



RV COLLEGE OF ENGINEERING®, BENGALURU-59  
(Autonomous Institution Affiliated to VTU, Belagavi)

## Design Thinking Lab (CS237L) Report

### Theme: Digital Humanities

TOPIC: **DIGITAL PATHWAYS: Connecting outsiders to the local world**

This Project is being carried out under the guidance and mentorship of **Dr. Azra Nasreen** and **Dr. Hemavathy R**, Associate Professors in the Department of Computer Science and Engineering, RV College of Engineering

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



**CERTIFICATE**

Certified that the Design thinking Laboratory work titled “Digital PATHWAYS: Connecting outsiders to the local world“ is carried out by in partial fulfilment for the requirement of degree of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belagavi during the year 2024-2025. It is certified that all corrections/suggestions indicated for the Internal Assessment have been incorporated in the report.

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## **DECLARATION**

This report has been prepared on the basis of our own work. Where other published and unpublished source materials have been used, those have been acknowledged.

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## ABSTRACT

The increasing globalization and movement of people have intensified the need for platforms that bridge cultural gaps and provide immersive experiences. Aantarya is an innovative web application designed to address this need, offering a seamless blend of tradition and technology to connect locals and non-locals in Bengaluru.

For locals, Aantarya provides an engaging platform to rediscover their city through interactive quizzes in four categories: Places, Food, Tradition and Events, and History. These quizzes entertain, educate, and strengthen cultural pride, encouraging residents to delve deeper into Bengaluru's heritage.

For non-locals, Aantarya simplifies cultural exploration by offering Kannada translation with pronunciation, making basic communication accessible. It introduces them to Bengaluru's hidden gems and authentic experiences beyond the typical tourist paths, enriching their connection to the city.

The Explore section encapsulates Aantarya's mission by featuring:

1. Storied Landmarks: A curated selection of ten iconic sites, including Bangalore Palace, Lalbagh, and Vidhana Soudha, enhanced with legacy bits and street view to offer an immersive journey through Bengaluru's cultural and historical narrative.
2. Authentic Eateries: A showcase of six renowned food spots like Vidyarthi Bhavan and MTR, where AR technology highlights the specialties of each place, allowing users to virtually experience Bengaluru's culinary delights.

Aantarya's integration of Augmented Reality (AR) transforms exploration into an interactive experience, offering users the chance to visualize history, culture, and cuisine like never before. Its intuitive user interface ensures accessibility for diverse users, fostering inclusivity and ease of use.

By merging innovation with cultural storytelling, Aantarya acts as a bridge, enabling locals to celebrate their city's legacy while inviting non-locals to immerse themselves in Bengaluru's vibrant heritage. It promotes authentic connections, enriches cultural understanding, and sets a precedent for how digital solutions can preserve and share cultural identity.

In an era where mass tourism often dilutes cultural authenticity, Aantarya redefines urban exploration, making it personal, meaningful, and memorable for all.

## Acknowledgement

Any achievement, whether academic or otherwise, is rarely the result of individual effort alone. It is often shaped by the guidance, support, and encouragement of mentors, peers, and well-wishers. We are immensely grateful to all those who, in various ways, contributed to the successful completion of this Design Thinking Laboratory project.

We extend our heartfelt gratitude to our mentors, Dr. Azra Nasreen and Dr. Hemavathy R, Associate Professors in the Department of Computer Science and Engineering, RV College of Engineering for their invaluable guidance, constructive feedback, and continuous support throughout this endeavor.

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Finally, we are grateful to all the teaching and technical staff of the Computer Science and Engineering Department, RVCE, for their assistance and cooperation, which played a vital role in bringing this work to fruition.

# CHAPTER 1 : EMPATHY

## 1.1 INTRODUCTION TO EMPATHY

The **Empathy Phase** is a foundational step in the design process of *Aantarya*, aimed at gaining a deep understanding of the users' needs, behaviors, challenges, and emotions. By ensuring the app aligns with the real-world experiences of its users, this phase enhances the overall user experience and engagement.

*Aantarya* caters to two distinct user groups: **locals** and **non-locals**. Locals, with their inherent connection to Bengaluru, seek deeper engagement with the city's culture, traditions, and hidden gems. Non-locals, in contrast, face challenges such as language barriers and unfamiliarity with the city, necessitating an intuitive platform that facilitates cultural understanding, navigation, and local exploration.

### **Key Objectives of the Empathy Phase:**

- **Identify Pain Points:** Understand challenges users face, including navigation difficulties and language barriers.
- **Understand Motivations:** Explore the reasons users engage with *Aantarya*, whether for cultural discovery, convenience, or social connection.
- **Define Goals:** Clarify user objectives such as learning Kannada, exploring cultural landmarks, or discovering local cuisine.
- **Capture Emotional Drivers:** Analyze emotional factors to ensure the app fosters positive and meaningful user experiences.

### **Methods Employed:**

- **User Interviews & Surveys:** Directly engage with users to identify their needs and challenges.
- **Empathy Mapping:** Visualize key insights about user behaviors, emotions, and goals.
- **Persona Development:** Create representative personas to guide design decisions and feature prioritization.

By focusing on the Empathy Phase, *Aantarya* ensures that its design is informed by a comprehensive understanding of user needs, resulting in an app that is intuitive, culturally relevant, and emotionally engaging for both locals and non-locals.

## **1.2 CUSTOMER PERSONA AND ENVIRONMENT**

### **Customer Persona**

#### **Locals:**

- **Natives/Neighbors (25-50 years):** Long-term residents seeking to explore lesser-known cultural spots and share local traditions.  
**Needs:** Cultural engagement, heritage preservation, and storytelling.  
**Challenges:** Balancing busy schedules with rediscovery of Bengaluru.
- **Non-Native Locals (20-35 years):** Young professionals and students integrating into Bengaluru's culture.  
**Needs:** Guidance on cultural landmarks, Kannada language support, and authentic food experiences.  
**Challenges:** Adapting to local customs and navigating the city.

#### **Non-Locals:**

- **Tourists (25-45 years):** Visitors wanting to explore Bengaluru's culture but facing language barriers and time constraints.  
**Needs:** AR navigation, language translation, and cultural insights.  
**Challenges:** Limited time and difficulty navigating the city.
- **Hostellers (18-30 years):** Budget-conscious students and travelers in shared accommodations.  
**Needs:** Affordable exploration, social spaces, and local recommendations.  
**Challenges:** Limited time and budget for exploration.

### **Environment**

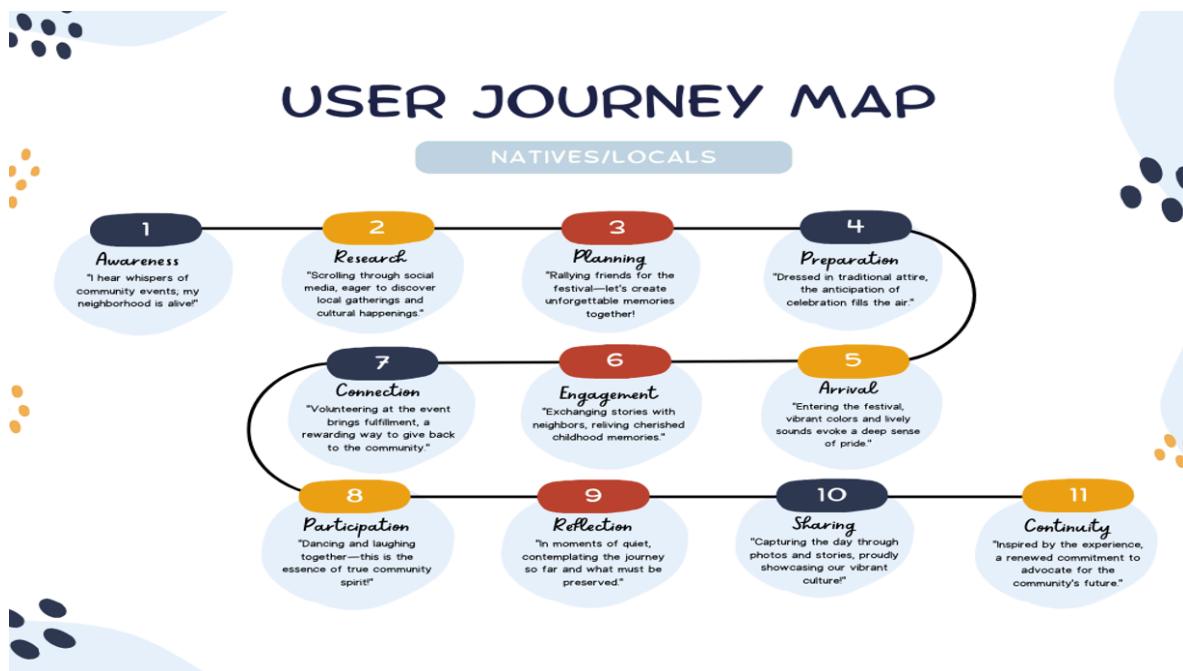
Aantarya operates in Bengaluru's dynamic urban landscape, including outdoor spaces (streets, markets, cultural sites) and indoor spaces (local eateries, cultural institutions).

