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ARCHIVAL AND RETRIEVAL OF MISSING OBJECTS USING IMAGE MATCHING ALGORITHMS AND ADVANCED MACHINE VISION TECHNIQUES

PHASE 1: REQUIREMENT GATHERING

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ABSTRACT

This report delves into the essential findings and outcomes resulting from the rigorous requirement gathering phase aimed at steering the development trajectory of a ***user-friendly mobile application***. Our focal point lies in crafting a solution that streamlines the archival and retrieval processes of missing objects. Employing a multifaceted approach encompassing in-person and online interviews, meticulously crafted surveys, exhaustive online research endeavours, and meticulous scrutiny of client-provided requirement documents, we embarked on a journey to uncover, articulate, and prioritize the pivotal requirements emanating from our stakeholders. The report meticulously outlines our stakeholder analysis, delineates the multifarious requirement elicitation methods employed, elucidates the process of meticulously documenting the plethora of gathered requirements, expounds upon the nuanced criteria employed for prioritization, and delves into the intricate validation process ensuring alignment with stakeholder expectations. This abstract encapsulates the comprehensive nature of our endeavours, positioning us at the precipice of delivering a transformative mobile application poised to revolutionize the landscape of archival and retrieval practices for missing objects.

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EXECUTIVE SUMMARY

In the endeavour to craft a user-centric mobile application aimed at revolutionizing the archival and retrieval landscape of missing objects, our journey begins with a robust requirement gathering phase. This executive summary encapsulates the breadth and depth of our endeavours, elucidating the pivotal role this phase plays in shaping the trajectory of our project. Through a meticulous blend of traditional and contemporary approaches, including immersive in-person interviews, thoughtfully crafted online surveys, exhaustive online research explorations, and thorough analysis of client-provided requirement documents, we meticulously navigated the labyrinth of stakeholder expectations to distil the essence of their needs. Our report serves as a testament to the meticulous stakeholder analysis undertaken, elucidates the diverse repertoire of requirement elicitation methodologies employed, meticulously catalogues the plethora of gathered requirements, provides insights into the discerning criteria utilized for prioritization, and delves into the intricate validation processes employed to ensure fidelity to stakeholder aspirations. As we embark on this transformative journey, this executive summary serves as a beacon illuminating the path forward, underscoring our unwavering commitment to delivering a mobile application that not only meets but exceeds stakeholder expectations, fundamentally altering the paradigm of archival and retrieval practices for missing objects.

Figure 1: requirement gathering process

INTRODUCTION

In today's fast-paced society, the challenge of locating missing objects poses a significant inconvenience for individuals and organizations alike. Traditional methods of archival and retrieval often prove cumbersome and inefficient in addressing this issue. To address this challenge, our project focuses on the development of a user-friendly mobile application dedicated to streamlining the archival and retrieval process for missing objects. By leveraging state-of-the-art image matching algorithms and advanced machine vision techniques, we aim to revolutionize the way individuals interact with and recover their lost belongings. This preamble establishes the context for delving into the requirement gathering phase, which stands as a pivotal stage in establishing the framework for crafting a revolutionary solution set to redefine the process of object retrieval.

OBJECTIVES

The main goal of the requirement gathering phase is to identify, record, and rank the essential requirements for creating a user-friendly mobile application for archiving and retrieving missing objects. Through a thorough approach, we aim to involve stakeholders, comprehend their needs, and convert these insights into actionable requirements. This process will form the basis for the subsequent stages of the project, ensuring that we have a comprehensive understanding of stakeholder expectations, technological needs, and usability factors. Ultimately, our objective is to establish a strong foundation for developing a solution that caters to the varied needs of our target users.

SCOPE

The requirement gathering phase entails activities like interviews, surveys, research, and document analysis to capture stakeholder needs. Prioritization and validation ensure alignment with expectations. Understanding user behaviour informs design. This comprehensive approach lays the groundwork for a transformative solution. Due to financial constraints, we will not organise seminars with our stakeholders. So, we will use just a questionnaire as our main means to collect the requirements.

STAKEHOLDER ANALYSIS (role, interest, expectation)

Acknowledging the diverse interests and roles of stakeholders is vital for project success. Each stakeholder brings unique perspectives and concerns that influence project outcomes. Let's identify the key stakeholders involved in our project:

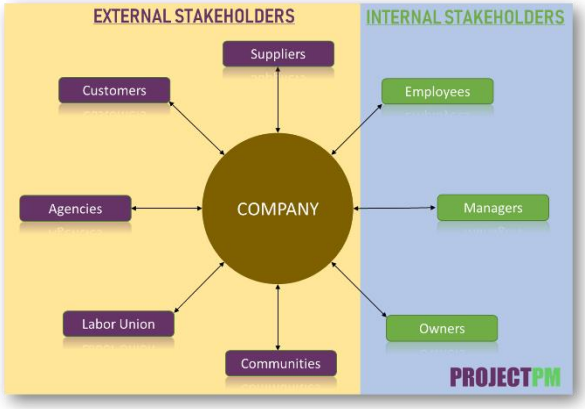


Figure 2: General stakeholders categorization

End Users:

- ***Roles and Responsibilities****:* End users are individuals who will interact directly with the mobile application. Their responsibilities include using the application to upload images of missing objects and search for potential matches.
- ***Interests****:* End users are primarily interested in a user-friendly interface, quick and accurate search results, and seamless navigation within the application.
- ***Requirements, Expectations, and Concerns:*** End users expect the application to be intuitive, easy to use, and accessible on multiple devices. They are concerned about the security of their personal data and the privacy of their uploaded images.

