotero.

5. Use Cases and Diagrams

Use Cases:

- Upload photo → similar items.
- Plan look (mood/occasion/weather).
- Manage wardrobe with auto-tags.

- Save/share style card; browse/filter; wishlist.

Diagrams:

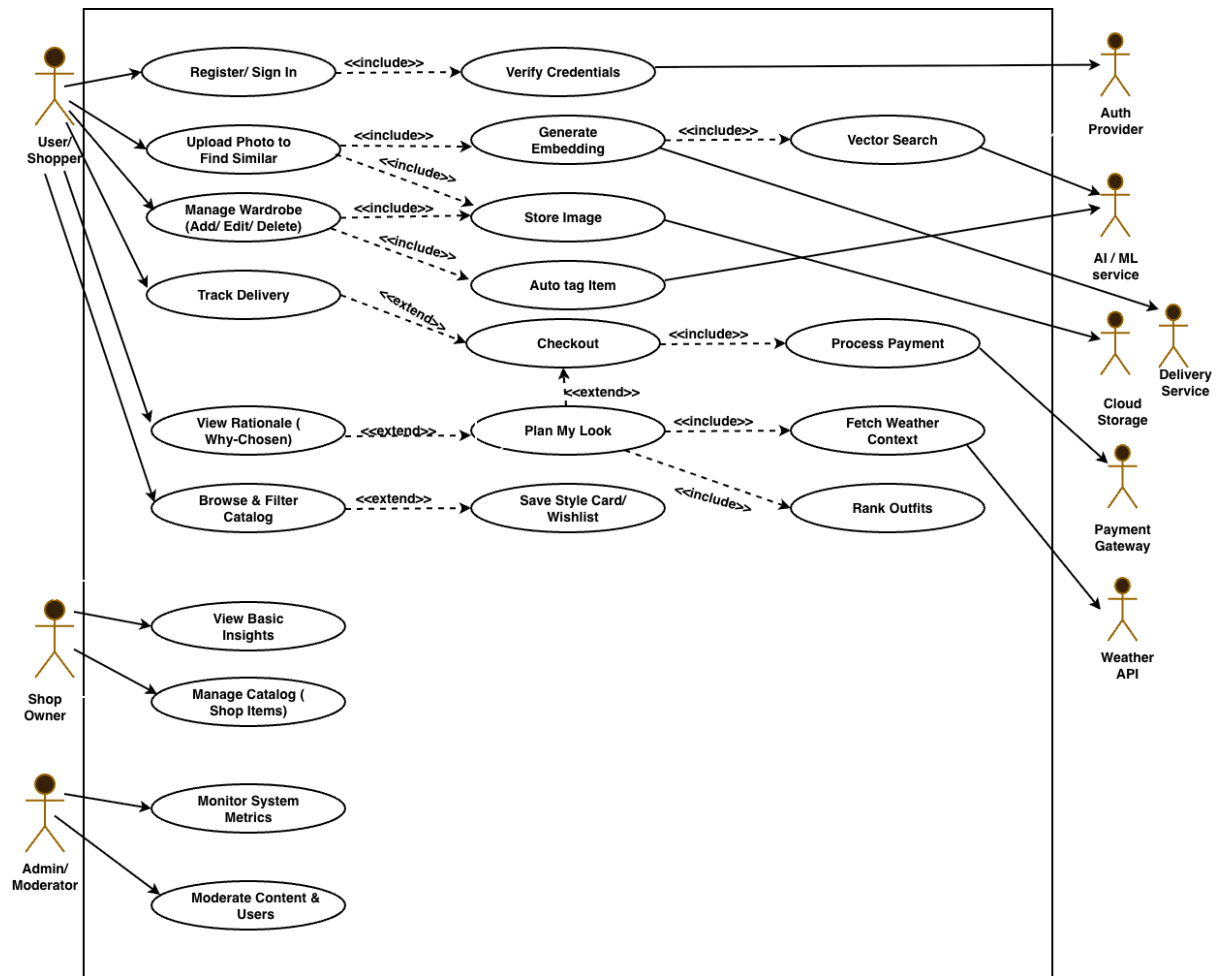


Figure 1: Use Case Diagram

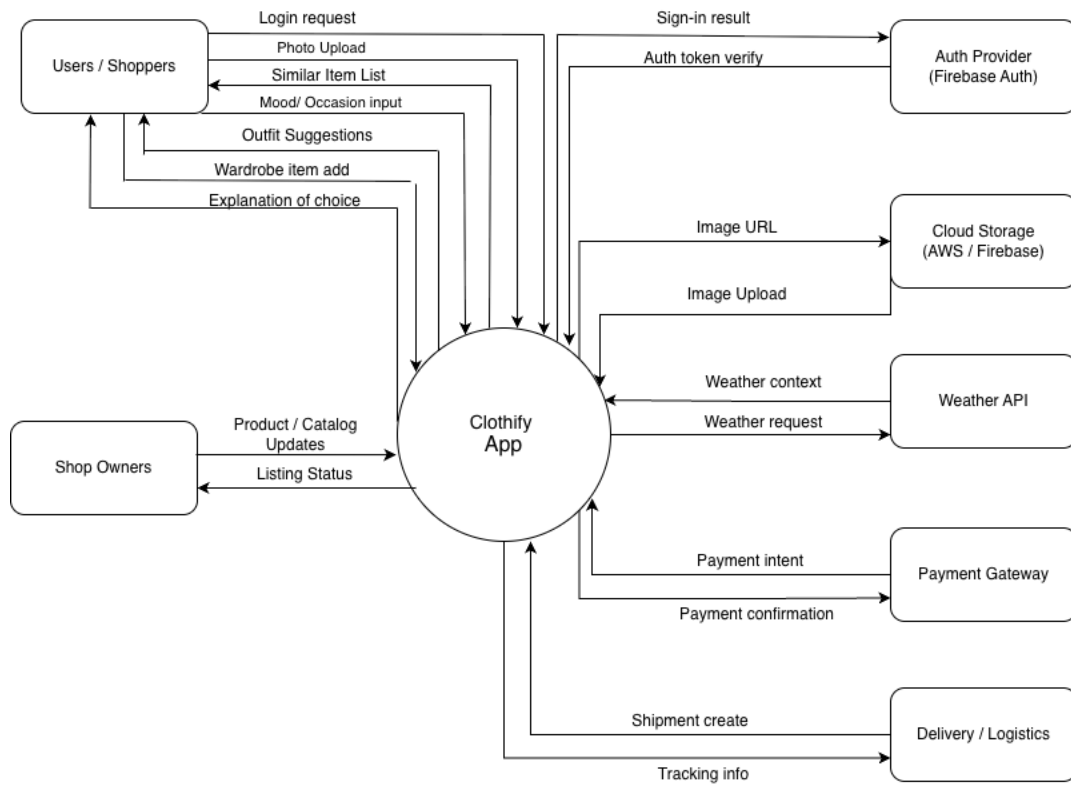


Figure 2: Context Diagram

6. Requirements Elicitation

The system requirements were gathered through surveys, interviews, document analysis, and observation. Surveys helped understand usability, trust, and decision-making time, while interviews with users and shopkeepers revealed practical needs and expectations. Reviewing competitor apps and user reviews highlighted common issues and missing features. Observation and brainstorming supported sketching early workflows and identifying usability problems. The information from all methods was analysed using simple statistics and thematic grouping. From this, the key requirements were defined, including photo-based search, an AI stylist, wardrobe management with tags, short explanations for recommendations, browsing and filtering options, wishlists, style cards, and secure user authentication.