#### **Environmental Challenges:**

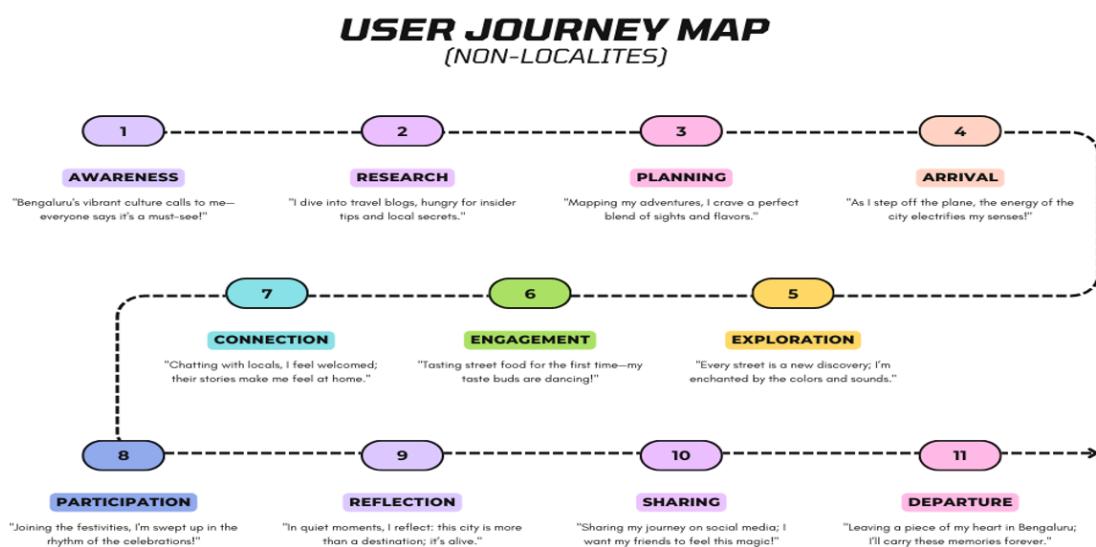
- **Dynamic Changes:** Construction or events may alter routes.
- **Lighting Conditions:** AR overlays must work in both bright and dim settings.
- **Accessibility Needs:** The app must support users with disabilities, offering audio guidance and wheelchair-friendly routes.

### 1.3 CUSTOMER JOURNEY MAP

#### USER JOURNEY MAP - LOCALS



#### USER JOURNEY MAP - NON LOCALS



## User Journey Summary

### Localites

Localites take pride in Bengaluru's vibrant culture, seeing it as part of their identity. They stay updated on events and trends, blending traditions with modern experiences in their plans. Each return to the city reaffirms their sense of belonging and connection.

In exploring the city, they rediscover familiar spaces and uncover new gems, actively engaging with its flavors, arts, and festivals. Their strong bonds with family, friends, and the community enhance their participation in cultural events. Reflecting on their journey, localites cherish the city's influence on their identity and proudly share its uniqueness with visitors. Even when they leave, their deep connection ensures Bengaluru remains home.

### Non-Localites

Non-localites are drawn to Bengaluru's culture through stories and recommendations. They research extensively to plan an itinerary blending iconic landmarks with local experiences. Upon arrival, they are energized by the city's lively atmosphere.

Through exploration, they immerse in Bengaluru's culture, discovering its food, art, and traditions. Meaningful interactions with locals foster a sense of belonging, and participation in festivals deepens their connection. They reflect on the city's charm and share their journey with others. Departing with cherished memories, they leave a part of their heart behind, carrying a lasting bond with Bengaluru.

## **Customer Journey Map for Aantarya**

### **1. Awareness**

Users become aware of Aantarya through various channels like social media campaigns, online advertisements, or word-of-mouth recommendations. Aantarya positions itself as a unique app that bridges the gap between cultural exploration and language learning in Bengaluru. Eye-catching visuals, compelling content, and testimonials from satisfied users spark curiosity and drive initial interest. For travelers and locals alike, the promise of uncovering the city's hidden gems and learning Kannada through engaging methods resonates strongly.

### **2. Consideration**

Once users download the app, they explore its features, such as AR-based navigation for city tours, step-by-step Kannada language tutorials, and curated cultural experiences. While the app offers diverse functionalities, users might feel overwhelmed by the variety of options and the depth of the content. The consideration stage is where Aantarya must excel in providing intuitive onboarding and clear guidance on how to navigate the app. A simple and engaging user interface, coupled with short tutorials or "getting started" guides, helps alleviate hesitation and nudges users to try different features.

### **3. Purchase**

As users delve deeper into the app, they are introduced to premium offerings such as exclusive city tours, detailed cultural insights, and personalized itineraries. These premium features cater to their desire for authenticity and deeper engagement, setting Aantarya apart from generic city guides. Limited-time offers, discounts, or a free trial of premium features can convert users into paying customers. The purchase stage is driven by the app's ability to demonstrate value, convenience, and a truly immersive experience.

### **4. Service**

The service stage focuses on maintaining user satisfaction through seamless functionality and regular updates. Features like real-time AR navigation, interactive Kannada lessons, and cultural insights are designed to keep users engaged. Prompt customer support, personalized

recommendations based on user preferences, and regular updates introducing new content or features enhance the experience further. The app's reliability and consistent delivery of quality service create a sense of trust among users, ensuring they keep returning for more.

## 5. Loyalty

Satisfied users transition into loyal advocates of Aantarya. They share their positive experiences with friends, family, and social media networks, helping the app grow organically. Referral programs with attractive bonuses or exclusive rewards for loyal users incentivize this word-of-mouth promotion. Regularly engaging with users through newsletters, personalized notifications about new features or cultural events, and special loyalty discounts ensure they remain connected to the app. By fostering a strong community of users, Aantarya becomes more than just an app—it transforms into a trusted companion for exploring Bengaluru's culture and language.

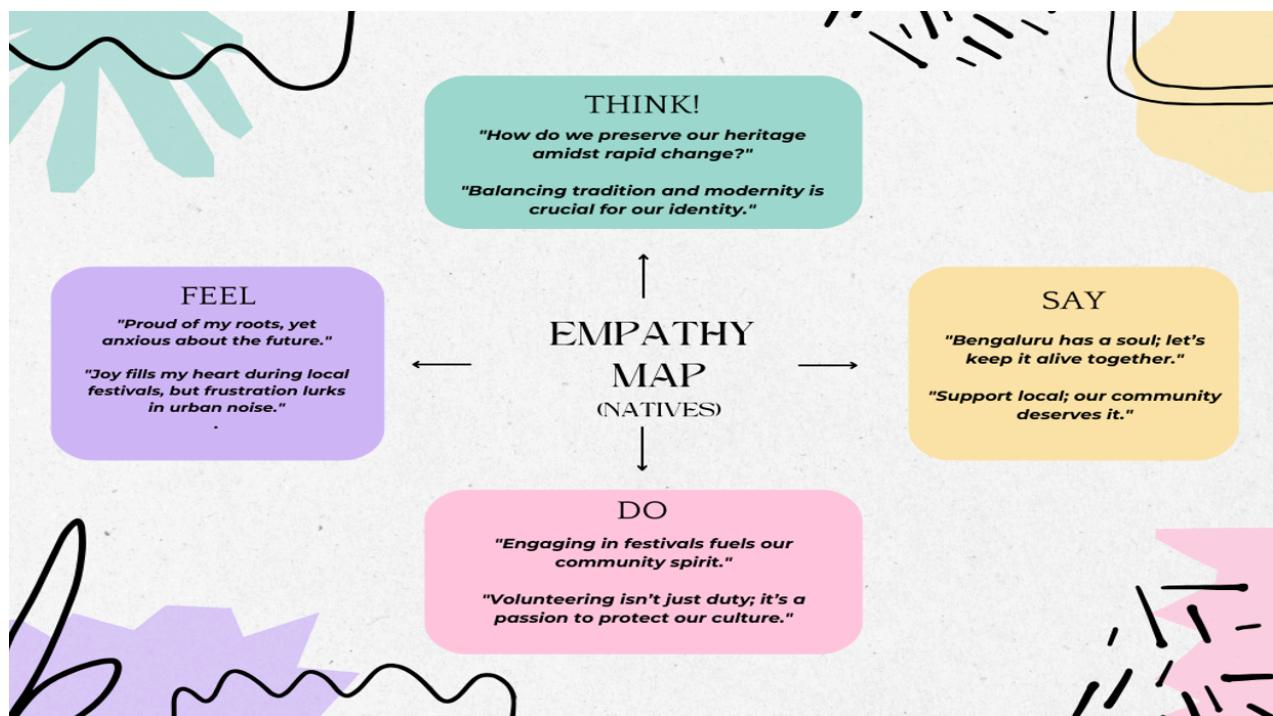
This detailed journey map ensures that every stage is carefully designed to address user needs, enhance engagement, and build long-term loyalty.