Administrators:

- ***Roles and Responsibilities***: Administrators manage the backend system, including maintaining the database of archived objects, managing user accounts, and ensuring the overall functionality of the application.
- ***Interests:*** Administrators are interested in efficient data management, system reliability, and ease of administering user accounts and permissions.
- ***Requirements, Expectations, and Concerns***: Administrators require tools for efficient database management, user management functionalities, and comprehensive reporting capabilities. They are concerned about system scalability, data security, and compliance with regulatory requirements.

Technical Team:

- ***Roles and Responsibilities***: The technical team is responsible for developing and maintaining the mobile application, implementing image matching algorithms, and ensuring the overall technical feasibility and performance of the solution.
- ***Interests:*** The technical team is interested in utilizing cutting-edge technologies, optimizing system performance, and addressing any technical challenges that may arise during development.
- ***Requirements, Expectations, and Concerns***: The technical team requires access to robust development tools, comprehensive documentation of requirements, and clear communication channels with stakeholders. They are concerned about the complexity of implementing advanced image matching algorithms and ensuring compatibility across different devices and platforms.

Project Sponsor and supervisor (client):

- ***Roles and Responsibilities:*** The project sponsor provides funding, resources, and strategic guidance for the project. They oversee the project's progress and ensure alignment with organizational goals.
- ***Interests****:* The project sponsor is interested in delivering a successful solution that meets the needs of stakeholders, achieves project objectives, and delivers value to the organization.
- ***Requirements, Expectations, and Concerns:*** The project sponsor expects regular updates on project status, adherence to budget and timelines, and proactive identification and mitigation of risks. They are concerned about any potential delays or deviations from the project plan.

Community and Public Interest Groups

- ***Roles and Responsibilities****:* Community and public interest groups represent the broader societal interests and may advocate for specific features or functionalities within the mobile application.
- ***Interests:*** These groups are interested in promoting transparency, inclusivity, and social responsibility within the project.
- ***Requirements, Expectations, and Concerns:*** Community and public interest groups may advocate for features such as accessibility options, ethical data practices, and

community engagement initiatives. They are concerned about ensuring equitable access to the application and addressing any potential biases or unintended consequences.

By conducting a thorough stakeholder analysis, we gain valuable insights into the diverse needs, interests, and concerns of key stakeholders, enabling us to prioritize requirements effectively and ensure alignment with stakeholder expectations throughout the project lifecycle.

REQUIREMENTS GATHERING METHODS.

Different Methods used

During this phase, various techniques and methods were employed to capture stakeholder requirements effectively. These included:

Brainstorming:

It is a group technique, it is intended to generate lots of new ideas hence providing a platform to share views, and every idea is documented so that everyone can see it.

Figure 3: Brainstorming Process

Interviews:

In-person and online interviews were conducted with stakeholders to delve deeper into their needs, preferences, and expectations regarding the mobile application. This provided valuable qualitative insights and allowed for direct communication with key stakeholders.

Figure 4. Interview process

Surveys:

Carefully crafted surveys were distributed to a broader audience to gather quantitative dataand identify common trends and patterns among users. Surveys provided a structured approach to collecting feedback and preferences from a larger sample size.

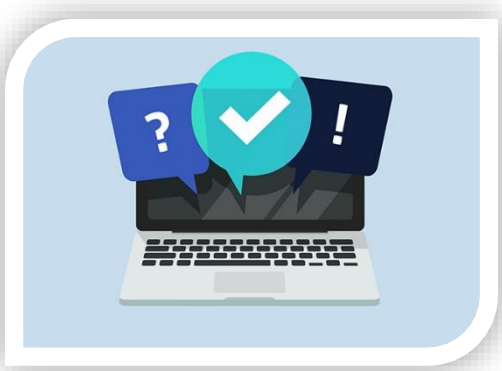


Figure 5: survey process

Prototyping:

Prototypes of the mobile application were developed to visualize and demonstrate proposed features and functionalities. Stakeholders were able to interact with the prototypes, providing feedback on usability, layout, and design aspects.

