



Lingual Leap

By:

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Part 1: Define the App

Step 1.1: Define the App Based on a Trigger Point

Trigger Point: Respond to an Opportunity

Opportunity Description:

In an increasingly globalized world, effective communication across different languages is more important than ever. Whether for travel, business, education, or social interactions, people frequently encounter language barriers that can hinder understanding and collaboration. The opportunity lies in creating an innovative app that leverages advanced translation technologies to bridge these gaps and facilitate seamless communication.

Step 1.2: Generate System Vision Document

Problem Description:

Language barriers pose significant challenges in international travel, global business, cultural exchange, and everyday communication. These barriers can lead to misunderstandings, missed opportunities, and decreased accessibility to information and services. Existing solutions often lack real-time capabilities, offline functionality, or user-friendly interfaces, leaving a gap in the market for a comprehensive language translation tool.

System Capabilities:

- Real-Time Language Translation: Users can speak or type into the app to receive instant translations in multiple languages.
- Offline Translation Mode: Allows users to access translation features without an internet connection, using locally stored language data.
- Text-to-Speech Conversion: Converts written text into spoken words in the selected language, enhancing communication for both visual and auditory learners.
- Speech-to-Text Conversion: Converts spoken language into written text, facilitating message composition and note-taking.

- Document and Email Translation: Users can upload documents or copy email text for translation, making it easier to handle multilingual correspondence.
- Language Learning Exercises: Provides interactive exercises to help users practice vocabulary, pronunciation, and grammar in different languages.
- Interpretation in Social Settings: Enables real-time interpretation during conversations, helping users communicate seamlessly in social or professional environments.
- Educational Content Translation: Translates educational materials, making learning resources accessible in various languages.
- Business Communication Support: Assists in translating business documents, presentations, and emails to enhance international business communications.
- Tourist Assistance: Helps travelers navigate foreign environments by translating signs, menus, and directions.

Business Benefits:

- Facilitating Seamless Communication for Travelers: Enhances the travel experience by enabling users to communicate effectively with locals, access services, and explore new cultures without language barriers.
- Enhancing Cultural Exchange: Promotes understanding and collaboration between people from different linguistic backgrounds, fostering a more connected and harmonious global community.
- Increasing Accessibility to Global Markets: Empowers businesses to engage with international clients and partners, expanding their reach and market opportunities.
- Reducing Misunderstandings and Conflicts: Minimizes the risk of miscommunication and misunderstandings, leading to smoother interactions and better relationships.
- Boosting Productivity and Efficiency: Helps individuals and organizations save time and resources by providing quick and accurate translations, facilitating efficient communication.

Part 2 : Define the App

Step 2.1: Generate User Stories

1. As a **frequent traveler**, I want to be able to communicate with locals in their native language in real-time, so that I can easily ask for directions, order food, and engage in conversations without language barriers.
 2. As a **business professional**, I need the ability to translate important documents and emails into multiple languages offline, so that I can effectively communicate with international clients and partners even when I'm not connected to the internet.
 3. As a **language learner**, I want to practice my listening and speaking skills by using the app's text-to-speech and speech-to-text features to convert written texts and spoken words between different languages.
 4. As a **tourist**, I want to explore foreign cities confidently by using the app's real-time translation feature to understand street signs, menus, and public transportation announcements in languages I'm not familiar with.
 5. As a **parent**, I want my children to have access to educational content in multiple languages, so that they can learn about different cultures and languages from an early age using the app's translation and language learning features.

6. As a **conference attendee**, I need to be able to understand presentations and engage with international speakers during Q&A sessions by using the app's real-time translation feature for spoken language.

 7. As a **customer service representative**, I want to provide support to international customers by using the app's translation capabilities to communicate with them in their preferred language via chat and email.

 8. As a **journalist**, I need to conduct interviews with people from diverse linguistic backgrounds, so I rely on the app's speech-to-text feature to transcribe spoken interviews into written text in different languages.

 9. As a **language teacher**, I want to create interactive lessons and exercises for my students using the app's text-to-speech and speech-to-text features to provide pronunciation practice and feedback.

 10. As a **remote worker**, I need to collaborate with colleagues from around the world, so I use the app's translation capabilities to communicate effectively in team meetings, brainstorming sessions, and project discussions.

Step 2.2: Generate User Cases

ID	Use Case	Description
1	Real-Time Language Translation	The user initiates real-time translation by speaking into the app's microphone or typing text. The app translates the input into the desired language and provides the translated text or spoken response instantly.
2	Offline Translation Mode	In scenarios where internet connectivity is limited or unavailable, the user activates offline translation mode. The app accesses locally stored language data to perform translations, ensuring uninterrupted communication even without an internet connection.
3	Text-to-Speech Conversion	The user inputs written text into the app, such as a document or message, and selects the desired language. The app converts the text into spoken words, allowing the user to listen to the content in their preferred language.
4	Interpreting for Deaf and Hard of Hearing Individuals	Sign language interpreters use the app to communicate with deaf and hard of hearing individuals who may not share the same spoken language, ensuring effective communication and access to information.
5	Language Identification	The user captures or uploads audio or text content in an unknown language. The app identifies the language and provides options for translation or further actions based on the detected language.

6	Interpretation in Social Settings	The user engages in conversations with others in social settings, such as meetings, gatherings, or casual interactions. They use the app to interpret spoken dialogue in real-time, facilitating communication between speakers of different languages.
7	Business Document Translation	The user interacts with the app to translate business documents, emails, or presentations into different languages to ensure clear and accurate communication in professional settings.
8	Tourist Assistance	The user navigates through unfamiliar locations while traveling. They utilize the app to translate signage, menus, or directions into their native language, enhancing their ability to explore and engage with local culture and attractions.
9	Language Learning Exercises	The user accesses language learning exercises within the app, such as vocabulary quizzes or pronunciation drills. They interact with the exercises by listening to spoken words, matching translations, or recording their own voice for pronunciation practice.
10	Language Tutoring and Feedback	The user engages in language tutoring sessions within the app, practicing speaking, listening, or writing skills. The app provides feedback on pronunciation, grammar, and vocabulary usage, helping the user improve their language proficiency through personalized exercises and assessments.
11	Multilingual Social Networking	The user interacts with others on a social networking platform within the app. The app supports multilingual communication, allowing users to post, comment, and engage with content in their preferred language while seamlessly translating interactions with users who speak different languages.

12	Cross-Cultural Business Negotiations	A business executive uses the app to bridge language gaps during international negotiations, ensuring mutual understanding and successful deal-making.	
13	Medical Interpretation	A healthcare provider communicates with patients from diverse linguistic backgrounds using the app to ensure accurate diagnosis and treatment recommendations.	
14	Legal Interpreting	A lawyer utilizes the app to communicate with clients and witnesses who speak different languages during legal proceedings, ensuring effective representation and comprehension of legal matters.	
15	Emergency Response	Emergency responders use the app to communicate with individuals in distress who speak different languages, ensuring prompt and accurate assistance during emergencies.	
16	Cultural Sensitivity Training	HR professionals use the app to deliver cultural sensitivity training to employees, helping them understand and respect cultural differences in the workplace.	
17	Language Access in Government Services	Government agencies use the app to provide language access services to citizens with limited English proficiency, ensuring equitable access to government programs and services.	