## CUSTOMER JOURNEY MAP

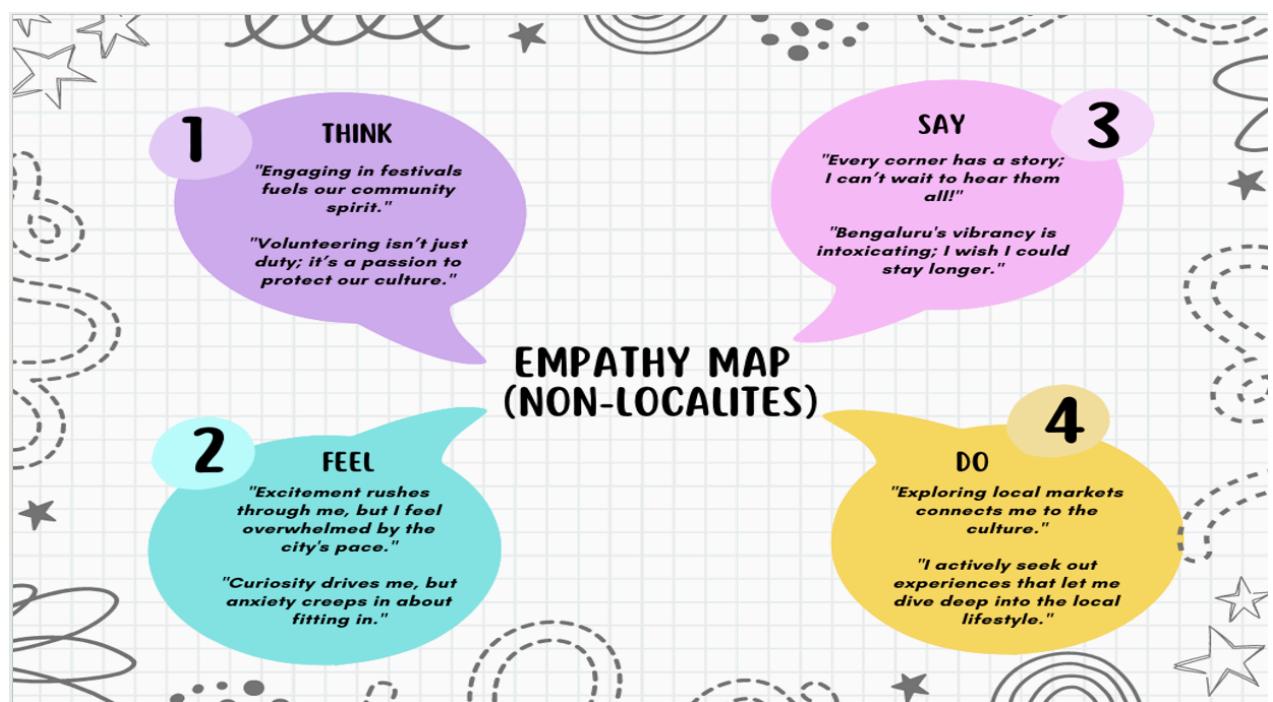
	AWARENESS	CONSIDERATION	PURCHASE	SERVICE	LOYALTY
CUSTOMER ACTIONS	User hears about Aantarya through social media, ads, or word-of-mouth.  Downloads the app out of curiosity about discovering more about Bengaluru's culture.	Browses through the app, trying different sections to explore features.  Checks if the app is worth keeping based on the usefulness and ease of navigation.	Decides to actively use the app, checking out quizzes, exploring nearby locations, and using AR features.	Looks for support options or additional guidance if issues arise.  Provides feedback or uses the in-app help feature.	Regularly uses the app, shares experiences with friends, and provides positive feedback.  Engages with seasonal updates, new features, or loyalty rewards if available.
TOUCH POINTS	Digital ads, social media posts, app store presence, and potentially from friends or local recommendations.	Feature exploration within the app, support/help section, and initial interaction with the UI.	Daily notifications, cultural quizzes, AR visuals, and feedback options.	Customer support, FAQs, feedback forms, or chat support.	Ongoing interactions, new feature notifications, loyalty rewards and social sharing options.
CUSTOMER EXPERIENCE	Initial excitement but possibly overwhelmed by the variety of features.  Emoji: Curiosity but also confusion about app's purpose	Mixed feelings—impressed with some unique features but hesitant due to complexity.  Emoji: Positive curiosity but still exploring	Engaged but may experience frustration if certain features aren't seamless or if there's a bug.  Emoji: Potential frustration if features don't work smoothly	Mixed reactions depending on the support received—relief if it's helpful, frustration if it's slow.  Emoji: Relief or surprise if support is effective	Positive attachment and satisfaction with the app; enjoys the evolving features.  Emoji: Happy and engaged
PAIN POINTS	Unclear understanding of what the app offers and how it stands out from other guides.	May feel overwhelmed if the UI is too cluttered or features are hard to find.	Possible app bugs, lag in AR visuals, or difficulty navigating the quiz and feedback sections.	Delays in receiving support or inadequate troubleshooting information.	Potential stagnation if no new features or updates are introduced.
SOLUTIONS	Clear onboarding process explaining app features and benefits.  Short intro video or tutorial guiding them through the main features.	Intuitive layout and helpful tooltips on first use of each feature.  Highlighting the unique aspects like the AR features and translation options.	Ensure a smooth and bug-free experience through regular updates.  Provide quick customer support for resolving issues.	Responsive and helpful customer support.  A clear FAQ section and troubleshooting guide within the app.	Regular updates with new content or events (e.g. seasonal quizzes, new hidden gems).  Introduce a referral or loyalty program to encourage sharing and continued engagement.

## 1.4 CUSTOMER EMPATHY MAP

### EMPATHY MAP - LOCALS



### EMPATHY MAP - NON LOCALS



## Empathy Map Summary

### Localites

Localites take immense pride in Bengaluru's rich cultural heritage, viewing themselves as custodians of its traditions. For them, festivals and events are not just celebrations but a reflection of the city's soul and identity. This sense of responsibility often intertwines with a deep nostalgia for how Bengaluru has grown and evolved over time. While they embrace the city's modern developments, they are steadfast in preserving its cultural essence, balancing progress with heritage.

Active participants in the cultural ecosystem, localites often lead or contribute to festivals, community events, and neighborhood traditions, fostering a collective spirit. Their pride is evident in phrases like, "Bengaluru is where history meets innovation," and they often go out of their way to share authentic experiences with visitors. They guide others to hidden gems, local cuisines, and lesser-known cultural landmarks, ensuring that the essence of Bengaluru is understood and appreciated. For localites, their bond with the city is deeply personal and unshakeable, making them ambassadors of its heritage.

### Non-Localites

Non-localites are enchanted by Bengaluru's energy and diversity, seeing it as a gateway to a culture rich in stories, traditions, and modern vibrancy. For them, every street and interaction feels like a new adventure. However, this excitement is often paired with a sense of apprehension about navigating the city's fast-paced life and understanding its cultural nuances. Despite this, their curiosity drives them to seek out experiences that help them feel connected and integrated.

Festivals, street markets, and cultural hubs become their entry points into Bengaluru's lifestyle. They are often in awe of the city's rhythm, saying things like, "Every corner has a story," as they immerse themselves in its vibrancy. Through meaningful interactions with locals, they begin to feel a sense of belonging, finding guidance and camaraderie in shared cultural experiences. Non-localites actively seek opportunities to dive into Bengaluru's unique blend of tradition and modernity, leaving with a newfound appreciation and memories that deeply resonate.

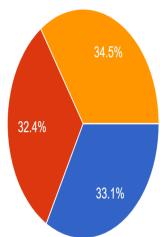
This deeper perspective highlights the shared connection both localites and non-localites feel toward Bengaluru while showcasing their unique ways of engaging with the city's culture.

## **1.5 TOOLS USED FOR EMPATHY MAP**

### **1.5.1. Customer Survey and Analysis**

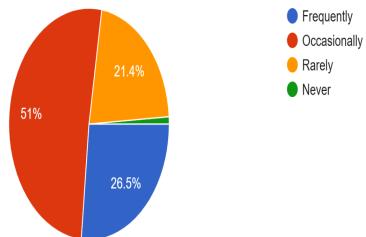
What best describes your connection to Bengaluru?

145 responses



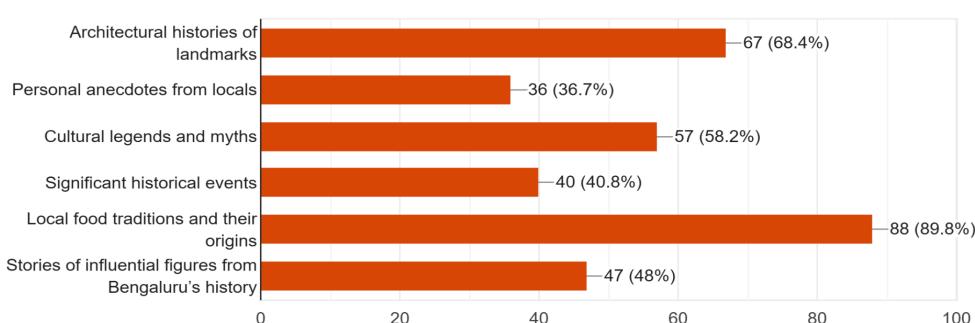
How often do you explore different neighborhoods in Bengaluru?

98 responses



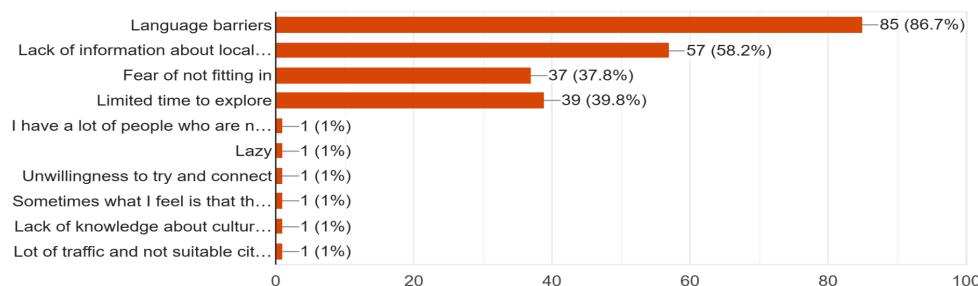
What kind of stories or histories do you think should be shared with newcomers about Bengaluru? (Select up to 3)

98 responses



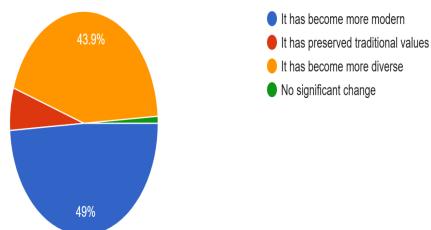
What factors do you think prevent outsiders from connecting with the local community? (Select all that apply)

98 responses



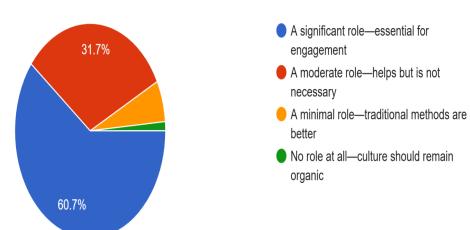
How do you think Bengaluru's culture has evolved in recent years?