7. Time Schedule

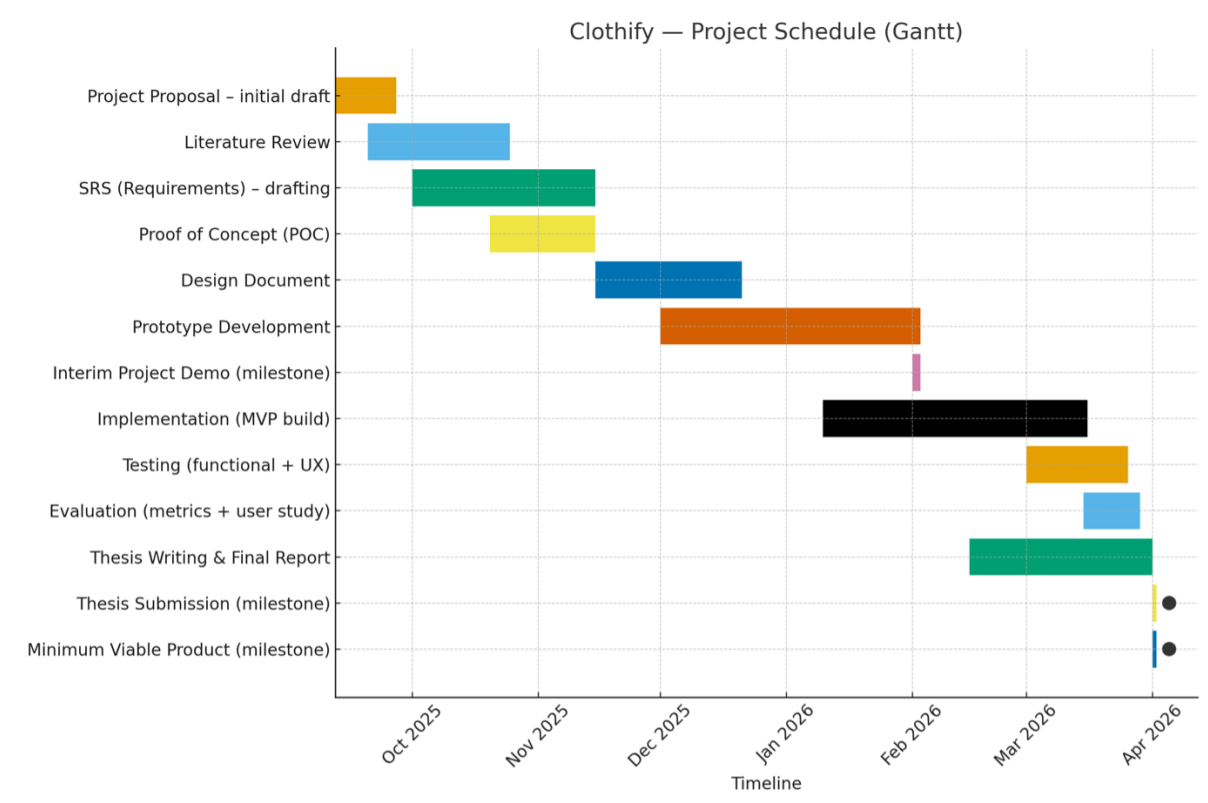


Figure 3: Gantt Chart

8. References

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9. Ethics Form



University of Westminster
University Research Ethics Committee

OFFICE USE: ____ - ____ - ____

Application for Research Ethics

PART A

Section 1 – PROJECT AND APPLICANT DETAILS

1.1 Project Title: Lufyco: An AI-Driven Mobile Fashion Assistant for Image-Based Search and Context-Aware Outfit Recommendations

1.2 Applicant Details

Name: Duniti Nihinsa Saruwa Bandara	University Email Address: Nihinsa.20220921@iit.ac.lk
Contact Address: No: 1A, Miraj House, Soysapura, Moratuwa	Telephone Number: 0705322534
Faculty: Software Engineering	

Please check the relevant box:

Undergraduate ☒ Postgraduate ☐ MPhil/PhD Student ☐ Staff ☐

I confirm I have read the *University's Code of Practice Governing the Ethical Conduct of Research* YES ☒ NO ☐

1.3 Supervisor/Dean of Faculty/Faculty Research Director details

Please note that all applicants with a supervisor(s) must ensure that the supervisor signs the declaration at the bottom of this page if completing Part A only or in **Section 10.3** if completing Part B