Fully Developed Use Cases:

1. UseCase : Language Learning Exercise

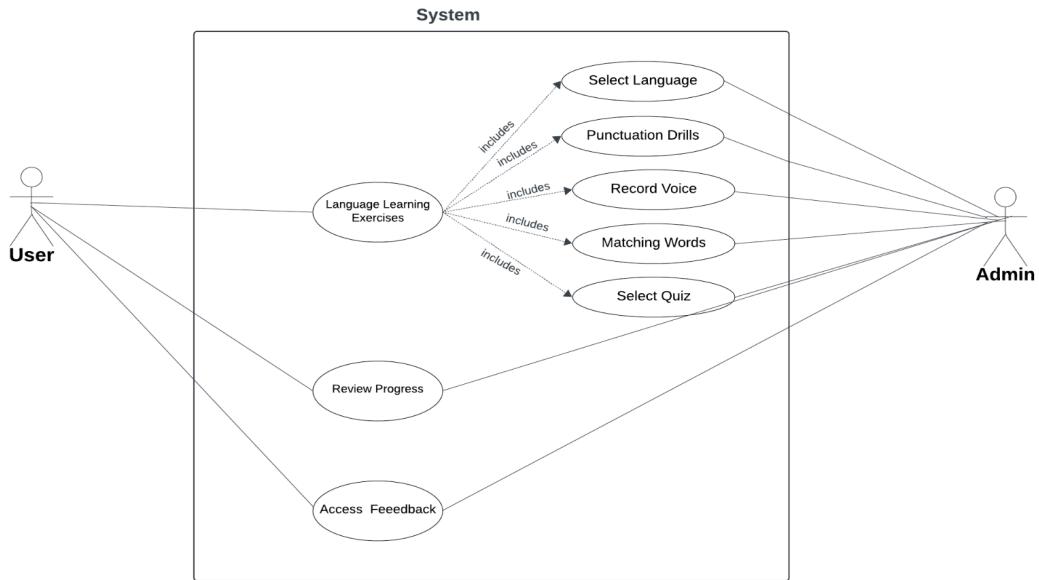
Use case name	Language Learning Exercises	
Scenario	The user accesses language learning exercises within the app, such as vocabulary quizzes or pronunciation drills.	
Triggering event	The user selects the language learning section in the app.	
Brief description	The user engages in various language learning exercises, interacting with the app to listen to spoken words, match translations, or record their own voice for pronunciation practice.	
Actors	User, System(app)	
Related use cases	Real-Time Language Translation, Speech-to-Text Conversion	
Stakeholders	Users	
Preconditions	The user is logged into the app. The app has language learning content available and functioning.	
Postconditions	The user completes language learning exercises and receives feedback. The user's progress is recorded and updated.	
Flow of activities	Actor	System
	1. User navigates to the language learning section of the app. 2. User selects a specific exercise (e.g., vocabulary quiz, pronunciation drill). 3. User interacts with the exercise (e.g., listens to words, matches translations, records voice). 4. User completes the exercise or proceeds to the next task. 5. User reviews feedback and suggestions for improvement.	1.1 The app displays available language learning exercises. 2.1 The app loads the selected exercise and presents the first task to the user. 3.1 The app processes the user's inputs and provides immediate feedback (e.g., correct/incorrect, pronunciation score). 4.1 The app updates the user's progress and stores performance data. 5.1 The app displays performance summary and personalized tips based on the user's performance.
Exception conditions	1. If the app fails to load an exercise, it should display an error message and suggest troubleshooting steps (e.g., check internet connection, restart app). 2. If the user encounters a technical issue (e.g., microphone not working), the app should provide guidance on how to resolve the issue.	

2. Use Case: Text-to-Speech Conversion

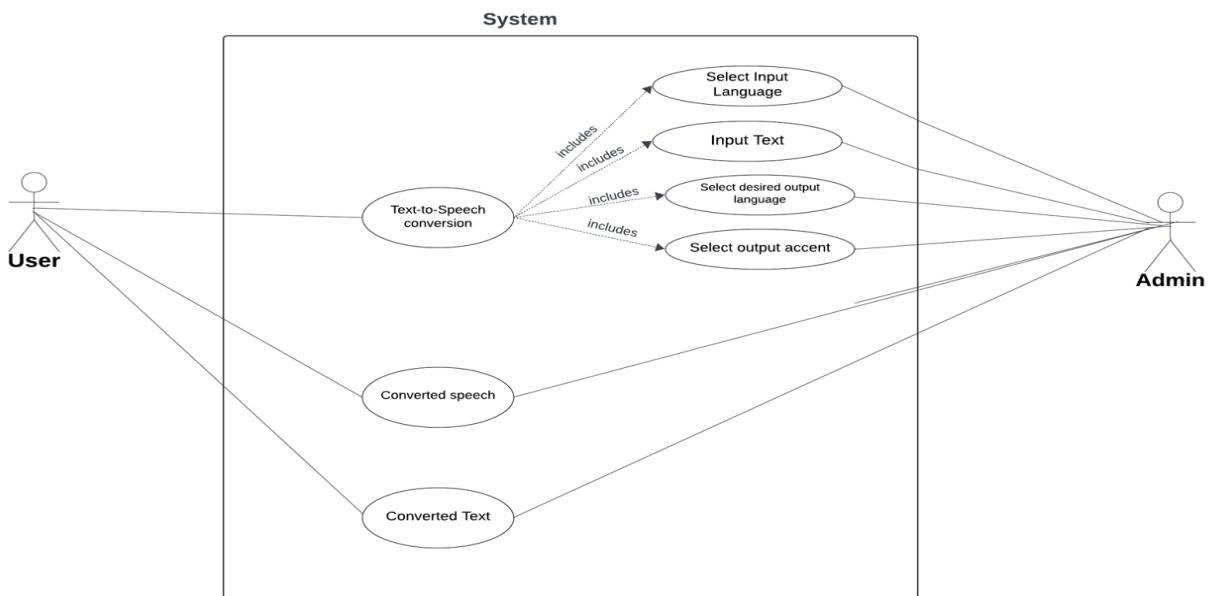
Use case name	Text-to-Speech Conversion	
Scenario	The user inputs written text into the app, such as a document or message, and selects the desired language.	
Triggering event	The user decides to open the app to use the Text to Speech conversion feature.	
Brief description	The user interacts with the app that provides a Text-to-speech conversion feature, allowing them to input written text, choose their preferred language, and then listen to the text being spoken aloud.	
Actors	User	
Related use cases	Real-Time Language Translation, Language Identification	
Stakeholders	User, System (App)	
Preconditions	<ol style="list-style-type: none"> 1. The user must have the app installed on their device. 2. The app must support text input and text-to-speech conversion. 	
Post conditions	<ol style="list-style-type: none"> 1. The text is successfully converted to speech in the selected language. 2. The user can listen to the spoken content without issues. 	
Flow of activities	Actor	System
	<ol style="list-style-type: none"> 1. User opens the app and navigates to the Text to Speech conversion feature. 2. User inputs written text into the provided text field. 3. User selects the desired language from a list of available languages and clicks the "Convert" button 4. User listens to the spoken content. 	<ol style="list-style-type: none"> 1.1 The app displays the Text to Speech conversion interface. 2.1 The app processes the input text. 2.2 The app prompts the user to select the desired language. 3.1 System converts the text into spoken words in the selected language. 4.1 System plays the converted speech
Exception conditions	<ol style="list-style-type: none"> 1. The app fails to launch or crashes immediately. 2. The text field does not accept input or deletes entered text unexpectedly. 3. The language list fails to load, or the selected language is not available. 4. The app fails to process the text or takes too long to convert it to speech. 	