98 responses



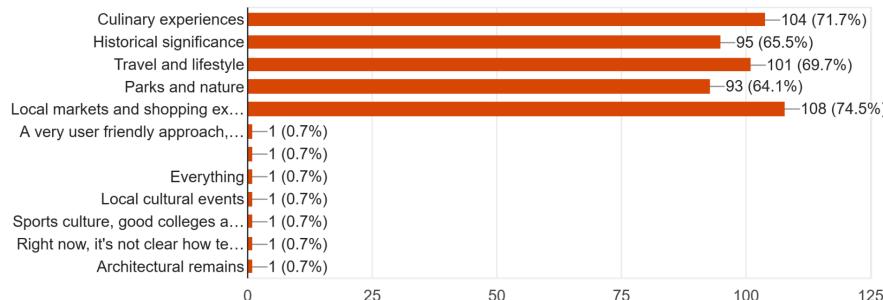
In your opinion, what role does technology play in preserving and promoting local culture?

145 responses



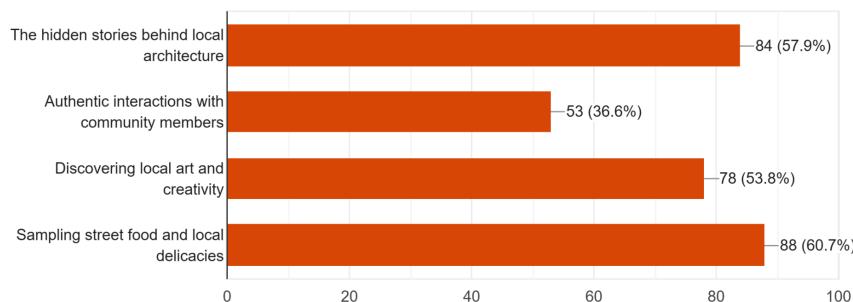
What all experiences do you look forward to having in the app

145 responses



When exploring new neighborhoods in Bengaluru, what intrigues you the most?

145 responses



- Customer Feedback Collection: Gathering direct input from users through surveys to understand their needs, preferences, and pain points.
- Data-Driven Insights: Analyzing survey responses to identify trends, patterns, and areas for improvement in products or services.
- Actionable Recommendations: Using survey results to guide decision-making and improve user experience by addressing identified concerns and enhancing features.

### 1.5.2.Customer Interaction Photos

**Worker (Non-Localite)**

- He was familiar with the local language so didn't face language related issues.
- Make the app user friendly for people who are not familiar with technology.

**RVCE STUDENT (Hostellite)**

- The city is quite welcoming.
- Language barrier makes it hard to adjust.
- Not a lot of cultural difference.

**S Vani Shree (RVCE Faculty, Localite)**

- More insights on traditional events and festivals.
- Include authentic food spots.
- Increasing the fluency of language to navigate better.

**WATCHMAN (Non-Localite)**

- Found it hard to adjust and navigate.
- Not familiar to places serving homely and affordable food.

**HOSTELLITES**

- Struggle to find local food spots beyond the tourist traps.
- Language barrier
- Getting to know Bangalore's rich history and heritage is hard without guidance

**EXPECTATIONS FROM APP**

- Providing some essential Kannada words or phrases to help navigate through the city better.

*Interviews.....*

- Visual Documentation of Engagement: Capturing photos of customer interactions to provide visual context for their experiences, emotions, and reactions.
- Real-Life Context: Photos offer insights into the environment, behaviors, and activities of customers, adding depth to qualitative data from surveys or interviews.
- Empathy Building: Customer interaction photos help teams relate more personally to user experiences, fostering a deeper understanding of their needs and challenges.

### 1.5.3 Customer Interview's details

#### **Localites**

**Objective:** To understand local users' engagement with the Aantarya web app and its impact on community involvement.

#### **Interview Focus:**

- **App Usage:** Local users frequently use event notifications and communication tools to stay informed about community activities.
- **Community Engagement:** The app enhances connections with locals and facilitates participation in events.
- **Perceptions of Benefits:** The app fosters a more interconnected community, but users suggested improvements in local service directories and news updates.
- **Usability:** Most found the app user-friendly, but some felt more localized content could be added.
- **Feedback and Improvement:** Locals suggested adding volunteer opportunities and collaboration spaces for neighborhood initiatives.

#### **Key Insights:**

- The app plays a crucial role in communication and community cohesion.
- There is a demand for more localized content and community features.
- Enhancing service accessibility and volunteer management would improve the experience.

#### **Non-Localites – Customer Interview Details**

**Objective:** To explore how non-local users interact with Aantarya and how it aids their integration.

#### **Interview Focus:**

- **App Usage:** Non-local users value features like translation tools, resource directories, and event notifications for adapting to the new environment.
- **Challenges in Adaptation:** Many struggled with language barriers and local cultural nuances, and suggested better support for non-native speakers.
- **Integration and Inclusivity:** While some felt the app helped connect with locals, others wanted more support for newcomers in services and cultural orientation.

- **Perceptions of Local Community:** A few felt the local community wasn't very welcoming, but many appreciated the app's role in easing interactions.
- **Suggestions for Improvement:** Non-local users recommended features like interactive maps, language tools, and easier access to expat networks.

#### **Key Insights:**

- The app helps non-local adaptation but needs to address language and cultural challenges.
- Adding integration-focused resources could enhance inclusivity.
- Improving social networking and localized information would better support non-local users.

## CHAPTER 2 : DEFINE

### **2.1 INTRODUCTION TO PROBLEM STATEMENT**

The Aantarya web app is designed to facilitate communication, community engagement, and integration between localites and non-localites. However, the app faces significant challenges in addressing the diverse needs and expectations of these two distinct user groups.

#### Breakpoint 1: Divergent User Requirements

Localites primarily use the app to strengthen community ties, access local services, and stay informed about events, while non-localites encounter difficulties related to language barriers, cultural differences, and unfamiliarity with local resources. A key challenge is ensuring the app serves both groups effectively by balancing these differing needs.

#### Breakpoint 2: Inclusivity Gaps

While the app performs well for localites, it lacks critical features necessary for non-local users' adaptation and integration. Features such as language support, cultural orientation tools, and resource directories are essential for enhancing their experience and facilitating smoother community integration.

#### Breakpoint 3: User Experience and Community Cohesion

Localites seek enhanced features to foster community cohesion, while non-local users require tools that ease adaptation and facilitate communication. The challenge is to develop a solution that is both inclusive and user-friendly, effectively bridging the gap between these groups.

#### Breakpoint 4: Technical and Cultural Barriers

Addressing technical and cultural barriers, such as language support and intuitive navigation, is essential for improving user experience. This includes tailoring content to local needs while also providing tools that help non-local users integrate seamlessly into the community.

In conclusion, the core issue is understanding and addressing the distinct needs of both local and non-local users, ensuring the app is inclusive, accessible, and enhances communication and community engagement for all.

## **2.2 HOW MIGHT WE QUESTIONS**

### **HOW MIGHT WE QUESTIONS**

1. How might we help non-locals in Bengaluru discover lesser-known cultural sites?
2. How might we use AR to make exploring Bengaluru more engaging ?
3. How might we make local cultural experiences accessible and enjoyable for people new to the city?
4. How might we help non-locals overcome language barriers while exploring the city?
5. How might we showcase authentic eateries in Bengaluru that reflect local culture?
6. How might we encourage locals to contribute their knowledge of hidden gems to the app?
7. How might we use user-generated reviews to build a sense of trust and authenticity?
8. How might we help non-locals discover culturally rich events and festivals happening in the city?
9. How might we design AR experiences that let users visualize what Bengaluru's historic streets looked like in the past?
10. How might we make cultural storytelling accessible and engaging for users?
11. How might we help users find places that locals genuinely love?
12. How might we make AR a seamless part of the user experience without requiring much technical know-how?



The "**How Might We**" approach strategically targets key challenges in enhancing the Aantarya app by focusing on inclusivity, engagement, and cultural integration. By addressing the needs of both locals and non-locals, it aims to provide a personalized, seamless experience. Key initiatives include leveraging augmented reality (AR) to engage users with Bengaluru's hidden cultural gems, overcoming language barriers, and showcasing authentic, local eateries and events, all of which enhance the city's cultural appeal. Encouraging local contributions and fostering trust through user-generated reviews further enriches the platform, creating a more authentic and community-driven experience.

This approach is beneficial in promoting a stronger sense of community, facilitating smoother integration for non-locals, and improving the overall user experience through personalized, culturally relevant content. It helps ensure that the app becomes a comprehensive tool for both exploring and connecting with Bengaluru, fostering deeper engagement and a stronger sense of belonging among all users.