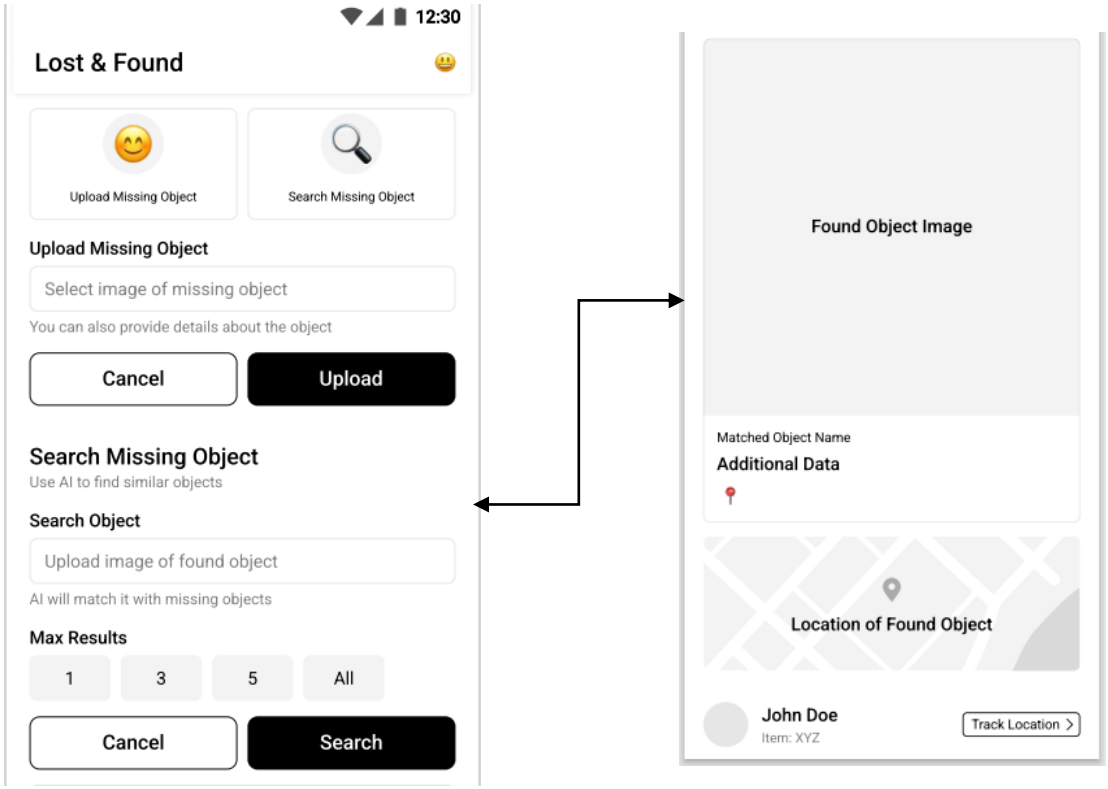


Figure 6: example prototype

DIFFERENT STAKEHOLDERS, METHOD USED, QUESTION ASKED AND PERSONA…

End Users (user requirements)

Methods used to collect Requirements

- **Interviews**
- **Surveys**
- **Prototyping**

Questions asked

1. Can you describe a specific instance when you lost or misplaced an item? What were the circumstances surrounding it?
2. What types of personal belongings do you commonly misplace or lose? Are there any specific categories or items that are more prone to being lost?
3. How would you typically describe the lost item to someone else? What details or characteristics would you emphasize?
4. What are the methods you used to recover your missing object? Was it easy?
5. Would you be willing to provide additional details about the lost item, such as its location, date, or any unique identifiers?
6. Will you like to use a mobile app to search for your missing object just by uploading it picture?? Are there any concerns or considerations you have regarding privacy and data security when using a mobile application to search for lost items?
7. Would you be interested in sharing information about your lost item on social media platforms or seeking help from your friends and family through the application?
8. How would you prefer to be notified if a potential match for your lost item is found? Would you prefer push notifications, email notifications, or any other form of communication?
9. Is there any specific information or functionality you would like to see in the application that would enhance the search and retrieval process for lost items?
10. Will you mind if we contact you later for clarification?

Sample Answers from Adolescents:

1. "Last Year, I lost my phone at the beach while playing volleyball with friends. I think it slipped out of my pocket when I dove for the ball."
2. "I usually misplace my headphones, water bottle, and sunglasses. They're small and easy to forget in my backpack."
3. "If I lost my phone, I'd describe it as black with a cracked screen and a phone case with stickers on it."
4. "I asked my friends to help me look for it and retraced my steps along the beach. It took a while, but we eventually found it buried in the sand."
5. "Sure, I can tell you where we were on the beach and the time of day. My phone has a few scratches on the back too."
6. "Yeah, that sounds cool! I'd love to try it out, but I'd want to make sure my pictures are safe."
7. "I'd share it on Snapchat or text my friends for help. They're always online and could help me find it faster."
8. "Push notifications would be great since I'm always on my phone. It would be like getting a text from a friend."
9. "It would be cool if the app had a map showing the last known location of my lost item. That would make it easier to find."
10. "No problem! You can text me anytime if you need more info."

Sample Answers from Adults:

1. "A few months ago, I lost my wallet while shopping at the mall. I think it fell out of my purse when I was trying on clothes in the fitting room."
2. "I often misplace my keys, wallet, and glasses. They're everyday items that I use frequently and can easily set down and forget."
3. "If I lost my wallet, I'd describe it as a black leather wallet with several card slots and a zippered compartment for coins."