Step 2.3: Generate User Diagrams

1. UseCase : Language Learning Exercises

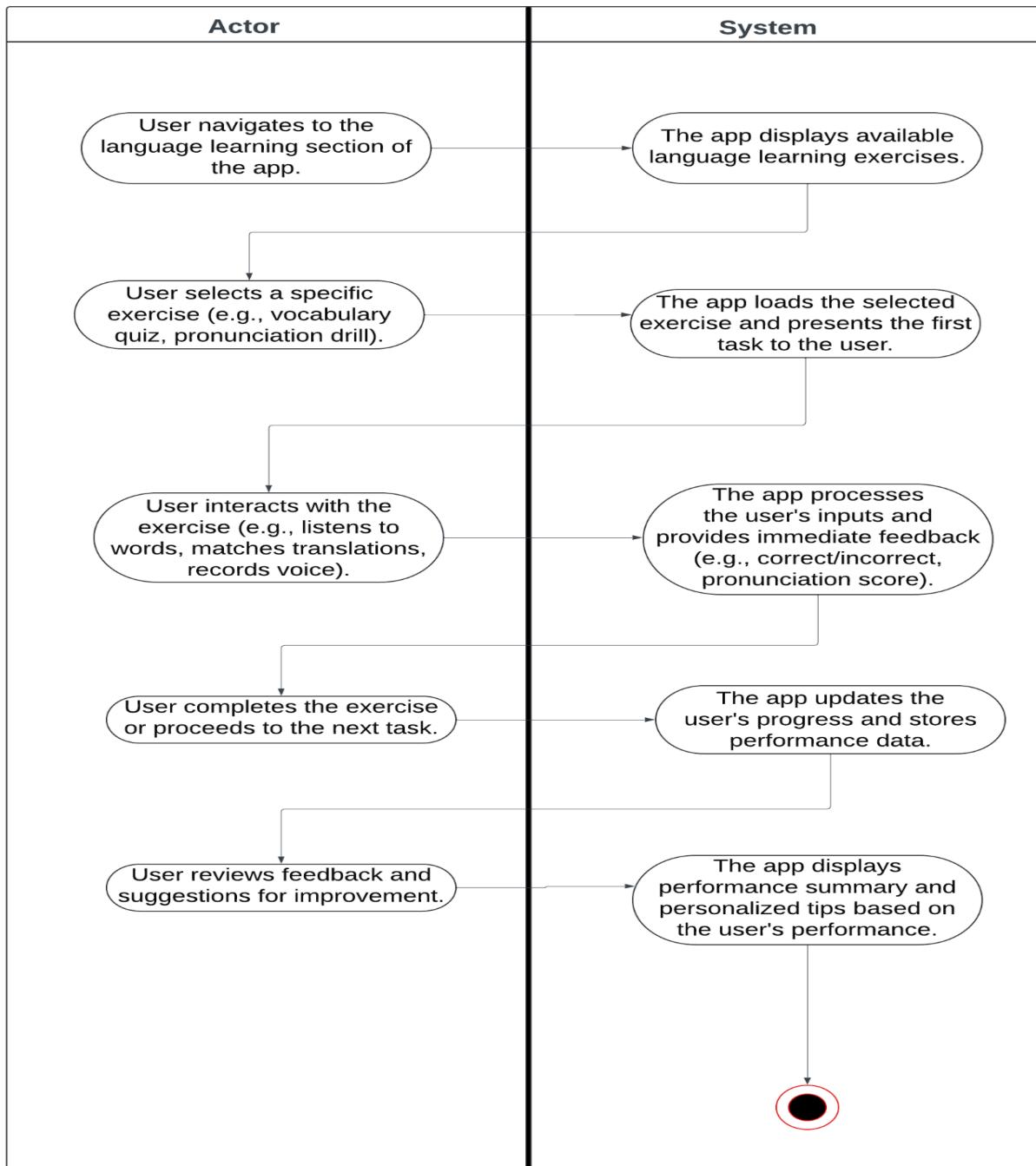


2. Use Case : Text-to-Speech Conversion



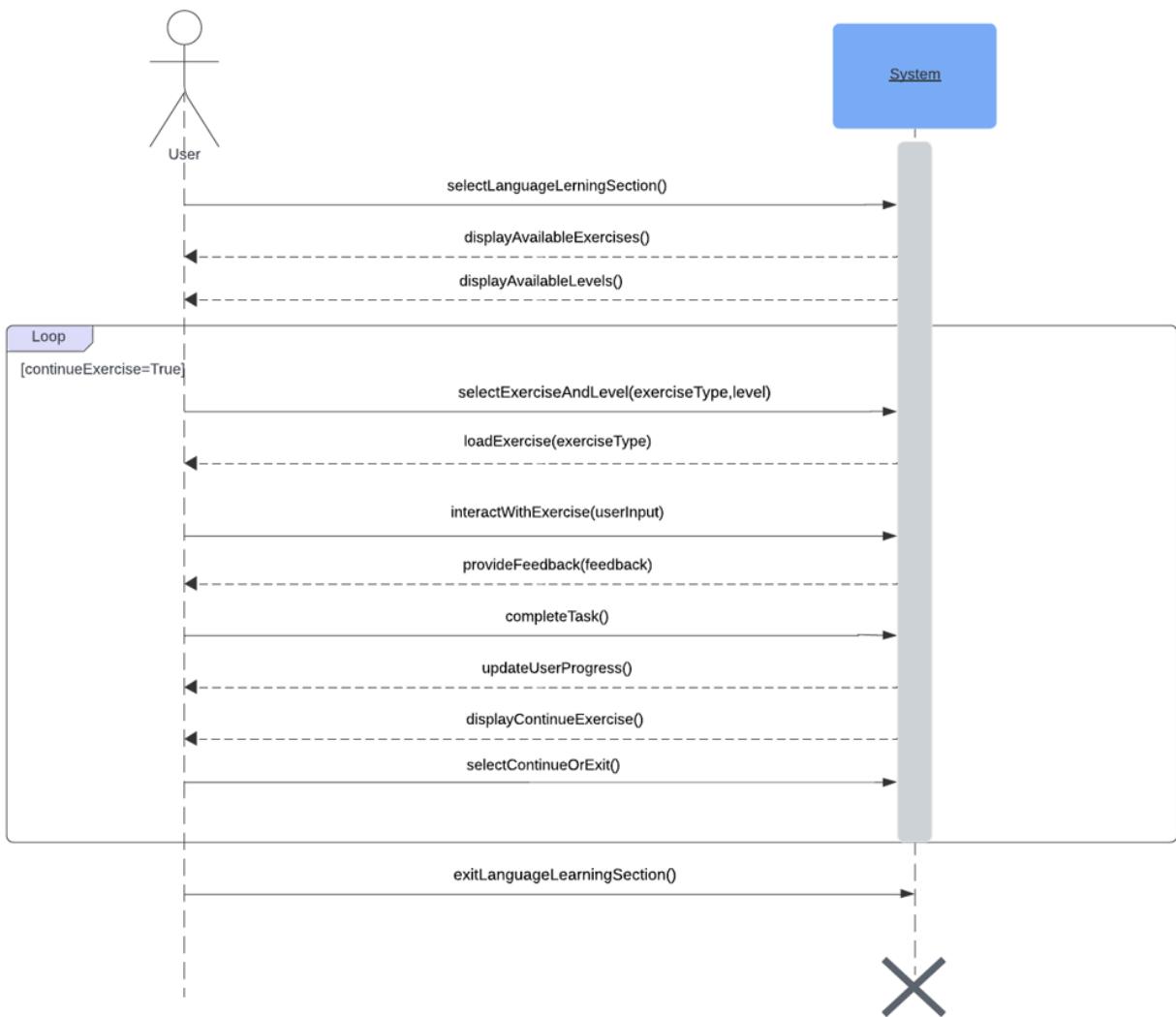
Step 2.4 : Generate Activity Diagrams:

