Capstone Project 1

CMU-SE 450

Project Plan

Version 1.3

Date: 28/04/2023

LinguaSnap for Travelers

Submitted by

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Capstone Project 1- Mentor:

Name Signature Date

INTERNATIONAL SCHOOL OF DUY TAN UNIVERSITY

PROJECT INFORMATION

Project acronym	LiS		
Project title	LinguaSnap for Travelers		
Start date	25 – February – 2023	**End Date**	31 – May – 2023
Lead institution	International School, Duy Tan University		
Project mentor	Nguyen Duc Man Email: mannd@duytan.edu.vn Phone: +84 904 235 945		
Partner organization	Duy Tan University		
Scrum Master	Dat, Nguyen Thanh	ntdat1232001@gmail.com	0972530969
Product owner	Truong ,Vu Dinh	jonnyvu2210@gmail.com	0905223611
Team members	Kha, Nguyen Ngoc	winkha14567@gmail.com	0945721427
	Long, Pham Ba Hoang	longphambahoang@gmail.com	0793310221

REVISION HISTORY

Version	Date	Comments	Author	Approval
1.0	12/04/2023	Initial Release	All members	
1.2	09/04/2023	Update Project plan	Kha	
1.3	28/04/2023	Update project plan	Kha,Trường	

Table of Contents

1. PROJECT OVERVIEW

1.1. Purpose and Scope

1.1.1. Purpose

- The purpose of the LinguaSnap app is to facilitate communication and understanding between speakers of different languages. It allows users to enter text or speech in one language and get an accurate translation in another, helping to overcome language barriers and enabling communication in diverse linguistic contexts.
- Can be used in a variety of situations, such as when traveling abroad, communicating with people who speak another language, translating written documents, conducting business with international partners , study or research in a foreign language, ...

1.1.2. Scope

- The scope of the LinguaSnap application can support a specific group of languages for translation, which can include common languages, less common languages or specialized languages depending on the target audience and use case. expected use.
- The translation application can provide different translation modes, such as text translation, speech translation or image translation.
- Text translation may involve entering text for translation, while voice translation may involve using speech recognition to translate spoken language.
- Image translation can involve translating text from images, such as signs or menus.

1.2. Assumptions and Constraints

No	Description	Note
Assumptions		
1	Only SDK 24 or above versions supported. Java version 8 or above	Scope
2	Customer reviewers will get seven days to approve a milestone document. If no comments are received within this time period, it will be considered as approved.	External Interfaces
Constraints		
1	The project is developed within 12 weeks and quarterly deployed on the market.	Schedule
2	The project shall conform to security requirements specified by the customer in the NDA	Security

3	The product operates at a high level of performance and has a page load of no more than 5 seconds.	Quality
4	The application operates on android 7.0 or aboves	Scope
5	The project will be implemented by a team consisting of 4 members	Resources
6	The financial estimation for the project is at a budget limit of $2248	Budget

1.3. Project Objectives

1.3.1 Standard Objectives

Metrics	Unit	Committed	Note
Start Date	dd-mmm-yy	25-2-2023	
End Date	dd-mmm-yy	31-5-2023	
Duration	elapsed days	99 days	
Maximum Team Size	Person	4 Person	
Billable Effort	Person-day	64 days	
Number of work hours per day for one engineer	Person-hour	8 hours	

Metrics	Unit	Target			Basic for setting Goals
		LSL	Average	USL	
Quality					
Customer Satisfaction	Point	8.5	9	9.5	Refer to Gx Target in the year 2020, 5% higher than previous project (A project)
Leakage	Wdef/ UCP				

Process Compliance	NC/Ob				
Cost					
Effort Efficiency	%	70	80	90	
Correction Cost	%	60	65	70	
Delivery					
Timeliness	%	85	90	95	
Requirement Completeness	%	80	85	90	

1.3.2 Specific Objectives

- Based on the needs of people when traveling or learning, we will build an app that can help users easily use according to their purposes.
- Integrate translation technology: Build and integrate an efficient translation technology to enable users to translate texts from one language to another, with high accuracy.
- Develop a search feature: Build a powerful search feature that allows users search for the related translated results on the Internet.
- User-friendly interface: Simple, easy-to-use and user-friendly user interface design, with clearly displayed search and translation features, makes it easy for users to interact with the application.
- Multi-Language Support: Supports many popular languages in the world, including English, French, Spanish, Chinese, Japanese and more, meeting the needs of multi-language translation of the user.
- Translation results storage and management: Provides translation results storage and management, allowing users to save previously used services and manage them easily.
- Confidentiality and privacy: Ensure the security and privacy of user data, and comply with legal regulations related to user data protection and personal information management.