## **2.3 DESIGN THINKING CHALLENGES IDENTIFIED**

- Diverse User Needs: The app must cater to both local users, who are familiar with the city, and non-local users, who may face challenges in navigating Bengaluru, understanding its culture, and finding relevant services. The challenge lies in ensuring that both user groups have tailored experiences without overcomplicating the interface or overwhelming either group.
- Inclusivity and Adaptation: Non-local users often face language barriers and cultural differences when adapting to a new city. The app must integrate features such as real-time translation, local context guidance, and intuitive onboarding processes to ease this transition and ensure inclusivity for users from diverse backgrounds.
- Authentic Cultural Representation: There is a demand from non-local users for authentic local experiences, away from the mainstream tourist spots. The app must highlight hidden cultural gems—local eateries, historical sites, and lesser-known events—while avoiding commercialized or over-exposed recommendations. This requires carefully curating content that showcases the true essence of Bengaluru.
- Engagement and Interaction: To build a thriving, user-driven platform, the app needs to encourage locals to actively contribute their knowledge of hidden spots and local experiences. However, locals may be hesitant to share information out of fear of overcrowding or commercialization. The challenge is to motivate users to contribute valuable content while ensuring it remains authentic and meaningful.
- Usability and Accessibility: The app must serve a wide range of users, including those with varying levels of technical expertise. Ensuring the app is easy to navigate, with user-friendly features like AR, is critical. The challenge is to integrate advanced technologies like AR without overwhelming less tech-savvy users, making the experience seamless for all.
- Integration of Emerging Technologies: Augmented reality (AR) offers great potential to enhance user engagement, particularly for non-locals & locals exploring specialities of authentic food eateries. However, ensuring that AR features are intuitive, accessible, and enhance rather than disrupt the user experience remains a significant challenge.

## CHAPTER -3 : IDEATE

### 3.1 INTRODUCTION TO IDEATION

The **Ideation Phase** is a pivotal stage in the design thinking process where creative solutions are generated to address identified problems. For our web app, "Aantarya," this phase played a critical role in shaping its concept and features to meet the needs of its users effectively.

#### Purpose of the Ideation Phase :

The Ideation Phase serves as a creative and collaborative process, enabling us to translate abstract challenges into actionable solutions. For "Aantarya," this stage was essential to define the core purpose of the web app, align it with the needs of its target audience, and explore innovative possibilities for addressing the cultural disconnect experienced by non-locals in Bengaluru.

Our goal during ideation was not just to brainstorm random features but to deeply analyze how the app could meaningfully contribute to bridging the cultural gap. This involved generating ideas that catered to both locals and non-locals while ensuring the app would be intuitive, immersive, and impactful. Additionally, this phase aimed to ensure the app promotes responsible tourism, respects the city's heritage, and incorporates modern technologies like AR to create an engaging user experience.

The ideation process began by revisiting key challenges, such as the difficulty non-locals face in connecting with Bengaluru's authentic culture, the lack of focus on hidden cultural gems in existing apps, and language barriers that hinder meaningful exploration. With these challenges in mind, the team engaged in collaborative brainstorming sessions to formulate "How Might We" (HMW) questions. Examples include, "How might we make cultural discovery more engaging for newcomers?" and "How might we use AR to bring Bengaluru's history and heritage to life?" These questions framed the ideation process around actionable, user-centric goals.

To encourage creativity, the team employed techniques such as mind mapping, reverse thinking, and storyboarding. The generated ideas centered on creating an engaging, inclusive, and immersive web app experience. Key concepts included:

- An AR-powered navigation system to highlight Bengaluru's hidden gems, heritage sites, and authentic eateries.
- A language support feature to help non-locals learn basic Kannada phrases for smoother communication.
- A quiz for locals, promoting engagement through cultural trivia and historical knowledge.

- Accessibility-focused features, ensuring the app caters to users unfamiliar with advanced technologies, through a simple UI/UX design.

The ideation phase emphasized balancing technical feasibility with user experience. For instance, while AR integration offers a modern solution, considerations like intuitive onboarding and non-AR modes were proposed to accommodate a broader audience. The team prioritized ideas that aligned with user needs while ensuring scalability and cultural impact.

By deeply understanding these problems, the ideation phase provided the foundation for designing a solution that caters to these pain points while celebrating the cultural diversity of Bengaluru. The outcome was a clear direction for creating a web app that serves as a bridge between locals and non-locals, offering an immersive and engaging experience for all users.

In conclusion, the ideation phase for "Aantarya" was a dynamic and collaborative process that laid the foundation for an innovative, user-focused web app. By generating and refining ideas, the team ensured the solution effectively bridges cultural gaps, making Bengaluru's vibrant heritage and traditions accessible to all.

### **3.2 IDEATION TECHNIQUES USED & DESCRIPTION**

Generating innovative ideas requires the use of structured techniques that inspire creativity and encourage a free flow of thoughts. These ideation techniques act as a catalyst for brainstorming, helping to produce a wide range of ideas. While not every idea might be groundbreaking, each one serves as a stepping stone, potentially sparking an even better concept. Therefore, no idea should be dismissed.

To kickstart our creative process, we leveraged several popular ideation techniques. These methods enabled us to think outside the box and, ultimately, generate an impressive collection of over 80 unique ideas! The key techniques we used in our ideation journey are outlined below. By employing these tools, we ensured a diverse and innovative pool of ideas to build upon.

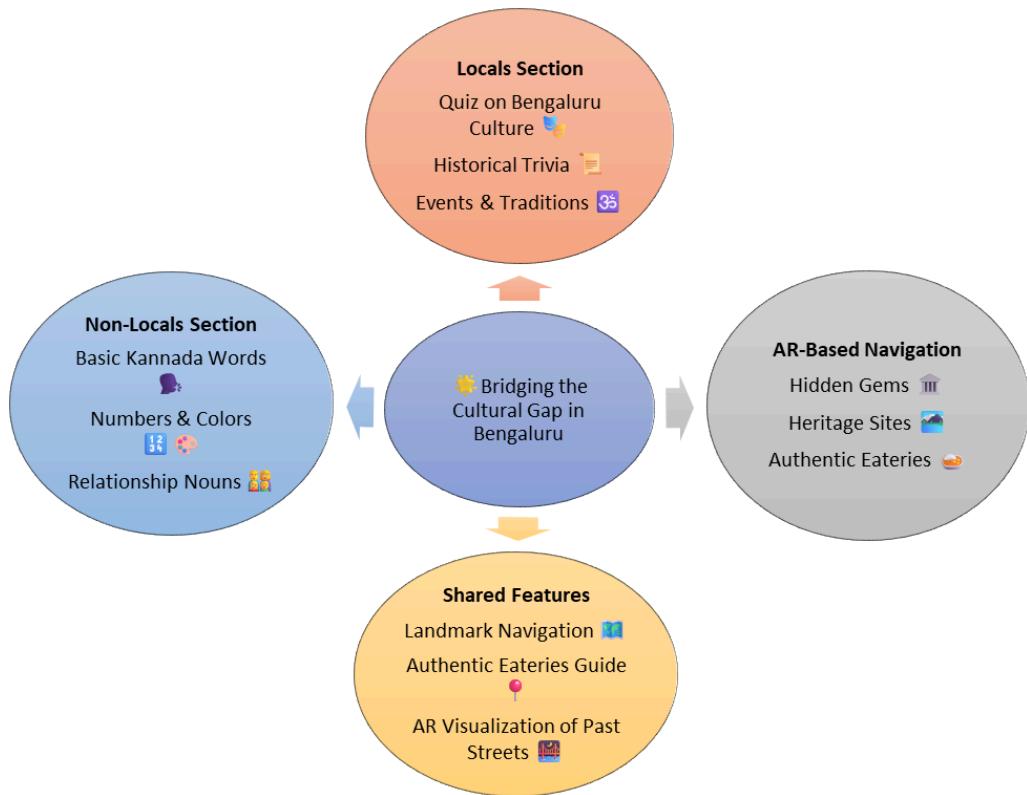
**Storyboarding** - It is an ideation technique that visually represents ideas, user journeys, or processes through sequential drawings or sketches, helping teams communicate concepts, understand experiences, and refine solutions in a creative, engaging way.



**Mind Mapping** - Mind Mapping is an ideation technique that organizes ideas visually around a central concept, using branches to represent related thoughts, fostering creativity, clarity, and connections between ideas for problem-solving or planning.



Brainstorming - It encourages individuals or groups to generate as many ideas as possible in a free-flowing and non-judgmental environment. The goal is to foster creativity, allowing participants to share even unconventional or seemingly impractical ideas, as they might spark new insights or lead to innovative solutions.



Worst Possible Idea - The Worst Possible Idea ideation technique encourages participants to deliberately brainstorm absurd, impractical, or "bad" ideas, which can spark creativity and lead to innovative, unexpected solutions.

We chose a basic webpage as our worst possible idea because it would turn an exciting cultural exploration into a bland, static experience, completely missing the immersive and dynamic connection that AR can offer.