1. UseCase : Language Learning Exercises



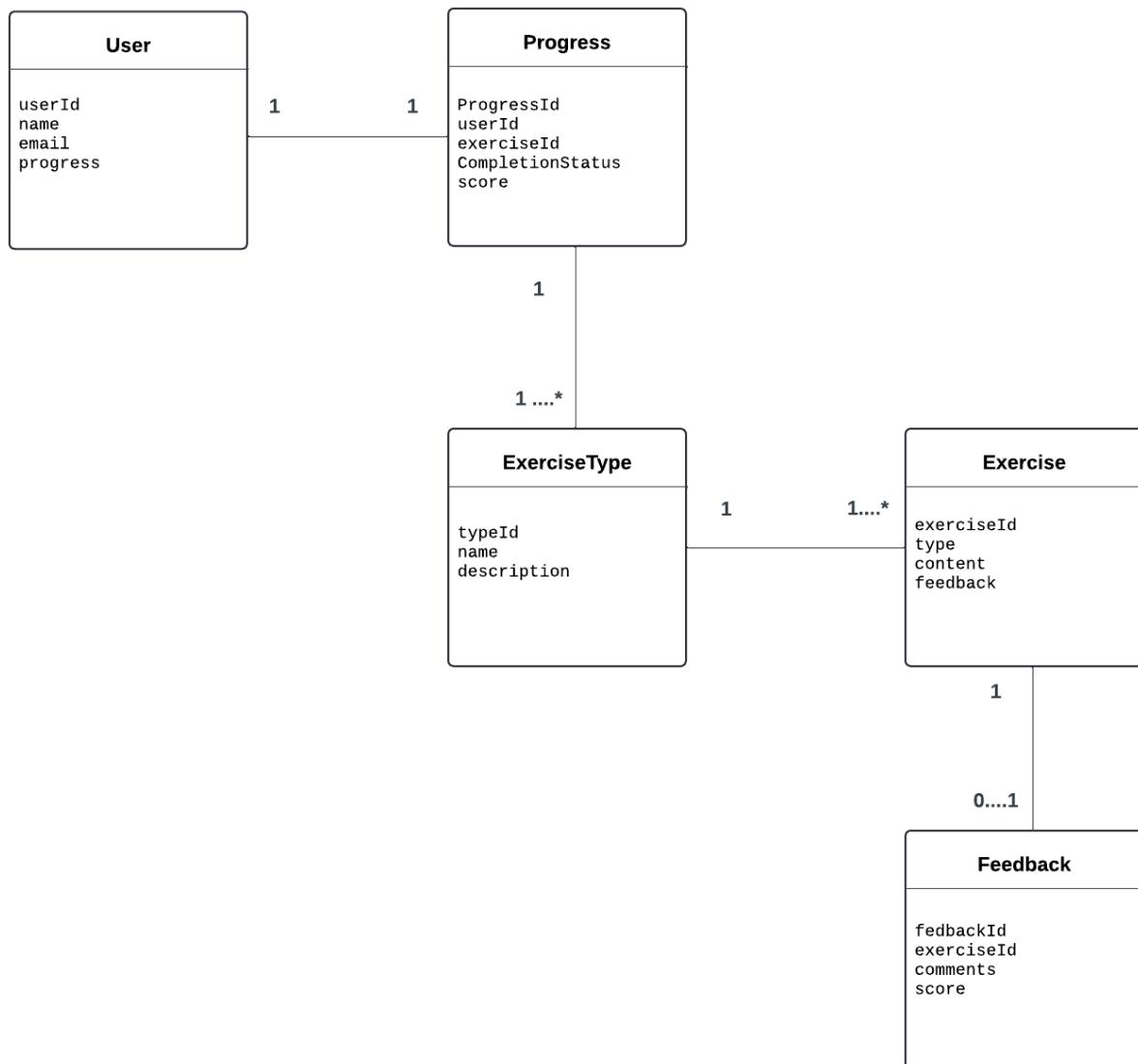
Step 2.5: System Sequence Diagrams

UseCase : Language Learning Exercises



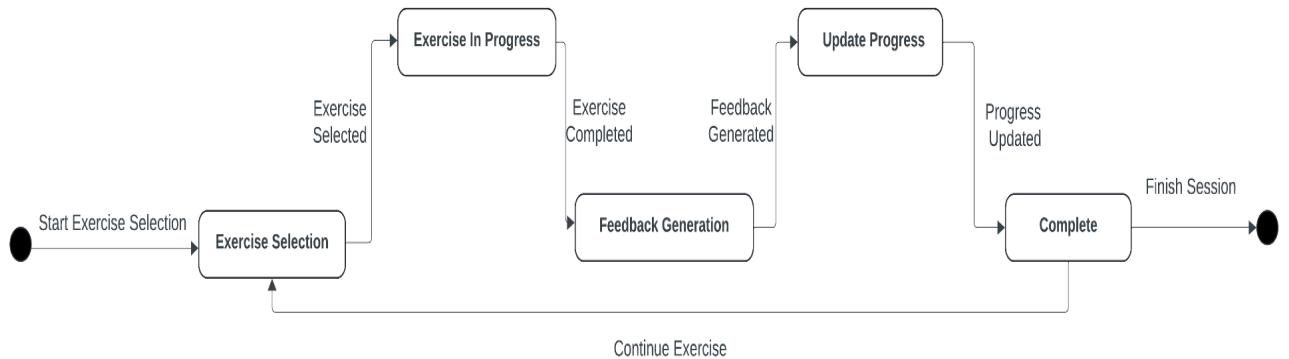
Step 2.6: Generate Domain Model Class Diagrams

UseCase : Language Learning Exercises



Step 2.7: Generate State Machine Diagrams

UseCase : Language Learning Exercises



Part 3: Cost Benefit Analysis Chart:

Step 3.1: Build a Cost/Benefit Analysis chart (and state your assumptions)

Assumptions:

I. Costs:

1. Initial development cost in Year 0: \$500,000
2. Operation and maintenance costs start at \$50,000 in Year 1 and increase by 10% annually.

II. Benefits:

1. Year 1: 50,000 users, with a 5% conversion to premium subscriptions at \$49.99/year. Ad revenue starts at \$0.10 per user per year.
2. Year 2-5: User base grows by 20% annually, with a 7% conversion rate to premium subscriptions. The subscription price remains at \$49.99. Ad revenue per user increases by 10% each year.

III. Calculation:

1. Premium Subscription Revenue

Premium subscription revenue = Number of users × Conversion rate × Subscription fee

2. Ad Revenue

Ad revenue = Number of users × Ad revenue per use

3. Total Benefits

Total benefits = Premium subscription revenue + Ad revenue

4. Net Cash Flow

Net Cash flow = Total Benefits - (Operation / Maintenance Costs)

5. Discount Factor

$1/(1+DiscountRate)^n$

6. Present Value

Present Value = Net Cash Flow × Discount Factor

IV. Financial Metrics:

1. Payback Period: The project recovers its initial investment by 3 years and 351 days

2. Net Present Value (NPV) \$ 214,574

3. Internal Rate of Return (IRR) 23%

4. Profitability Index (PI) 1.89

Cost Benefit Analysis						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost						
Development Cost	(500,000)					
Operating Cost		(50,000)	(55,000)	(60,500)	(66,550)	(73,205)
Total Cost	(500,000)	(50,000)	(55,000)	(60,500)	(66,550)	(73,205)
Discount Factor (10%)	1.00	0.9091	0.8264	0.7513	0.683	0.6209
PV of Cost	(500,000)	(45,454)	(45,454)	(45,454)	(45,454)	(45,454)
Cummulative PV of Costs	(500,000)	(545,454)	(590,908)	(636,362)	(681,816)	(727,270)
Benefit						
Tangible Benefits	0	129,975	216,558	260,662	313,839	377,984
Total Benefits		129,975	216,558	260,662	313,839	377,984
Discount Factor (10%)	1.00	0.9091	0.8264	0.7513	0.683	0.6209
PV of Benefits		117,977	178,974	195,839	214,356	234,698
Cummulative PV of Benefits		117,977	296,951	492,790	707,146	941,844
Cummulative PV of Benefit + Cost	(500,000)	(427,477)	(293,957)	(143,572)	25,330	214,574
Payback Period	3.96 years				i.e 3 Years 351 Days (0.96 * 365) = 351 days	
Net Present Value (NPV)	(500,000)	(427,477)	(293,957)	(143,572)	25,330	214,574
	(500000)	79975	161558	200162	247289	304779
IRR	23%					
Profitability Index	1.89%					