1.4. Critical Dependencies

No	Dependency	Expected delivery date	Note
1	API of Google Cloud	15-3-2023	External system
2	Firebase	15-3-2023	External System
3	Google ML Kit	15-3-2023	External System

1.5. Project Risk

Risk	Description	Probability	Impact	Mitigation Strategy
Incorrect requirements	Developing the product which does not accord with the requirements	3	5	Discuss and communicate frequently with Stakeholders
Estimate working time	Actual working time is not enough to finish a task compared to the estimated previous time	2	4	Review old tasks and evaluations to estimate for the new task. Replan for each sprint.
People	Team member who is ill, has health problems, or busy	4	3	Notify the scrum master (or ask a colleague to help you) Complete the assigned tasks when possible
Lack of technical experiences	Detect harmful content in the images is a difficult technique that all members need to	4	4	Spend a lot of time for learning and training

	research and develop.			
Team Communication	Team members can conflict with each other while discussing something related to the project	4	2	Conduct a meeting to share knowledge, experience and learning methods
External problems	It has power problems, laptop, personal computer, network system	3	3	Find another workplace (library, coffee shop, ...) Notify the scrum master to assign appropriate tasks
Market	Other products are deployed at the same time and compete with the project team's product	2	3	Develop newer features and organize promotional activities

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2. PROJECT DEVELOPMENT APPROACH

2.1 Technical Process

2.1.1. Reasons for selecting

To keep up with today's increasingly changing technology trends, we want a truly flexible and easy project development model to adapt to that change. Our project will develop more new features in the future. We will continuously update and apply new technologies that increase the attractiveness and intelligence of the application.

Currently, our team is a small team with little experience in project development. Therefore, we cannot avoid problems that arise in the software development stages and requirements can be changed to be more suitable. For the traditional model that requires managerial skills and high accuracy, it will not suit our team. Applying Agile Scrum model will help us to solve these problems, bring a lot of experience and best performance for project development.

2.1.2. Agile Methodology

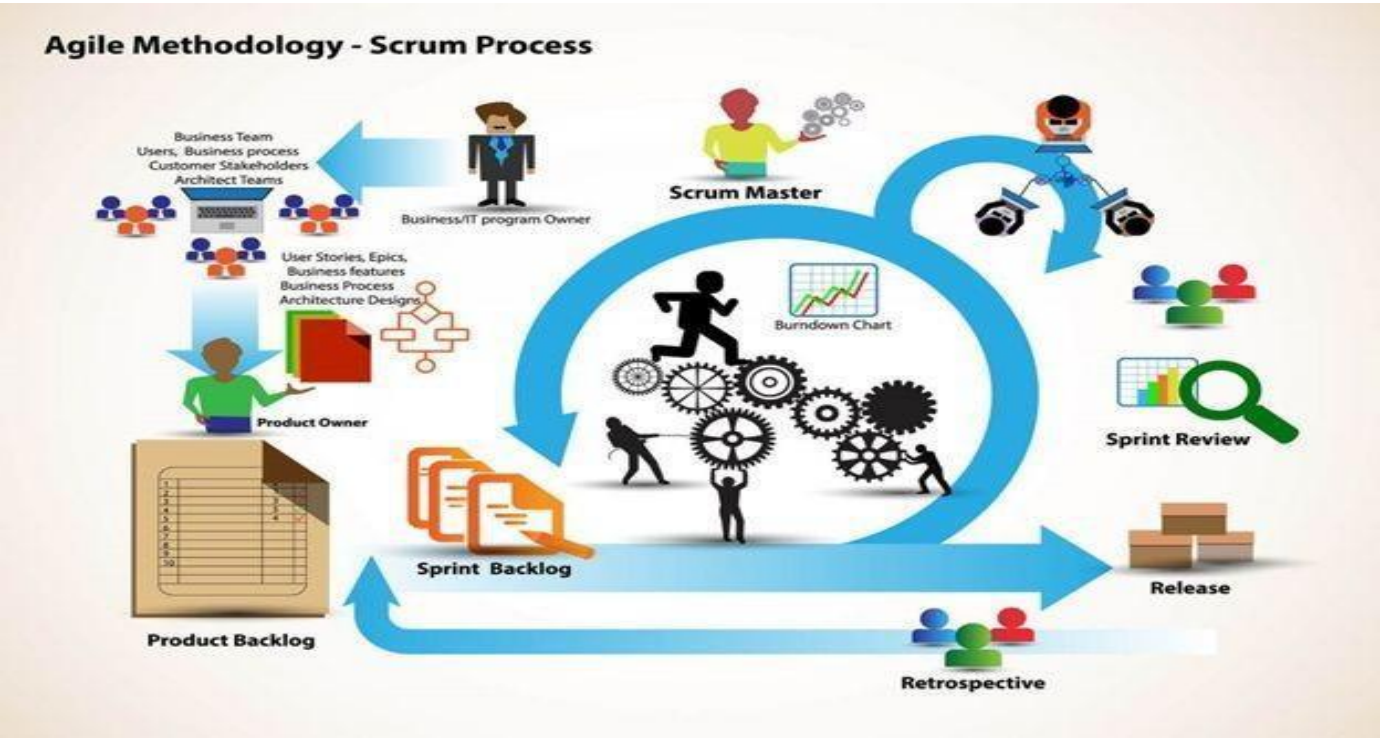
Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams.