### An Exhaustive List of Ideas :

- AR Historical Overlays: Visualize how a landmark or street looked in the past through AR.
- Gamified Cultural Quests: City-wide scavenger hunts or quests to explore cultural sites, with rewards.
- Festive AR Experiences: Special AR animations during festivals like Diwali or Karaga.
- Interactive Cultural Stories: Audio-visual storytelling triggered by specific landmarks using AR.
- Virtual Walkthroughs: AR-enabled guided tours of heritage sites for immersive experiences.
- Live Cultural Event Alerts: Notifications for events and festivals happening nearby.
- Multilingual Cultural Insights: Information about landmarks and events in multiple languages.
- Language Games: Gamified learning modules to practice basic Kannada phrases.
- Cultural Etiquette Tips: Short tutorials on local customs and traditions to avoid cultural faux pas.
- Offline Maps with AR Features: Ensure usability in low-connectivity areas.
- AR Food Spotlights: Overlay information about famous dishes at a restaurant through AR.
- Crowd Monitoring for Eateries: Real-time AR updates showing how busy a restaurant is.
- Cultural Shopping Trails: Highlight old Bengaluru streets known for unique crafts or goods.
- Dish Recommender: Users can upload photos to get recommendations for similar dishes nearby.
- Recipe AR Stories: AR-triggered videos showing how popular Bengaluru dishes are made.
- User-Generated Content: Allow users to share hidden gems, reviews, or stories.
- Cultural Trivia Challenges: Quizzes and trivia for locals and tourists to test their knowledge.
- Photo Contests: Encourage users to upload photos of cultural spots with rewards for the best ones.
- Daily Challenges: Discover specific places or try certain dishes for rewards.
- Themed Hunts: Festive or cultural-themed scavenger hunts.
- Bengaluru Explorer Badge: Award badges for exploring a certain number of sites.
- Quiz Leaderboard: Rank users based on quiz performance for local pride.
- Include short stories or trivia about landmarks and local culture.
- Provide downloadable PDFs or static maps with heritage trails and food recommendations.
- Categorized translations with audio for pronunciation help (e.g., numbers, colors, greetings).
- Simple digital flashcards for non-locals to learn essential Kannada phrases.
- Use Google Maps API to provide directions without custom AR or advanced routing.
- Pin lesser-known places on the map with user-submitted recommendations.
- A curated list of authentic eateries, including their names, addresses, and dishes.
- Integrate a calendar of cultural events and festivals happening across the city.
- Highlight shopping streets and old markets with descriptions of what to explore there.
- Display user ratings for places, allowing others to decide where to visit.

- Enable an SOS button for emergencies, providing immediate access to help.
- Include a "hidden gems" map layer curated by locals and frequent users.
- Offer a progressive web app for lightweight access without a full app installation.
- Use AR overlays to display real-time information about eateries, like wait times or specialties.
- Add a feature to create custom travel itineraries based on user preferences.
- Include static and interactive maps to guide users to Bengaluru's cultural hubs
- Showcase video or audio-guided tours of popular heritage sites.

## CHAPTER -4 : PROTOTYPING

### 4.1 INTRODUCTION TO PROTOTYPING

Prototyping is a critical phase in the design thinking process, enabling developers to visualize, test, and refine ideas before full implementation. For "Aantarya," a web app designed to help locals and non-locals connect with Bengaluru's culture, prototyping was essential to validate user interactions, ensure cross-platform compatibility, and refine its features.

The web app's goal is to offer seamless user experiences across devices, combining AR elements, navigation, and cultural content in a lightweight and accessible format. Prototyping allowed the team to test the practicality of features, such as AR-based exploration, interactive quizzes, and cultural content delivery, in a web environment.

#### 4.1.1 List of Options available for prototyping :

##### ❖ Local Stories and Culture Hub (Blog & Video Series)

###### Description:

This prototype focuses on creating a centralized content hub that immerses users in Bengaluru's diverse cultural fabric. The hub would host curated blogs, articles, and video series covering various aspects of the city's traditions, neighbourhoods, and local history. Stories could include interviews with local residents, shop owners, and artisans, providing first-hand insights into Bengaluru's identity.

The video series could feature guided walkthroughs of iconic neighborhoods, food trails, or lesser-known cultural events. Additionally, hidden stories about specific landmarks, historical events, or personal anecdotes from locals could make the experience deeply engaging. This feature is designed to appeal to both locals, who might rediscover their city, and non-locals, who wish to connect more meaningfully with Bengaluru. The hub could also allow user contributions, fostering a collaborative platform for cultural storytelling.

##### ❖ Gamified City Challenges and Quests

###### Description:

This option gamifies cultural exploration, making it an interactive and engaging experience for users. Players would embark on quests across Bengaluru, completing tasks that challenge their knowledge of the

city's culture, history, and landmarks. Activities might include solving puzzles related to specific locations, answering trivia about local traditions, or finding AR-hidden objects at historical sites or famous eateries.

Each completed challenge would unlock rewards such as badges, points, or digital souvenirs that encourage continued participation. The gamified feature is particularly appealing to younger users and tourists looking for a fun way to explore. For locals, it provides an opportunity to test their knowledge of the city while revisiting familiar places in a new light. Challenges could be designed around themes such as "Heritage Trails," "Food Hunts," or "Festival Quests," ensuring variety and sustained interest.

#### ❖ Event Calendar and Live Updates

##### Description:

This prototype revolves around an interactive event calendar that keeps users updated about Bengaluru's vibrant cultural life. The calendar would feature a wide range of events, from popular festivals and performances to lesser-known exhibitions, workshops, and local community gatherings.

Users could view event details such as schedules, locations, and ticketing options, with filters to customize their preferences. For example, they might search specifically for food festivals, live music performances, or neighborhood fairs. Push notifications would alert users about events happening nearby or ones they've marked as "interested."

The calendar could also integrate a social aspect, allowing users to share events with friends or plan group visits. By spotlighting lesser-known cultural gatherings alongside popular events, this feature encourages users to engage with Bengaluru's diverse communities and traditions.

#### ❖ AR-Based Navigation for Authentic Eateries and Street View for Popular Places

##### Description:

This prototype integrates augmented reality (AR) and street view technology to enhance the user's exploration of Bengaluru. AR is specifically implemented for showcasing **authentic eateries**, allowing users to discover famous food spots and their specialties interactively. When users point their camera at a listed eatery, AR overlays will display information such as recommended dishes, a brief history of the

establishment, and visual previews of the food. This feature helps non-locals identify the best places to experience Bengaluru's culinary culture, making it easier to navigate the city's vibrant food scene.

For popular places and landmarks, the app incorporates street view navigation, providing a real-world, immersive experience. Users can virtually explore streets leading to iconic locations like Lalbagh Botanical Garden, Bangalore Palace, or Vidhana Soudha. Street view helps users familiarize themselves with the surroundings before visiting, ensuring easier navigation and a sense of connection to the destination.

This combination of AR for food exploration and street view for landmarks creates a seamless and engaging way for users to uncover Bengaluru's hidden gems and popular spots. By blending technology with cultural storytelling, the feature enriches the overall experience of both locals and non-locals.

#### **4.1.2 Prototype Selected :**

Why AR-Based Navigation for Authentic Eateries and Street View for Popular Places Fits Aantarya:

**Enhanced Culinary Exploration:** The integration of AR for authentic eateries offers users an interactive way to explore Bengaluru's vibrant food scene. It empowers non-locals to easily navigate and discover the city's diverse culinary offerings, while also providing locals with fresh insights into their favorite food spots. This bridges the gap between cultural exploration and everyday experiences, enriching users' understanding of Bengaluru's food culture.

**Immersive Experience for Landmarks:** The street view feature for popular landmarks enhances users' connection to Bengaluru's iconic destinations. By providing a virtual preview of the surroundings, it makes navigation easier and more engaging. Users can experience the city from the comfort of their own homes, fostering a sense of familiarity and excitement about visiting these places in person. This immersive approach adds value for both locals and non-locals, encouraging exploration of well-known and hidden gems alike.

**Blending Technology with Tradition:** This feature aligns with Aantarya's vision of combining technology with cultural storytelling. By using AR and street view, users can dive deeper into Bengaluru's food culture and iconic landmarks, making the experience not just informational, but also interactive. The seamless integration of these technologies with Aantarya's existing platform creates a holistic and dynamic exploration experience, enhancing the overall user journey.

By introducing AR-based navigation for eateries and street view for landmarks, Aantarya offers a more engaging, informative, and immersive way to discover Bengaluru, blending modern technology with the city's rich cultural heritage.

#### **4.1.3 Challenges and Learnings :**

##### **Challenges:**

1. Accuracy of AR Content: Ensuring that AR overlays for eateries and landmarks provide accurate and useful information in real-time.
2. User Experience Design: Balancing user-friendly navigation with immersive AR features for both locals and non-locals, ensuring ease of use without overwhelming the user.
3. Data Integration: Compiling and maintaining a reliable database of authentic eateries, popular places, and quiz content, which requires constant updates and accuracy.
4. Cultural Sensitivity: Presenting content that is respectful and inclusive of Bengaluru's diverse traditions, while catering to both locals and tourists.

##### **Learnings:**

1. User Engagement: Interactive features like AR navigation and quizzes significantly enhance user engagement and interest, creating a more personalized and memorable experience.
2. Tech Integration: Seamlessly integrating AR and street view into the app can enrich the experience but requires careful planning and testing to avoid technical glitches.
3. Cultural Adaptation: Understanding the importance of offering content that resonates with both locals and non-locals, enhancing their cultural connection to Bengaluru.
4. Collaboration Across Teams: Developing features like the quiz and AR-based navigation required close collaboration between content creators, tech developers, and cultural experts to ensure accuracy and cultural relevance.