Step 3.2: Project Iteration Schedule

Iteration 1: Real-Time Language Translation (4 weeks)

Time Estimate: 4 weeks

Use cases assigned to iteration:

- Real-Time Language Translation
- Offline Translation Mode
- Text-to-Speech Conversion
- Interpreting for Deaf and Hard of Hearing Individuals
- Language Identification

Iteration 2: Interpretation in Social Settings (5 weeks)

Time Estimate: 5 weeks

Use cases assigned to iteration:

- Interpretation in Social Settings
- Business Document Translation
- Tourist Assistance
- Language Learning Exercises
- Language Tutoring and Feedback

Iteration 3: Multilingual Social Networking (6 weeks)

Time Estimate: 6 weeks

Use cases assigned to iteration:

- Multilingual Social Networking
- Cross-Cultural Business Negotiations
- Medical Interpretation
- Legal Interpreting
- Emergency Response

Iteration 4: Cultural Sensitivity Training (3 weeks)

Time Estimate: 3 weeks

Use cases assigned to iteration:

- Cultural Sensitivity Training
- Language Access in Government Services

Iteration 5: Collaboration and Connectivity (4 weeks)

Time Estimate: 4 weeks

Use cases assigned to iteration:

- Integration with Banking APIs
- Facilitate Collaborative Budgeting
- Expense Categorization through Machine Learning

Total Time Estimate: 22 weeks

Step 3.3: Build a Work Breakdown Structure

1. Project Planning (10 days)

- Define Project Scope
- Identify Stakeholders and Roles
- Establish Project Timeline
- Allocate Resources
- Risk Assessment and Mitigation Planning

2. Analysis Tasks (15 days)

- Market Research
- Define User Personas and Scenarios
- Gather Requirements (Functional and Non-functional)
- Prioritize and Refine Use Cases

3. Design Tasks (20 days)

- Information Architecture (Database Schema, Data Flow Diagrams)
- User Interface (UI) Design (Wireframing, High-Fidelity Mockups)
- System Architecture Design (System Components, Integration Points)
- Security Design (Authentication, Authorization, Encryption)

4. Build Tasks (60 days)

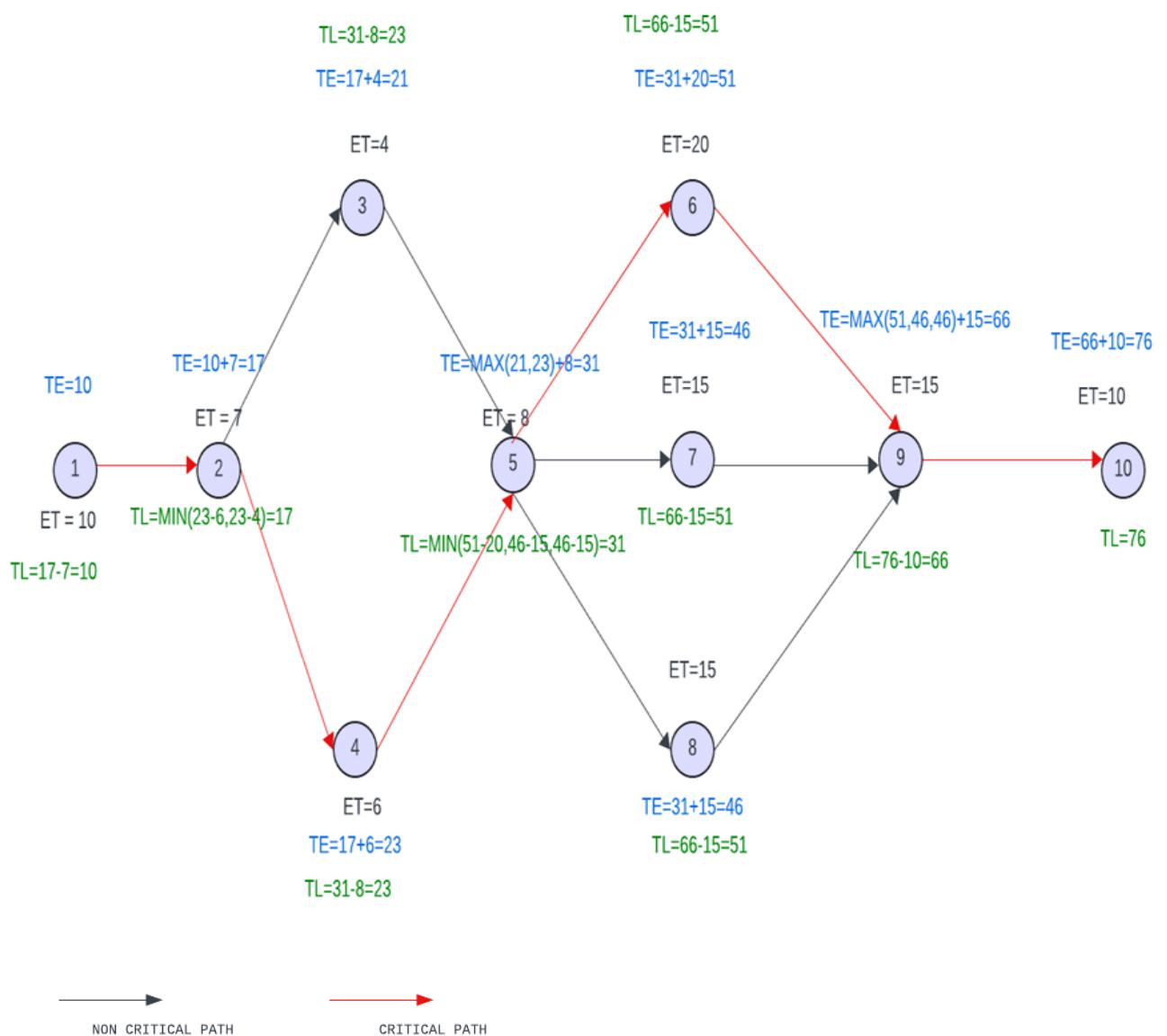
- Real-time Language Translation Module
- Interpretation in Social Settings Module
- Multilingual Social Networking Module
- Cultural Sensitivity Training Module
- Collaboration and Connectivity Module

5. Testing and Deployment Tasks (15 days)

- Develop Test Cases
- Unit Testing
- Integration Testing
- User Acceptance Testing (UAT)
- Deployment to App Stores
- Post-Deployment Monitoring