4. "I retraced my steps and checked with the store's lost and found, but unfortunately, I didn't find it. It wasn't easy, especially since I had to cancel my credit cards."
5. "Of course, I can provide details like where I last used it and any unique features that could help identify it, like the initials engraved inside."
6. "Using a mobile app to search for my missing item sounds convenient, but I'd want assurance that my personal information is secure."
7. "I might share it on Facebook or send a group text to my family asking for help. They could keep an eye out for it while I continue searching."
8. "I prefer email notifications since I check my email regularly. It's a reliable way to stay updated without being too intrusive."
9. "It would be helpful if the app had a feature to track the search progress and provide suggestions for places to look based on the item's last known location."
10. "Not at all, feel free to reach out if you need more information. I want to make sure you have everything you need to help me find my lost item."

Persona

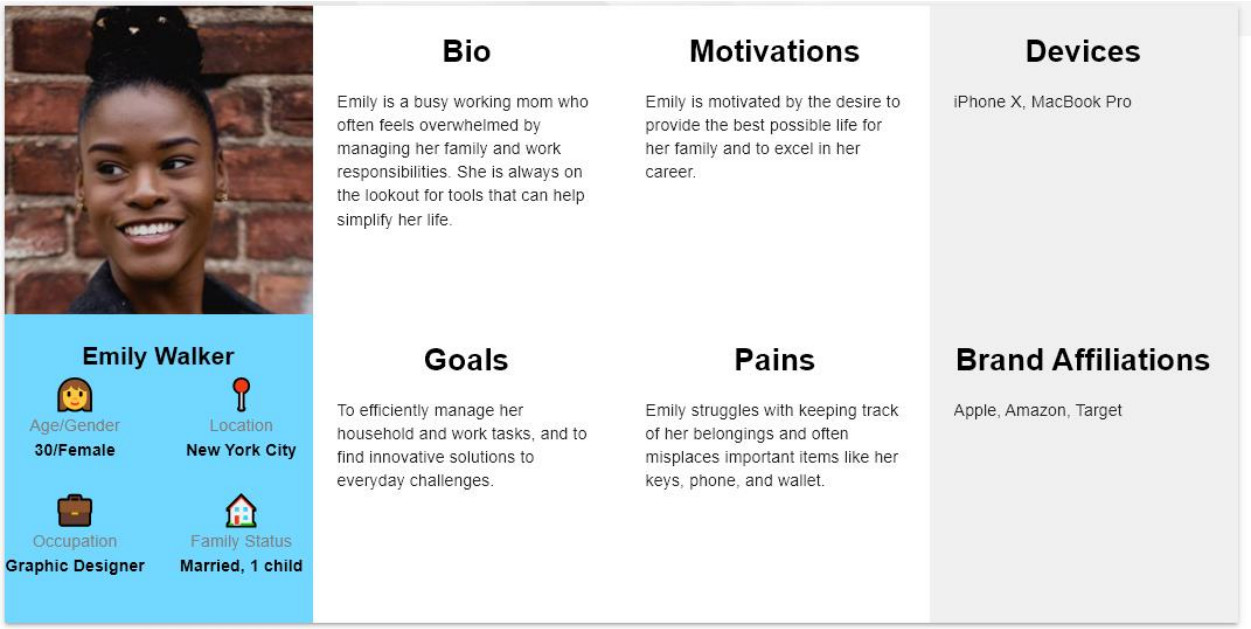


Figure 7: Sample user Persona

Summary of Requirements from the user

Functional

1. **Upload Images of Lost Items:** Users should be able to upload images of lost items through the mobile application interface. (Priority: High)
2. **Search for Potential Matches:** The application should allow users to search for potential matches of lost items within the database using uploaded images. (Priority: High)
3. **Utilize Image Matching Algorithms:** The application must incorporate state-of-the-art image matching algorithms to compare uploaded images with archived objects. (Priority: High)
4. **Implement Computer Vision Techniques:** Advanced computer vision techniques, such as feature extraction and similarity scoring, should be employed to identify potential matches with high accuracy and efficiency. (Priority: High)
5. **Provide Notification System:** Users should receive notifications when potential matches for their lost items are found. Notification preferences, such as push notifications or email notifications, should be customizable. (Priority: Medium)
6. **Ensure Data Privacy and Security:** The application must prioritize data privacy and security, ensuring that users' personal information and uploaded images are protected. Compliance with data protection regulations should be ensured. (Priority: High)
7. **Location Tracking:** The app should have the functionality to track the last known location of the lost item, providing users with helpful information for retrieval. (Priority: Medium).

Non-Functional

1. **User-Friendly Interface:** The application should feature an intuitive user interface and seamless navigation to enhance user experience. (Priority: High)
2. **Efficiency and Performance:** The system must be efficient and capable of processing image comparisons and search queries quickly to provide timely results. (Priority: High)

3. **Reliability and Accuracy:** The application should demonstrate high reliability and accuracy in identifying potential matches for lost items, minimizing false positives and negatives. (Priority: High)

Administrator (user requirements)

Methods used to collect Requirements

- **Interviews**

  Conduct one-on-one interviews with potential administrators or stakeholders who will be responsible for overseeing the system. During these interviews, gather insights into their specific needs, preferences, and challenges related to system administration. Ask open-ended questions to uncover their expectations, desired functionalities, and pain points. Explore topics such as database management, user account management, system configuration, monitoring and maintenance, data security, and user support. Document their responses to identify common themes and prioritize requirements.