## **4.2 PROTOTYPE IMPLEMENTATION**

The prototype of the Aantarya web app was developed with the goal of providing an immersive and interactive experience that bridges the cultural gap between locals and non-locals in Bengaluru. The app was designed with three main sections: one for locals, one for non-locals, and a shared section accessible to both user groups. The following is a detailed implementation of each section and its features:

### **1. User Segmentation:**

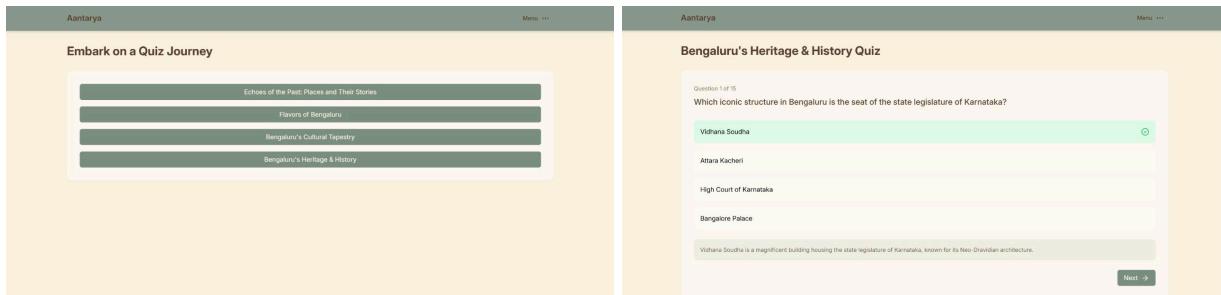
- The Aantarya app features three sections, each tailored to different user needs:
  - **Local Section:** Designed to engage Bengaluru's residents with quizzes about their city's culture, history, and heritage.
  - **Non-Local Section:** Offers tools to help visitors understand the local language, Kannada, and provides essential cultural information.
  - **Shared Features Section:** A common space accessible by both locals and non-locals, featuring navigation to popular places and authentic eateries.



### **2. Local Section:**

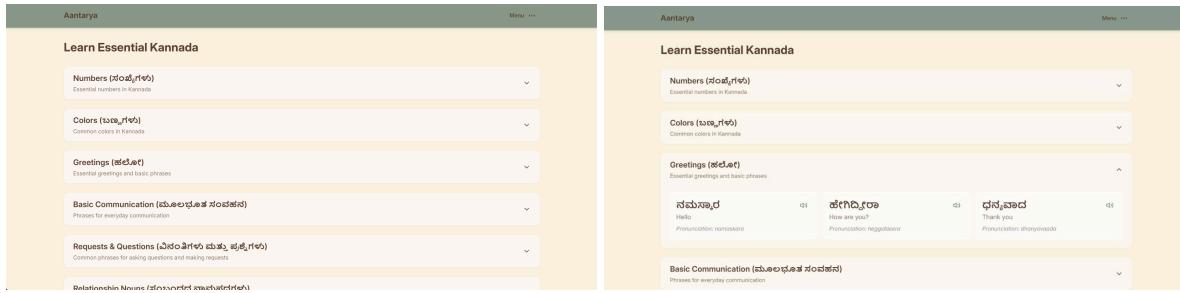
- **Quiz Feature:** The Local section contains a quiz designed to engage Bengaluru's residents with questions about the city's culture, history, and landmarks. The quiz consists of 10 questions, divided into five themes:

- **Echoes of the Past:** Focuses on the city's places and their stories.
- **Flavours of Bengaluru:** Questions related to Bengaluru's food culture.
- **Bengaluru's Cultural Tapestry:** Covers traditions, festivals, and cultural elements.
- **Bengaluru's Heritage & History:** Deals with historical events and heritage sites.
- **Authentic Places & Events:** Focuses on key places and cultural events that define Bengaluru.
- **Immediate Feedback:** After each question, users receive immediate feedback showing whether their answer is correct or incorrect. The score is displayed at the end, encouraging further participation and engagement.



### 3. Non-Local Section:

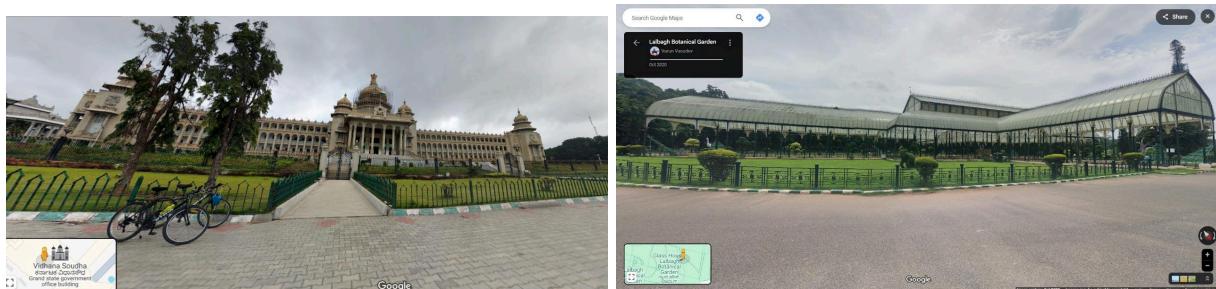
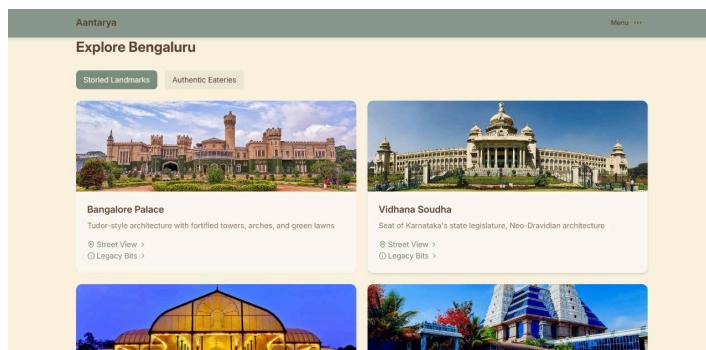
- **Kannada Basics:** The Non-local section provides an introduction to basic Kannada, aimed at helping non-locals communicate easily while exploring Bengaluru. The section includes:
  - **Words and Phrases:** Essential words and phrases for navigating daily life in Bengaluru.
  - **Numbers & Colors:** Commonly used numbers and color names in Kannada.
  - **Relationship Nouns & Vegetables:** Terms related to family relationships and common vegetables in Kannada.
- **Pronunciation Guide:** Each word and phrase is accompanied by its pronunciation in both English and Kannada to help non-locals learn the correct pronunciation.
- This feature ensures non-locals can quickly adapt to their surroundings and feel more connected to the city's local culture.



**4. Shared Features Section:** This section is designed for both locals and non-locals to explore Bengaluru's landmarks and eateries, providing an interactive and informative experience for all users.

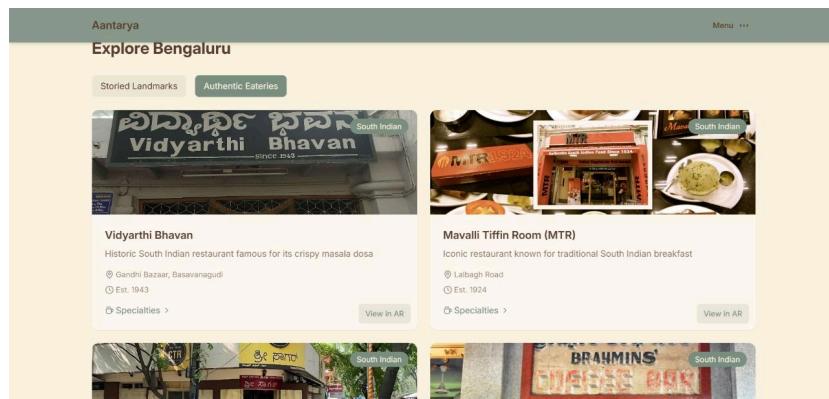
- **Storied Landmarks (Places):**

- **Content:** This subsection includes a list of key landmarks, shopping streets, temples, and cultural sites in Bengaluru. Each place is accompanied by a brief description to help users understand its cultural and historical significance.
- **Street View Navigation:** Users can explore these landmarks virtually through street view technology. This feature enables users to familiarize themselves with the area before visiting the places in person, providing an immersive experience of Bengaluru's iconic spots such as Lalbagh Botanical Garden, Bangalore Palace, and ISKCON Temple.



- **Authentic Eateries:**

- **Content:** A curated list of Bengaluru's authentic eateries is provided in this subsection, with detailed information including the name, address, establishment date, and food specialties of each eatery.
- **AR Food Preview:** An augmented reality (AR) feature is integrated for each eatery. By pointing their device's camera at the restaurant, users can access AR overlays that display key information, such as recommended dishes, a brief history of the eatery, and visual previews of the food items served.
- This feature enables users to engage with the eateries before visiting, offering a dynamic way to explore the city's diverse culinary offerings.



## 5. Technological Integration:

- **Augmented Reality (AR):** The AR feature is integrated into both the Authentic Eateries and Storied Landmarks sub-sections. For eateries, AR allows users to explore the dishes and food items visually, enhancing their decision-making experience. For landmarks, AR helps in creating a more engaging experience by providing information when users interact with specific places via their device's camera.
- **Street View:** The street view feature is incorporated into the Landmark navigation, allowing users to explore and familiarize themselves with Bengaluru's streets and landmarks before their physical visit.

## **6. Testing and Feedback:**

- The prototype underwent multiple phases of testing to ensure the functionality of each feature, particularly the AR and navigation capabilities. During testing, feedback was collected from initial users to assess user engagement and experience. This feedback was used to refine the app's performance and ensure the features were both user-friendly and culturally relevant.
- The development team worked closely with cultural experts to ensure the content accurately represented Bengaluru's diverse traditions, food culture, and history.

For Source Code , please visit : <https://github.com/AkshathaN17/Aantarya>

### **4.3 TOOLS & TECHNOLOGY USED**

→ Frontend Framework:

The project leverages React 18 for building dynamic and interactive user interfaces, combined with TypeScript for type-safe development, ensuring fewer runtime errors and better maintainability.

→ Development and Build Tool:

Vite is used as the development and build tool, providing a fast development server and optimized production build with support for modern JavaScript features. The configuration (`vite.config.ts`) includes React plugin integration and dependency optimization.