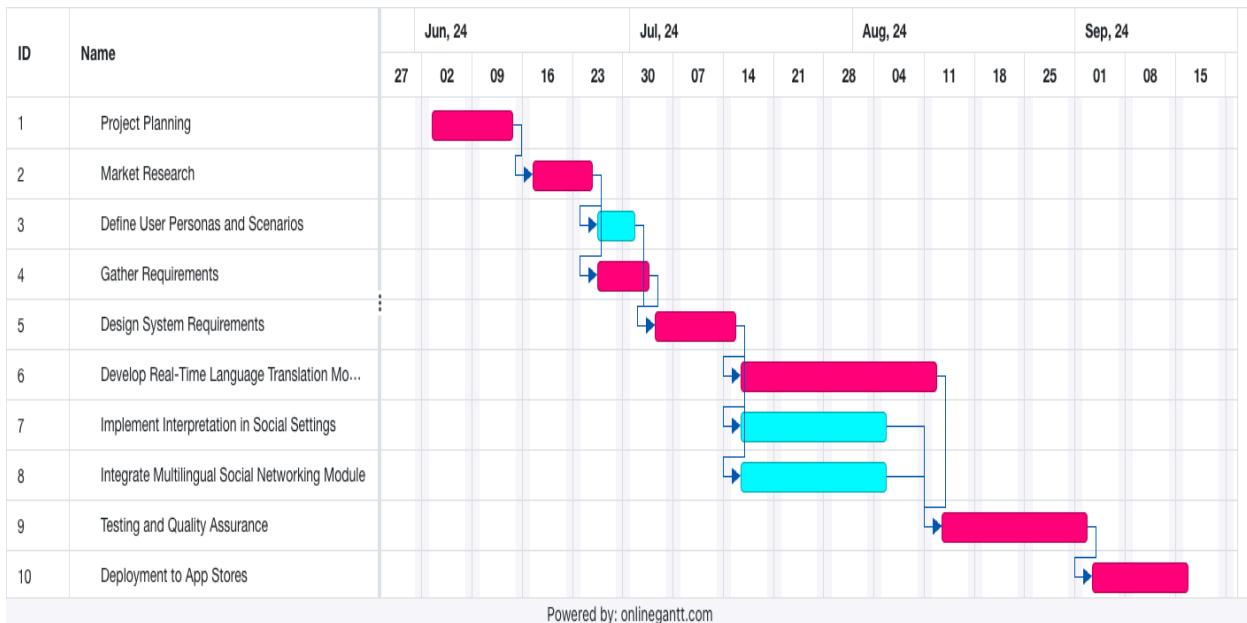
Overall Project Timeline:120 days

Step 3.4: Project Network Diagram



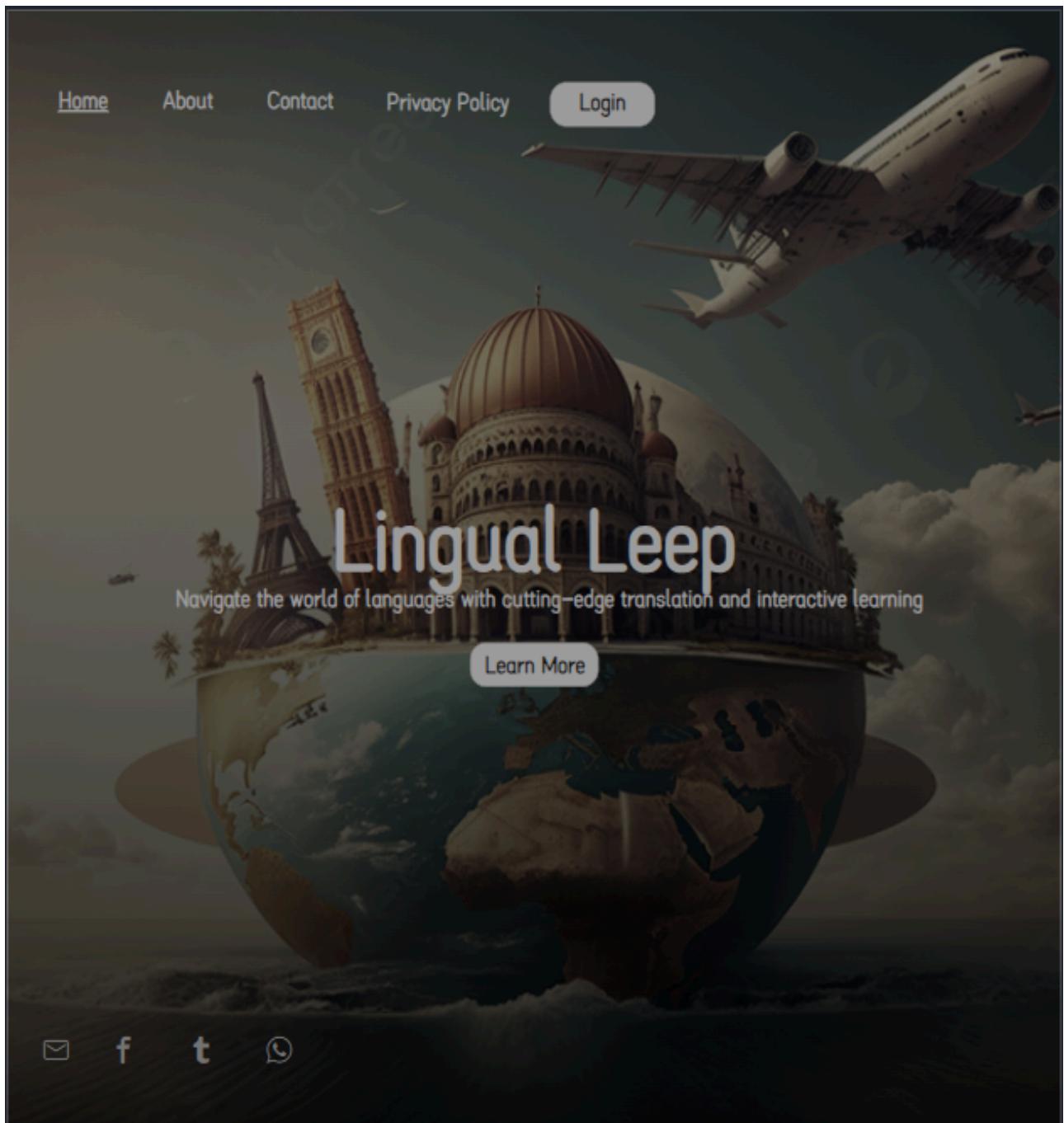
Activity	Preceding Event	Duration	TE	TL	Slack	Critical Path
1. Project Planning	-	10	10	10	0	Yes
2. Market Research	1	7	17	17	0	Yes
3. Define User Personas and Scenarios	2	4	21	23	2	No
4. Gather Requirements	2	6	23	23	0	Yes
5. Design System Requirements	3,4	8	31	31	0	Yes
6. Develop a Real-Time Language Translation Module	5	20	51	51	0	Yes
7. Implement Interpretation in the Social Settings Module	5	15	46	51	5	No
8. Integrate the Multilingual Social Networking Module	5	15	46	51	5	No
9. Testing and Quality Assurance	6,7,8	15	66	66	0	Yes
10. Deployment to App Stores	9	10	76	76	0	Yes