- **Prototyping**

  Develop prototype designs or mock-ups of the system's administrative interface to visualize potential functionalities and gather feedback from stakeholders. Present the prototypes to administrators and stakeholders in interactive sessions, allowing them to explore the interface and provide input on its usability, layout, and features. Use the prototypes as a tool for eliciting specific requirements and refining the design based on user feedback. Iterate on the prototypes to incorporate suggested changes and ensure alignment with user expectations.

- **Brainstorming**

  Facilitate brainstorming sessions with a diverse group of stakeholders, including administrators, system developers, and end users, to generate ideas and identify potential requirements for the Administrator role.

Encourage participants to share their insights, experiences, and suggestions for enhancing system administration capabilities

Summary of requirement gathered

1. **Database Management:**
    - Ability to add, update, and remove archived objects from the database.
    - Features for categorizing and organizing archived items efficiently.
    - Tools for managing metadata associated with archived objects, such as descriptions, tags, and timestamps.
2. **User Management:**
    - Functionality for creating and managing user accounts with different access levels and permissions.
    - Options for assigning roles and responsibilities to users based on their job functions.
    - Tools for monitoring user activity, tracking login/logout sessions, and auditing changes made by users.
3. **System Configuration:**
    - Settings for configuring system preferences, such as notification preferences, search parameters, and default display options.
    - Customization options for tailoring the system interface to meet specific user preferences and workflow requirements.

4. **Monitoring and Maintenance:**
    - Tools for monitoring system performance, including real-time dashboards and reports on system usage, resource utilization, and performance metrics.
    - Features for conducting routine maintenance tasks, such as software updates, data backups, and system diagnostics.
5. **Data Security and Compliance:**
    - Measures for ensuring data security, including encryption protocols, access controls, and authentication mechanisms.
    - Compliance with relevant regulations and standards, such as GDPR, HIPAA, or industry-specific data protection requirements.
6. **User Support:**
    - Resources for providing user support and assistance, including documentation, help desk services, and training materials.

Technical Team (technical aspects of the system.)

Methods used to collect Requirements

- **Brainstorming**

For our project, the process of gathering requirements from the technical team began with an introduction session led by the facilitator. During this session, the facilitator provided an overview of the project's goals, scope, and objectives. The technical team members were encouraged to actively participate by sharing their perspectives, insights, and expertise related to the project requirements.

Following the introduction, the idea generation phase commenced. The facilitator initiated the brainstorming process by posing open-ended questions and prompts focused on the technical aspects of the project. Team members were urged to generate ideas and suggestions freely, without

judgment or criticism. All ideas were welcomed and recorded without evaluation at this stage to encourage creativity and exploration.

As ideas began to flow, discussions and exploration ensued. The facilitator encouraged team members to build upon each other's ideas, ask clarifying questions, and explore potential implications and applications. Discussions were guided towards identifying key requirements, technical constraints, dependencies, and trade-offs to ensure a comprehensive understanding of the project's technical landscape.

Once a sufficient number of ideas had been generated and discussed, the facilitator guided the team in organizing and categorizing the ideas into themes or groups. Through collaborative effort, team members prioritized the identified requirements based on their importance, feasibility, and impact on project success. This prioritization process ensured that the most critical technical requirements were given due consideration.

Throughout the brainstorming session, meticulous documentation was maintained by the facilitator or a designated note-taker. All ideas, discussions, and decisions were captured on a whiteboard, flip chart, or digital document. This documentation served as a valuable reference for further analysis, refinement, and incorporation into the project requirements, ensuring that the technical team's contributions were effectively integrated into the project's development process.

Outcome of the brainstorming session

Technical requirements

1. **Image Processing Algorithms:**

- Implementation of feature/image machine
- Implementation of image recognition algorithms for object detection and feature extraction.
- Integration of image segmentation techniques to isolate objects of interest within images.
- Utilization of image enhancement (image processing) methods to improve image quality and clarity.

2. **Database Management:**

    - Design and implementation of a scalable database schema to store archived objects and associated metadata.
    - Integration with a relational database management system NoSQL database for efficient data storage and retrieval.
    - Implementation of data indexing and querying mechanisms for fast and accurate retrieval of archived objects.

3. **System Architecture:**

    - Design of a MVC (model, view, controller) architecture coupled with micro service architecture for a modular and scalable development.

4. **Integration with External APIs or Services:**

    - Integration with third-party APIs for accessing external data sources, such as relocation services for mapping lost item locations.
    - Incorporation of APIs for accessing external image databases or repositories for comparison and matching.
    - Integration with communication APIs for sending notifications to users about potential matches or updates on lost items.

5. **Data Security and Privacy:**

    - Implementation of encryption mechanisms to secure sensitive data, such as user information and uploaded images.
    - Implementation of access control measures to restrict unauthorized access to system resources and data.

6. **Scalability and Performance**

    - Design for scalability to accommodate a growing user base and increasing volumes of archived objects.
    - Optimization of algorithms and data processing pipelines for improved performance and response times.