→ Styling and Design:

- ◆ Tailwind CSS is employed for responsive and utility-first styling. The custom theme (`tailwind.config.js`) defines additional colors and fonts to align with the project's design needs.
- ◆ The layout ensures a mobile-first design with minimal effort, thanks to Tailwind's flexibility.

→ Code Quality and Linting:

- ◆ ESLint is configured with TypeScript support and specific React hooks linting to maintain consistent and high-quality code.
- ◆ Scripts for linting (`npm run lint`) and building (`npm run build`) are defined in the `package.json` file.

→ Package Management:

npm is used for dependency management. Key dependencies include:

- ◆ react, react-dom: Core libraries for building the React app
- ◆ axios: For making HTTP requests
- ◆ lucide-react: For lightweight iconography

Development dependencies include tools like `@vitejs/plugin-react` and `typescript`.

→ Component-Based Architecture:

The application follows a modular, component-based architecture with components such as Navbar, Hero, and sections like LocalsSection and NonLocalsSection. This promotes code reuse and separation of concerns.

→ Data Handling:

The project uses TypeScript files (`placesData.ts`, `quizData.ts`, etc.) for managing static data. This approach ensures type safety and simplifies the integration of structured content into components.

→ Application Bootstrapping:

The entry point (main.tsx) initializes the React app using createRoot from react-dom/client and renders the App component inside a strict mode wrapper to highlight potential problems.

→ Configuration Files:

The following configuration files are crucial for development and build processes:

- ◆ tsconfig.json: Configures TypeScript compilation options
- ◆ vite.config.ts: Defines the Vite build settings and plugin usage
- ◆ tailwind.config.js: Specifies custom themes and content paths for Tailwind CSS
- ◆ eslint.config.js: Enforces coding standards and practices

→ Pronunciation Tool for Kannada:

The project includes a feature for Kannada pronunciation, which is powered by a Text-to-Speech (TTS) tool or service. This tool converts Kannada text into speech, enhancing the user experience for non-native speakers. The utility logic for audio processing is implemented in [audioUtils.ts](#).

## Chapter 5: Testing

### **5.1 Introduction to Testing**

Testing is a crucial phase in the design thinking process, focused on collecting feedback from users to understand their needs, preferences, and challenges better. It can be integrated with prototyping or approached as a standalone stage. Effective testing not only evaluates the functionality and usability of the prototype but also provides insights that can impact all stages of the design thinking process.

Testing helps build empathy by uncovering deeper user perspectives, which can refine the problem statement. It may also lead to unexpected insights, sparking fresh ideas in the ideation phase. Moreover, it often highlights areas for improvement, guiding the iteration or redesign of the prototype. Testing ensures the final solution aligns closely with user expectations and addresses their problems effectively, making it an iterative and user-centered approach.

#### **5.1.1 Types of testing done**

Testing was conducted through two primary methods: direct interactions with stakeholders and hands-on prototype evaluations.

##### **Stakeholder Interactions:**

To begin, we engaged in discussions with both Bengaluru natives and non-residents to understand their needs and gather feedback on the initial concept. The surveys focused on common challenges faced while exploring the city, desired features in a support app, and the usability of an app-based solution. Insights from these discussions highlighted key requirements, such as incorporating a street view of iconic and culturally significant locations. This step not only validated our concept but also helped us prioritize the most essential features for users.

##### **Prototype Evaluation:**

After developing the prototype, we carried out user testing with a selected group of participants, including both locals and visitors. These users were invited to explore the app's features, such as learning basic Kannada phrases, discovering notable places, and engaging with quizzes about

Bengaluru. Feedback was gathered through direct conversations, enabling us to assess the app's usability, functionality, and performance in real-world scenarios.

## **5.2 Validation**

The prototype underwent testing with feedback collected from two primary stakeholder groups: locals and non-locals. Their responses provided valuable insights for refining the app and tailoring its features to user needs.

### **Feedback from Locals:**

The local participants appreciated the accuracy of the Kannada phrases, emphasizing their utility in helping users communicate effectively in the local language. They also expressed enthusiasm for the AR feature integrated with restaurants, finding it innovative and engaging. However, they suggested improvements to the quiz section, recommending the inclusion of a wider variety of themes and genres to enhance user interest and engagement. Their feedback underscored the importance of expanding interactive elements to create a richer user experience.

### **Feedback from Non-Locals:**

Non-residents found the AR feature for restaurants particularly appealing, noting that it allowed them to preview food options visually before committing to a visit. This functionality was seen as a practical aid for exploring dining options in an unfamiliar city. On the other hand, they highlighted that the AR feature for places was less helpful and suggested that a street-view-based approach could offer greater utility and a more immersive experience. Their feedback highlighted the need to focus on practical and intuitive navigation tools for exploring Bengaluru's landmarks.

These responses from both stakeholder groups were instrumental in identifying areas of improvement and aligning the prototype more closely with user expectations.

## **5.3 Changes/ Modifications**

### **5.3.1 Updated Model Based on Feedback**

The feedback collected during testing provided valuable insights into areas requiring improvement for the app. A notable concern was the need to enhance the AR calibration, particularly for the restaurant preview feature, ensuring better alignment with real-world visuals and improving the overall user experience.

Non-locals shared that the AR feature for exploring places wasn't very useful and suggested using a street-view option instead, which they felt would work better. Both locals and non-locals also said the quiz section could be more interesting if it had more themes and topics to choose from.

In response to these insights, the prototype was updated to address these specific issues, incorporating user-driven enhancements to improve functionality and overall usability.

### **5.3.2 Adjusted Prototype**

Based on the feedback, the following updates were made to improve the app:

1. **Better AR for Restaurants:** The AR feature for restaurants was improved to show food options more clearly and align better with real-world visuals.
2. **Street View Added:** Based on suggestions, a street-view option was added to make exploring places easier and more helpful for users.
3. **Improvements in the Quiz section:** Various themes and numerous questions were added

These changes made the app more user-friendly and fixed key issues found during testing.

## **5.4 Testing Tools and Techniques**

For testing the app, direct user interactions were used as the primary tool. Feedback was gathered systematically through interviews, allowing users to provide detailed suggestions and report any difficulties they encountered while using the prototype. The prototype was also tested in real-world conditions to evaluate its accuracy in streetview and AR view of restaurants. Users

were asked to try conversing in the local language and explore places using the app, and their interactions were observed to identify areas for improvement.

### **5.5 Results**

The testing phase provided important insights into the functionality and usability of the app. Both locals and non-locals found the AR-based restaurant feature particularly helpful, as it allowed users to preview food options visually before visiting. Feedback also emphasized the need for a simpler, more intuitive interface, leading to significant design improvements. The updated version of the app, featuring a new street-view option for places and an enhanced quiz section, was re-tested and received positive feedback from most participants, confirming that the changes resolved the initial concerns effectively.

### **5.6 Visual Representations**



## Chapter 6: Conclusion and Reflection

### **6.1.Conclusion**

This project set out to create an innovative application designed to bridge cultural, linguistic, and navigational gaps for users exploring Bengaluru. The app's primary focus was to provide locals and non-locals with a seamless, engaging, and practical tool for navigating the city while learning about its culture and cuisine. Leveraging features such as AR-based restaurant previews, interactive quizzes, and a newly added street-view option for places, the app addressed key user requirements identified during the testing phase.

The iterative process of design and development played a crucial role in refining the app. Initial feedback revealed areas for improvement, such as enhancing the AR calibration for restaurants, simplifying the user interface, and adding features that better align with user preferences. Each iteration was an opportunity to incorporate this feedback, ensuring the app was not only functional but also intuitive and enjoyable to use.

The response to the final prototype was overwhelmingly positive. Participants appreciated the interactive and visually appealing features, such as the ability to preview dishes at restaurants through AR. The addition of street-view navigation significantly enhanced usability for non-locals, making the app more practical for exploring iconic locations. Furthermore, the revamped quiz section added an element of fun, engaging users while helping them learn about the city's rich culture.

This project underscored the importance of user-centered design and the iterative development process in creating impactful solutions. While there remains room for future enhancements, such as expanding the database of cultural insights or incorporating multilingual support, the current prototype stands as a robust foundation for future iterations. The project exemplifies how technology, when combined with empathy and innovation, can address real-world challenges and foster a deeper connection between users and their environment.

## **6.2.Reflection**

Working on this project has been a deeply enriching experience, blending technical development with creative problem-solving and user-centered design. One of the most significant takeaways from this journey has been the invaluable role of user feedback. Engaging with stakeholders, both locals and non-locals, provided insights that shaped every stage of the app's evolution. Their input not only informed our design decisions but also emphasized the importance of empathy in understanding diverse user needs.

The iterative nature of the project presented both challenges and opportunities. Each testing phase brought to light new areas for improvement, such as the need for better AR calibration and a more user-friendly interface. Addressing these challenges required a careful balance between technical feasibility and user satisfaction. For example, implementing the street-view feature demanded a shift in focus from AR-based navigation to a more practical solution, showcasing the need for adaptability in problem-solving.

The technical aspects of the project, including AR integration and user interface design, were equally rewarding. They pushed us to explore new tools and refine our skills, ensuring the app was both functional and engaging. Collaboration played a critical role throughout, as team members brought unique perspectives and expertise to the table, enabling us to overcome hurdles effectively. This project also reinforced the importance of clear communication and shared goals in achieving a successful outcome.

Beyond the technical achievements, this project offered a profound understanding of the impact of technology in fostering cultural appreciation and simplifying everyday challenges. It highlighted the potential of design thinking as a powerful framework for creating meaningful solutions that resonate with users. Moving forward, the lessons learned from this experience will continue to influence how we approach future projects, making us more empathetic, resourceful, and innovative in tackling complex problems.