Agile software development is more than frameworks such as Scrum, Extreme Programming, or Feature-Driven Development (FDD).

Agile software development is more than practices such as pair programming, test-driven development, stand-ups, planning sessions, and sprints.

Agile software development is an umbrella term for a set of frameworks and practices based on the values and principles expressed in the Manifesto for Agile Software Development and the 12 Principles behind it. When you approach software development in a particular manner, it's generally good to live by these values and principles and use them to help figure out the right things to do given your particular context.

Scrum Process



About Scrum:

Scrum is a subset of Agile. It is a lightweight process framework for agile development, and the most widely-used one.

Scrum is most often used to manage complex software and product development, using iterative and incremental practices. Scrum significantly increases productivity and reduces time to benefits relative to classic "waterfall" processes. Scrum processes enable

organizations to adjust smoothly to rapidly-changing requirements and produce a product that meets evolving business goals.

An agile Scrum process benefits the organization by helping it to

+ Increase the quality of the deliverables
+ Cope better with change (and expect the changes)
+ Provide better estimates while spending less time creating them
+ Be more in control of the project schedule and state

2.2. Quality Management

2.2.1. Estimates of Defects to be detected

Pre-release review defects

Process	Planned found by review	Actual found by review
Requirement	50	20
<Work product>		
Design	30	25
<Work product>		
Coding	180	150
<Work product>		
Other	50	30
<Work product>		
Total	310	225

Pre-release test defects

Process	Planned found by review	Actual found by review
Requirement	35	25

<Work product>		
Design	30	10
<Work product>		
Coding	160	120
<Work product>		
Other	40	25
<Work product>		
Total	265	180

2.2.2. Strategy for Meeting Quality Objectives

Strategy	Expected Benefits
Do defect prevention using the standard defect prevention guidelines and process; use standards developed in Java for coding.	15–25% reduction in defect injection rate and about 5% improvement in productivity
Group review of program specs for first few/logically complex use cases. Group review of design docs/first time-generated code by project leader, developer, and one consultant.	Improvement in quality as overall defect removal efficiency will improve; some benefits in productivity as defects will be detected early
Introduction of RUP methodology and implementing the project in iterations. Milestone analysis and defect prevention exercise will be done after each Iteration.	Approximately 5% reduction in defect injection rate and 1% improvement in overall productivity

2.2.3. Quality Control

Review Item	Type of Review	Reviewer	When
Proposal	Group review	Man Nguyen, Long Pham, Truong Vu, Dat Nguyen, Kha Nguyen	Initial
Project plan Project schedule Test Plan	Group review Group review One-person review	Long Pham, Truong Vu, Dat Nguyen, Kha Nguyen	End of Initiation stage
Business analysis and requirements specification document, Use Case catalog	Group review	Long Pham, Truong Vu, Dat Nguyen, Kha Nguyen	End 9 o o 0% f f require ments
Design document, object model	Group review	Long Pham, Truong Vu, Dat Nguyen, Kha Nguyen	End of 90% design
Stage plans	One-person review	Man Nguyen	Beginning of each stage
Complex/first specs incl. Diagrams, Time test, Generaed cases, Program interactive	Group review	Man Nguyen, Long Pham, Truong Vu, Dat Nguyen, Kha Nguyen	End of detailed design
Code	Group review	Long Pham, Truong Vu, Dat	After coding for first few programs