Innovative Solution

1. **Deep Learning-Based Image Recognition:**
    - Utilizing convolutional neural networks (CNNs) or deep learning models to perform advanced image recognition and feature extraction.
    - Training the models on large datasets of images to enable robust object detection and classification capabilities.
    - Implementing transfer learning techniques to fine-tune pre-trained models for specific object retrieval tasks, reducing the need for extensive training data.

2. **Feature Extraction and Matching Algorithms:**
    - Developing sophisticated feature extraction algorithms to identify unique characteristics and patterns within images.
    - Implementing efficient matching algorithms, such as SIFT (Scale-Invariant Feature Transform) or SURF (Speeded Up Robust Features), to compare features and determine similarity between images.
    - Exploring novel approaches, such as graph-based matching or semantic hashing, to improve the accuracy and speed of image matching processes.
3. **Contextual Analysis and Semantic Understanding:**
    - Incorporating contextual analysis techniques to consider surrounding objects, scenes, and environmental factors when matching images.
    - Leveraging semantic understanding and natural language processing (NLP) to interpret textual descriptions of lost items and enhance search accuracy.
    - Implementing context-aware algorithms that adaptively adjust search criteria based on contextual information, improving the relevance of search results.
4. **Active Learning and Feedback Mechanisms:**
    - Implementing active learning strategies to iteratively improve the performance of the image matching system over time.

- Integrating feedback mechanisms that allow users to provide input on the relevance and accuracy of search results, enabling the system to learn from user interactions and refine its algorithms accordingly.

5. **Real-Time Image Processing and Analysis:**
   - Leveraging edge computing or cloud-based processing to enable real-time image processing and analysis, facilitating quick and responsive object retrieval.
   - Implementing parallel processing techniques to distribute image processing tasks across multiple computing nodes, accelerating the overall retrieval process.

Risk and mitigation

1. **Technical Complexity:**
   - **Risk:** The project may encounter technical complexity due to the intricate nature of image matching algorithms and machine vision techniques.
   - **Mitigation:** Break down the technical implementation into manageable components and conduct thorough research to understand the underlying concepts. Collaborate with experts in computer vision and seek guidance from mentors or advisors to navigate complex technical challenges effectively.

2. **Performance Bottlenecks:**
   - **Risk:** The system may experience performance bottlenecks, resulting in slow response times or system failures, especially during peak usage periods.
   - **Mitigation:** Perform comprehensive performance testing and optimization of algorithms and system components. Implement caching mechanisms, parallel processing, and load balancing techniques to improve system scalability and responsiveness. Monitor system performance continuously and proactively address any emerging bottlenecks.

3. **Data Quality and Availability:**

   - **Risk:** Insufficient or poor-quality training data may hinder the effectiveness of image matching algorithms and machine learning models.
   - **Mitigation:** Conduct thorough data pre-processing and cleaning to ensure the quality and reliability of training data. Augment training data with synthetic or generated samples to address data scarcity issues. Implement data validation and quality control measures to detect and correct errors or inconsistencies in the dataset.

4. **Integration Challenges:**

   - **Risk:** Integrating the system with external APIs, databases, or services may pose challenges, such as compatibility issues or data format mismatches.
   - **Mitigation:** Conduct thorough compatibility testing and API documentation review to identify potential integration issues early in the development process. Establish clear communication channels with third-party providers and collaborate closely to address any compatibility or interoperability issues. Implement robust error handling and fullback mechanisms to handle integration failures gracefully.

5. **Security Vulnerabilities:**

   - **Risk:** The system may be susceptible to security vulnerabilities, such as data breaches, unauthorized access, or malicious attacks.
   - **Mitigation:** Implement stringent security measures, including encryption, authentication, and access control mechanisms, to protect sensitive data and system resources. Conduct regular security audits and penetration testing to identify and address potential vulnerabilities proactively.

Project Sponsor and supervisor (client):

Methods used to collect Requirements

Requirement extraction from system description.

1. **Document Review:**
    - The project team carefully reviews the system description documentation provided by the project sponsor or client. This may include project proposals, scope documents, user manuals, or any other materials that describe the intended functionality and objectives of the system.
2. **Requirement Identification:**
    - During the document review process, the team identifies and extracts explicit and implicit requirements mentioned in the system description. This involves capturing functional requirements (e.g., system features, user interactions) as well as non-functional requirements (e.g., performance, security, scalability).
3. **Requirement Clarification:**
    - Any ambiguities or inconsistencies in the system description are noted, and clarification is sought from the project sponsor or client. This may involve scheduling meetings or discussions to gather additional information or context about specific requirements.

Outcome of requirement extraction

Functional Requirements:

1. **User Registration and Authentication**
    - Priority: High
    - Users should be able to create accounts and log in securely to access the application's features.
2. **Image Upload and Storage**
    - Priority: High

- Users should be able to capture and upload images of lost items to the application.
- The application should store uploaded images securely in a centralized database.

3. **Image Matching and Retrieval**

   - Priority: High
   - The application should perform real-time image matching using advanced algorithms to compare uploaded images with archived objects.
   - Identified matches should be retrieved and displayed to users in a timely manner.