Step 3.5: Gantt chart

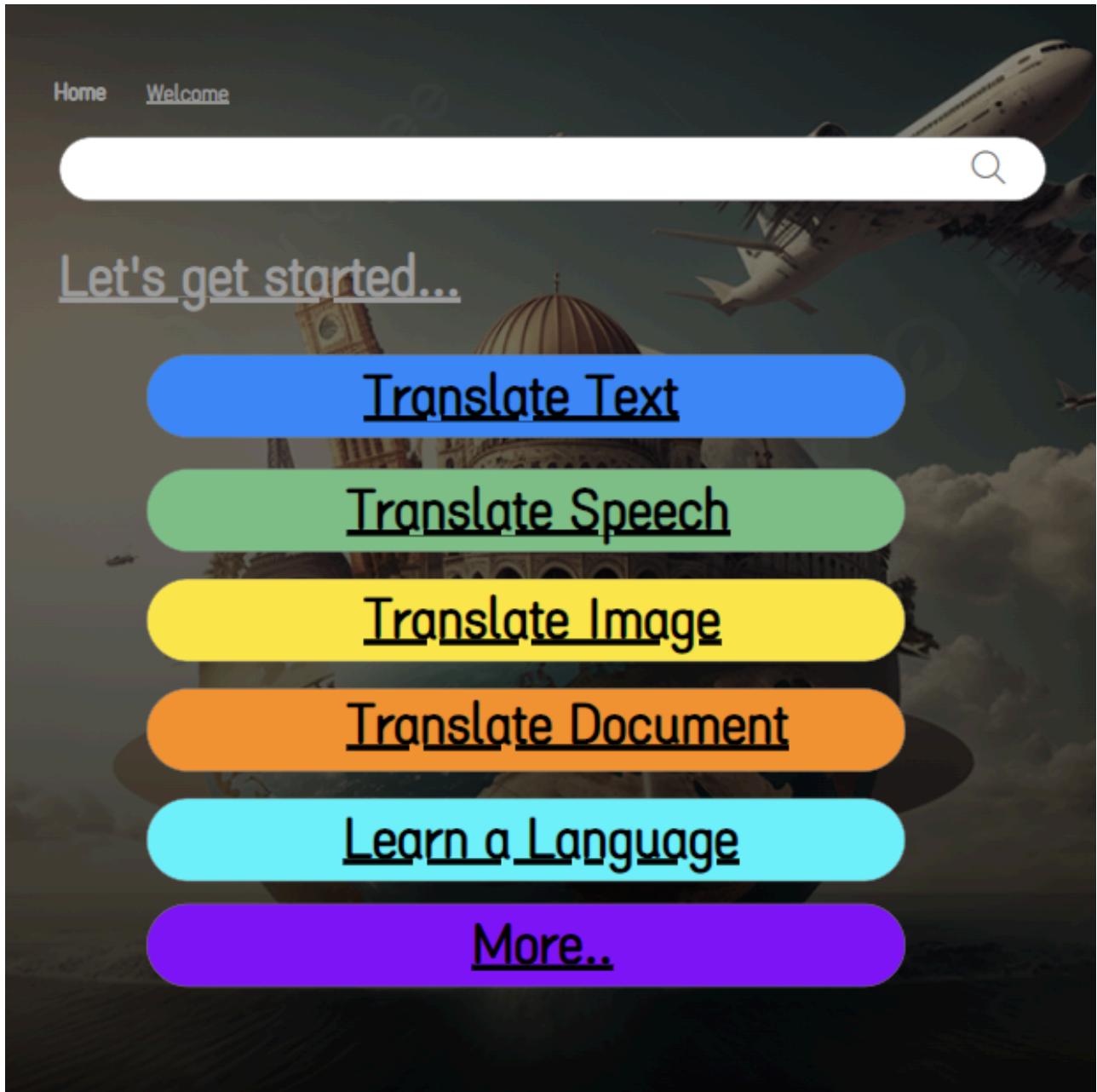


Part 4: User Interface Design Mockup

Level 0: Home Page

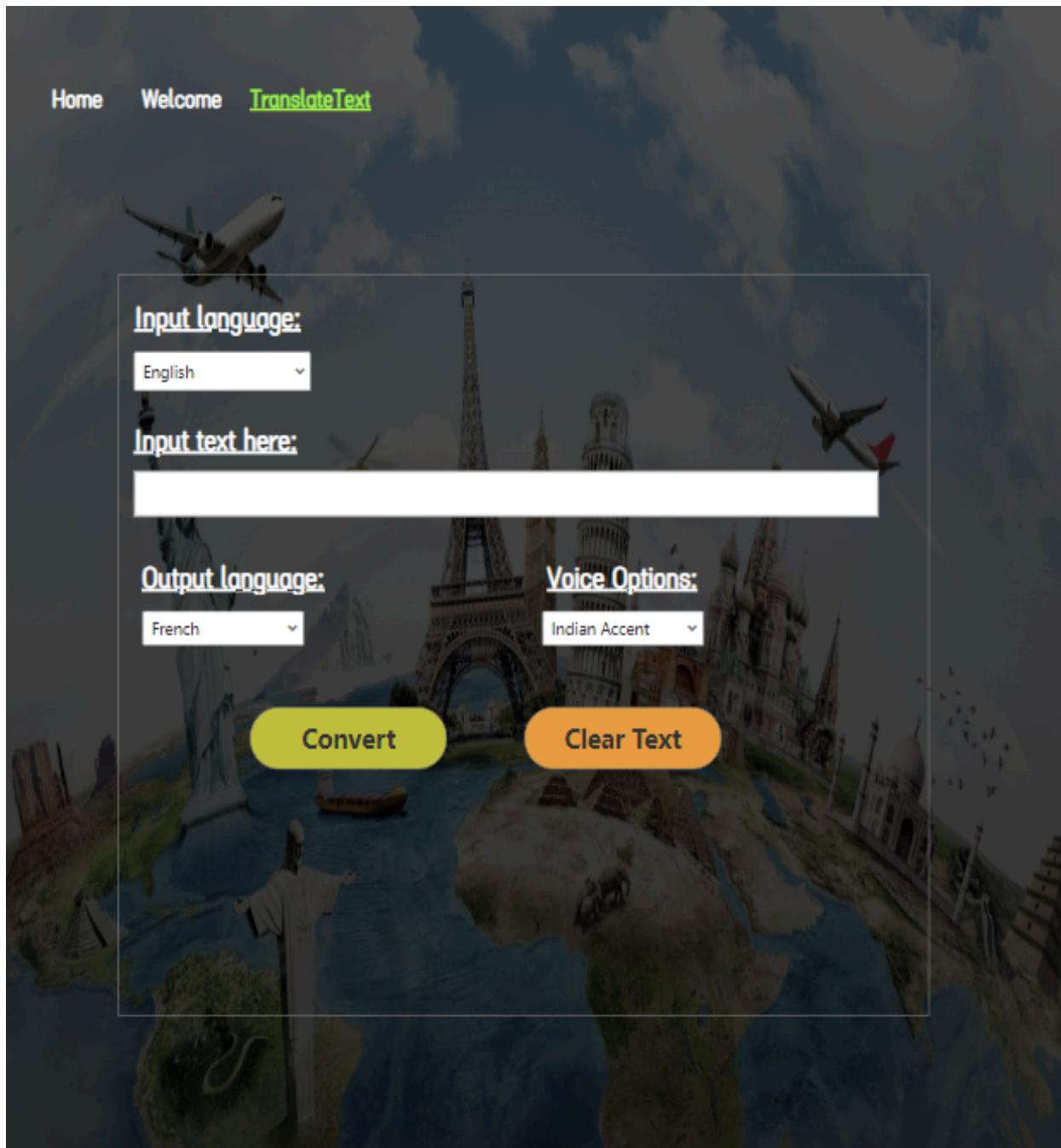


Level 1 : Welcome Page after logging in

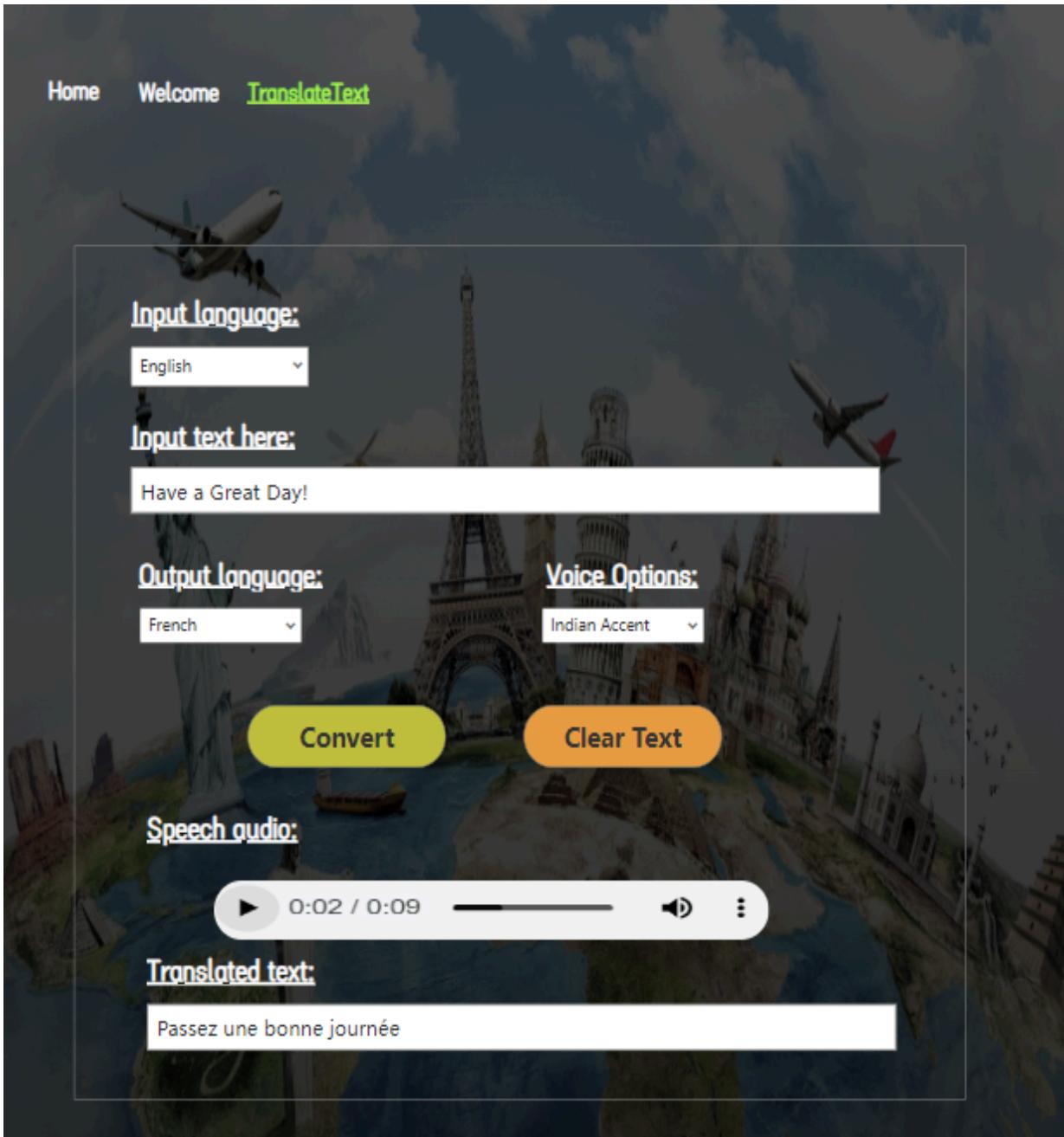


Use Case: Text-to-Speech Conversion

Level 2: After Choosing Translate Text option

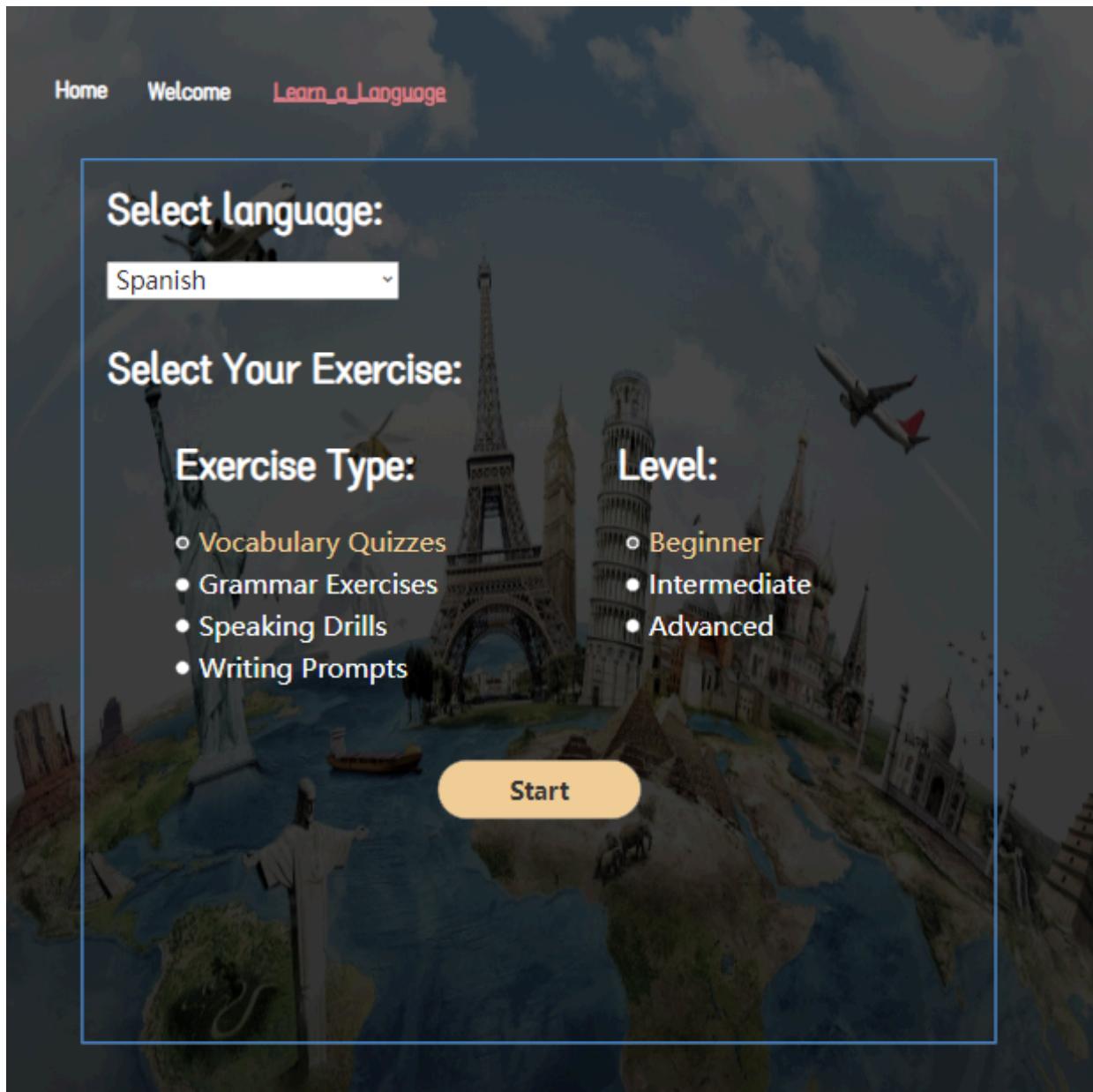


Level 3: After clicking on the convert button



UseCase : Language Learning Exercise

Level 2: After Choosing Learn-a-Language option



Level 3: After clicking on the start button

The background of the interface features a collage of international landmarks, including the Eiffel Tower, the Leaning Tower of Pisa, the Taj Mahal, and the Colosseum, set against a backdrop of clouds and a globe.

Home Welcome Learn a Language Back

Exercise-1:

Choose the correct form of the verb to complete the sentence.

1. Ella ___ a la tienda ayer.

- va
- fue
- ido
- ir

Submit

Level 3: After clicking on the submit button

Home Welcome Learn a Language Back

Exercise-1:

Choose the correct form of the verb to complete the sentence.

1. Ella ___ a la tienda ayer.

- va
- fue -(correct)
- ido -(incorrect)
- ir

Next

Level 4: After completing the exercise

Home Welcome Learn_a_Language Back

Your Progress..

67% – Good Job!

Date	Exercises	Percentage
Jan–05–2024	Vocabulary	45%
Jan–09–2024	Writing	34%
Jan–23–2024	Vocabulary	51%
Feb–03–2024	Grammer	67%

Overall – Can do Better!
Areas for improvement

previous

Continue Exit