All **staff** must ensure that their Dean of Faculty, or Faculty Research Director (or nominee), as appropriate, signs the declaration at the bottom of this page if completing Part A only or in **Section 10.3** if completing Part B

Name: Ms. Akarshani Amarasinghe	University Email Address: akarshani.a@iit.ac.lk
Faculty: Department of Computer Engineering, Faculty of Engineering, University of Sri Jayewardenepura.	Telephone Number: 0716573164
Signature: 	Date: 12-Nov-2025

Section 3 - RISK OF HARM				
NOTE 1: Where indicated below applicants should check if the research will require ethical approval from a National Research Ethics Committee via the Integrated Research Application System (IRAS) - nres.queries@nhs.net - http://www.hra-decisiontools.org.uk/ethics/ NOTE 2: The University of Westminster holds a Human Tissue Authority Licence – This licence is specifically for tissue stored at 115 New Cavendish Street in accordance with the terms of the licence – Advice must be obtained from the University Human Tissue Designated Individual (N.Presneau@westminster.ac.uk)				
RISK OF HARM (to self, colleagues, participants, environment or animals)		Yes	No	N/A
1	Will any pain or more than mild discomfort result from the study?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Could the study induce any psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Will the study involve prolonged or repetitive physical or psychological testing of human participants that may put someone at risk, e.g. use of treadmill?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Will the study involve raising sensitive topics (e.g. sexual activity, drug use, revelation of medical history, bereavement, illegal activities, etc.)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Does your work involve any "relevant material" containing human cells (e.g. blood, urine, saliva, body tissues but NOT established cell-lines) from living or deceased persons (Such work must take account of the Human Tissue Act)? – See Note 1 and 2 above.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Will DNA samples be taken from human participants (Such work must take account of the Human Tissue Act)? – See Note 1 and 2 above.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Does your study raise any issues of personal safety for you or other researchers or participants involved in the project (Especially relevant if taking place outside working hours or off University premises)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Does your study involve deliberately misleading the participants (e.g. deception, covert observation)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Does your work involve administration of a food or non-food substance of a different type from or in abnormally higher or lower amounts than normal or one that is known to cause allergic reaction(s) or potential psychological stress?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	Does your study involve issues relating to personal and/or sensitive data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PARTICIPANTS (and/or their records/associated data)		Yes	No	N/A
Does your work involve any of the following:				
11	Human participants in a health and/or social care setting (e.g. patients, those attending day centres, community care, rehabilitation centres, etc., including in the NHS, other public, private and/or voluntary sectors)? – See Note 1 above.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12	Human participants who may be deemed vulnerable (e.g. children, people in poverty and/or with physiological or psychological impairments, persons attending rehabilitation centres, persons in easily identifiable positions that could be subject to victimisation, etc.)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13	Expectant or new mothers?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14	Refugees/Asylum seekers?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15	Minors (under the age of 18 years old)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16	Participants in custody (e.g. prisoners or arrestees)? – See Note 1 above.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17	Participants with impaired mental capacity (e.g. severe mental illness, brain damage, sectioned under Mental Health Act, lowered or reduced sense of consciousness)? – See Note 1 above.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18	Animals (or animal tissue).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
INFORMATION TO PARTICIPANTS		Yes	No	N/A
19	Will you provide participants with a Participant Information Sheet prior to obtaining informed consent which can be taken away by the participant?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Will you describe the procedures to participants in advance, so that they are informed about what to expect?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Will you obtain informed consent for participation (normally written)? OR in the case of using personal data previously acquired was consent given for the reuse of the data for other research purposes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Will you tell participants that they may withdraw from the research at any time and for any reason without any impact on their care, service provision etc.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Will you give participants the option of omitting questions they do not want to answer?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Will you tell participants that their data will be treated as confidential and that, if published, it will not be identifiable as theirs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Will you offer feedback to participants at the end of their participation, upon request (e.g. give them a brief explanation of the study and its outcomes)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Has external funding or collaboration been applied for/received, which requires	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>