4. **Intuitive User Interface**

   - Priority: Medium
   - The application should feature user-friendly interfaces and seamless navigation to enhance usability.
   - Users should be able to easily navigate through different sections of the application, including image upload, search, and match results.

5. **Search Functionality**

   - Priority: High
   - Users should be able to search for potential matches of their lost items using various search criteria, such as keywords or visual similarities.
   - The search functionality should be fast, accurate, and intuitive for users to use effectively.

6. Notification Functionality

   - Priority: High
   - Users should receive real-time notifications via push notifications or email when potential matches for their lost items are found.

7. Crowdsourcing and Community Engagement

   - Priority: Medium

- Users should have the option to share information about their lost items on social media platforms and enlist the help of friends, family, and other users in the search process.

Non-Functional Requirements:

1. **Security and Privacy**
    - Priority: High
    - The application should implement robust security measures to protect user data and privacy.
    - Measures should include encryption of data transmission, secure storage of user information, and authentication mechanisms.
2. **Performance**
    - Priority: High
    - The application should be responsive and per formant, even under high load conditions.
    - Image matching algorithms should be optimized for speed and efficiency to ensure quick retrieval of matches.
3. **Scalability**
    - Priority: Medium
    - The application should be designed to handle a growing user base and increasing volumes of uploaded images.
    - Scalability measures should include efficient database management, resource allocation, and load balancing.
4. **Reliability**
    - Priority: High
    - The application should be reliable and available for users to access whenever needed.
    - Measures should be in place to mitigate downtime, such as redundant systems and regular maintenance.

5. **Compatibility**

- Priority: Medium
- The application should be compatible with a wide range of mobile devices and operating systems.
- Compatibility testing should be conducted to ensure consistent performance across different platforms.

REQUIREMENT DOCUMENTATION

Functional Requirements:

- User Registration and Authentication
- Image Upload and Storage
- Real-time Image Matching
- Intuitive User Interface
- Notification Functionality
- Crowdsourcing and Community Engagement

Non-Functional Requirements:

- Security and Privacy
- Performance
- Scalability
- Reliability
- Compatibility

User-Specific Requirements:

- User-friendly Interfaces
- Seamless Navigation
- Real-time Notifications
- Social Media Integration

ASSUMPTIONS AND CONSTRAINTS

Assumptions

1. Users will have access to smartphones with sufficient camera capabilities to capture images of lost items.

    - **Potential Impact:**

    If users have outdated or low-quality smartphones, it may affect the quality of uploaded images, potentially impacting the accuracy of image matching.

2. Users will have a stable internet connection to upload images and receive real-time notifications.

    - **Potential Impact:**

        Poor internet connectivity may result in delays in image uploads or notifications, affecting the user experience and overall effectiveness of the application.

Constraints:

1. **Budget Constraint:** The project has a limited budget allocated for development, testing, and deployment of the mobile application.

    - **Impact:** The budget constraint may limit the scope of the project, affecting the selection of features and technologies to be implemented within the allocated budget.

2. **Timeline Constraint:** The project must be completed within a specified timeframe to meet stakeholder expectations and market demands.

    - **Impact:** The timeline constraint may require prioritization of requirements and efficient project management to ensure timely delivery without compromising quality.

3. **Technical Limitations:** The mobile application must be compatible with various mobile devices and operating systems, imposing technical constraints on development.

    - **Impact:** Technical limitations may restrict the choice of technologies and development approaches, requiring careful consideration to ensure compatibility and performance across different platforms.

CONCLUTION

As we embark on the journey of developing the Mobile-Based Archival and Retrieval of Missing Objects Application using Image Matching, it becomes evident that this endeavour holds significant promise in addressing the pervasive challenges surrounding the loss or misplacement of personal belongings. By harnessing state-of-the-art technologies and embracing user-centric design principles, this project endeavours to deliver a solution that not only simplifies the process of finding lost items but also empowers individuals to reclaim what matters most to them.

Throughout the requirement gathering phase, the invaluable insights and perspectives shared by stakeholders have served as guiding lights, illuminating the path forward. From the nuanced user requirements to the intricate technical considerations and constraints, each aspect has been meticulously examined and prioritized to ensure the creation of a robust and intuitive application.

As we transition into the next phases of design, development, and testing, it is imperative to remain steadfast in our commitment to collaboration, innovation, and responsiveness. By adhering to the prioritized requirements, navigating potential risks and constraints with agility, and fostering an environment of continuous improvement, we can navigate the complexities of the project with confidence and clarity.

In essence, this project represents more than just a technological venture; it embodies a shared vision of empowerment and transformation. By delivering a solution that seamlessly integrates into the lives of users, we aspire to make a meaningful difference, offering them not just a tool, but a newfound sense of control and reassurance in the face of uncertainty. Together, let us embark on this journey, fuelled by determination, creativity, and the unwavering belief that even the smallest of innovations can spark profound change.

APPENDICES

1. **Interview Transcripts:**

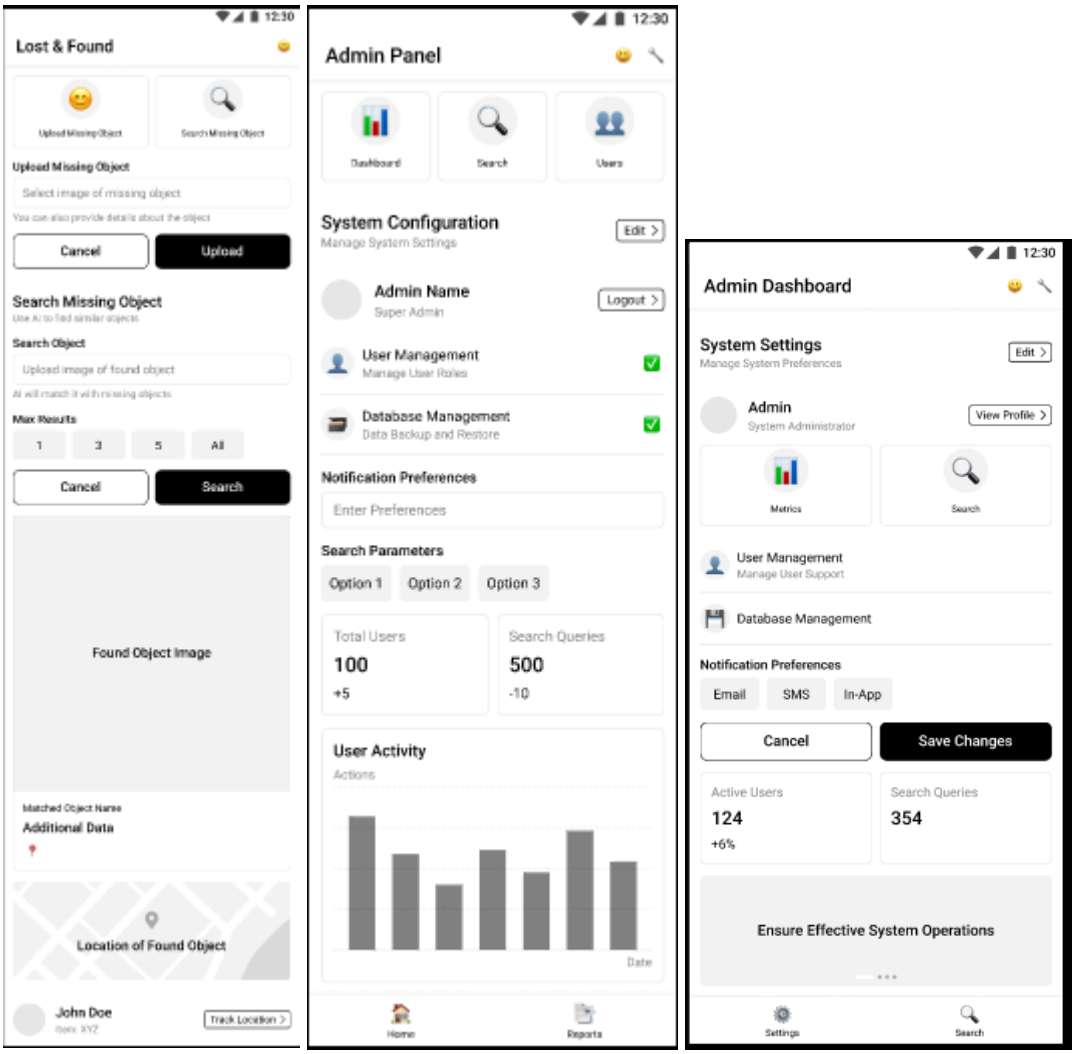
   Fine the transcript in the project github repo:

   https://github.com/ROD-HBK/Group6 : navigate to task 2 directory

2. **Survey Results:**

   - The survey results will be written here

3. **Prototypes:**



Tools:

Creating a persona: Free Buyer Persona Templates and Builder | Semrush Persona

Prototype: Figma

Glossary:

1. **Archival:** The process of storing and organizing information or objects for future reference or retrieval.
2. **Retrieval:** The act of finding and accessing stored information or objects, typically for a specific purpose or use.
3. **Image Matching Algorithms:** Computational methods used to compare and analyse images for similarities or matches based on predefined criteria.
4. **Computer Vision Techniques:** Technologies and methods for processing, analysing, and interpreting visual data from images or videos.
5. **Feature Extraction:** The process of identifying and extracting meaningful features or patterns from raw data, such as images, to facilitate analysis and decision-making.
6. **Similarity Scoring:** A quantitative measure used to assess the degree of similarity between two objects or entities based on their features or characteristics.
7. **User Interface:** The visual and interactive elements of a software application or system through which users interact and perform tasks.
8. **Notification Functionality:** The capability of a system to send alerts or notifications to users based on predefined events or conditions.
9. **Crowdsourcing:** The practice of obtaining input, ideas, or resources from a large group of people, typically via an online platform or community.
10. **Community Engagement:** The involvement and participation of individuals or groups within a community in activities or initiatives aimed at achieving common goals or objectives.

REFENCEES

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https://www.projectpractical.com/9-steps-to-effective-project-requirements-gathering-process/

https://teachingagile.com/sdlc/requirement-analysis/effective-requirements-gathering-techniques-and-tips

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