		Nguyen, Kha Nguyen	

2.2.4. Measurements Program

Data to be collected	Purpose	Responsible	When
Size: No. of KLOC/ FP	Early estimate project cost	PM/SM	At the end of stages
Effort: No. person-day	Calculate project effort for scheduling	Team members	Daily
Quality: No. defects detected	Early evalute product quality and the feasibility of the project	Reviewer, Tester	Right after the review/test
Schedule	Divide work and allocate resources properly, ensure the project is completed on time and on budget	PM/SM	Weekly and at the end of stages

2.3. Unit Testing Strategy

- Grey Box:

- It is a combination of a Black Box and White Box testing. It is the type of testing in which tester aware with internal functionality of a method or unit but not in a more deep level like white box testing. In this, the user partially aware of the internal functionality of a system.
- Write test cases before fixing the defect and independent of each other.
- Write cases to verify behavior, also write test cases to ensure the performance of the code
- Execute test cases continuously and frequently.
- Using tool: Install and run Jest for writing unit test in NodeJS

- Isolation of a code – Isolate function to test it more rigorously. Isolate code to do Automated Unit Testing in a better way. Isolating functions/code helps to do testing in a good way. It helps to reveal dependencies between functions of code.

2.4. Integration Testing Strategy

- Bigbang Strategy:

- All components are put together at the same time, there is no order, except all are integrated at the same time.
- Towards the end of the project, we started to apply this tactic to test the entire application.

3. ESTIMATION

3.1. Size

+ Total number of FP: 68

Software Scale Drivers	
Precedent	Nominal
Development Flexibility	Nominal
Architecture / Risk Resolution	Nominal
Team Cohesion	Very High
Process Maturity	Nominal

Software Cost Drivers			
Product		**Personnel**	
Required Software Reliability	Nominal	Analyst Capability	High
Data Base Size	Nominal	Programmer Capability	High
Product Complexity	Nominal	Personnel Continuity	Nominal

Developed for Reusability	High	Application Experience	High
Documentation Match to Lifecycle Needs	Nominal	Platform Experience	High
		Language and Toolset Experience	High
Project		**Platform**	
Use of Software Tools	High	Time Constraint	Nominal
Development	Nominal	Storage Constraint	Nominal
Required Development Schedule	Nominal	Platform Volatility	Nominal

Software Development (Elaboration and Construction)

Cost per Person-Month (Dollars) = 60,789 $
Resource = 4 person.
Effort = 7.6 Person-months.
Schedule = 64 Day = 2.13 Months.
Other cost = 400 USD.
Cost = Effort * Schedule + Other cost = $2248
Total Equivalent Size = 3604 SLOC
Effort Adjustment Factor (EAF) = 0.65

Acquisition Phase Distribution

Phase	Effort (Person-months)	Schedule (Months)	Average Staff	Cost (Dollars)
Inception	0.6	1.0	0.6	$120
Elaboration	2.3	2.9	0.8	$350
Construction	7.3	4.8	1.5	$1558
Transition	1.1	1.0	1.2	$220

Software Effort Distribution for RUP/MBASE (Person-Months)

Phase/Activity	Inception	Elaboration	Construction	Transition
Management	0.1	0.3	0.7	0.2
Environment/CM	0.1	0.2	0.4	0.1
Requirements	0.2	0.4	0.6	0.0
Design	0.1	0.8	1.2	0.0
Implementation	0.0	0.3	2.5	0.2
Assessment	0.0	0.2	1.7	0.3
Deployment	0.0	0.1	0.2	0.3

3.2. Effort

The Effort estimation

Activity /Process	Total budgeted Effort Usage (USD)	Total % budgeted Effort Usage (%)	Sprint 1		Sprint 2		Sprint 3	
			USD	%	USD	%	USD	%
Requirement	100	5,96	50	11,41	50	5,32	0	0.00
Design	200	14,9	100	15,21	50	15,21	50	14,14
Coding & Unit Testing	1298	34,44	500	26,62	400	35,71	398	42,98
Testing	250	13,41	123	9,89	50	15,31	77	16,02
Deployment	100	2,98	25	1,90	25	2,55	50	4,71
Support for Acceptance Test	50	4,47	20	3,80	15	5,10	15	4,71
Project Planning	50	2,98	20	3,80	15	2,55	15	2,36
Project Review	100	5,96	60	4,56	35	8,16	5	5,66
Training	100	14,9	50	22,81	30	10,20	20	9,43
Total	2248	100	948	100.00	670	100.00	630	100.00

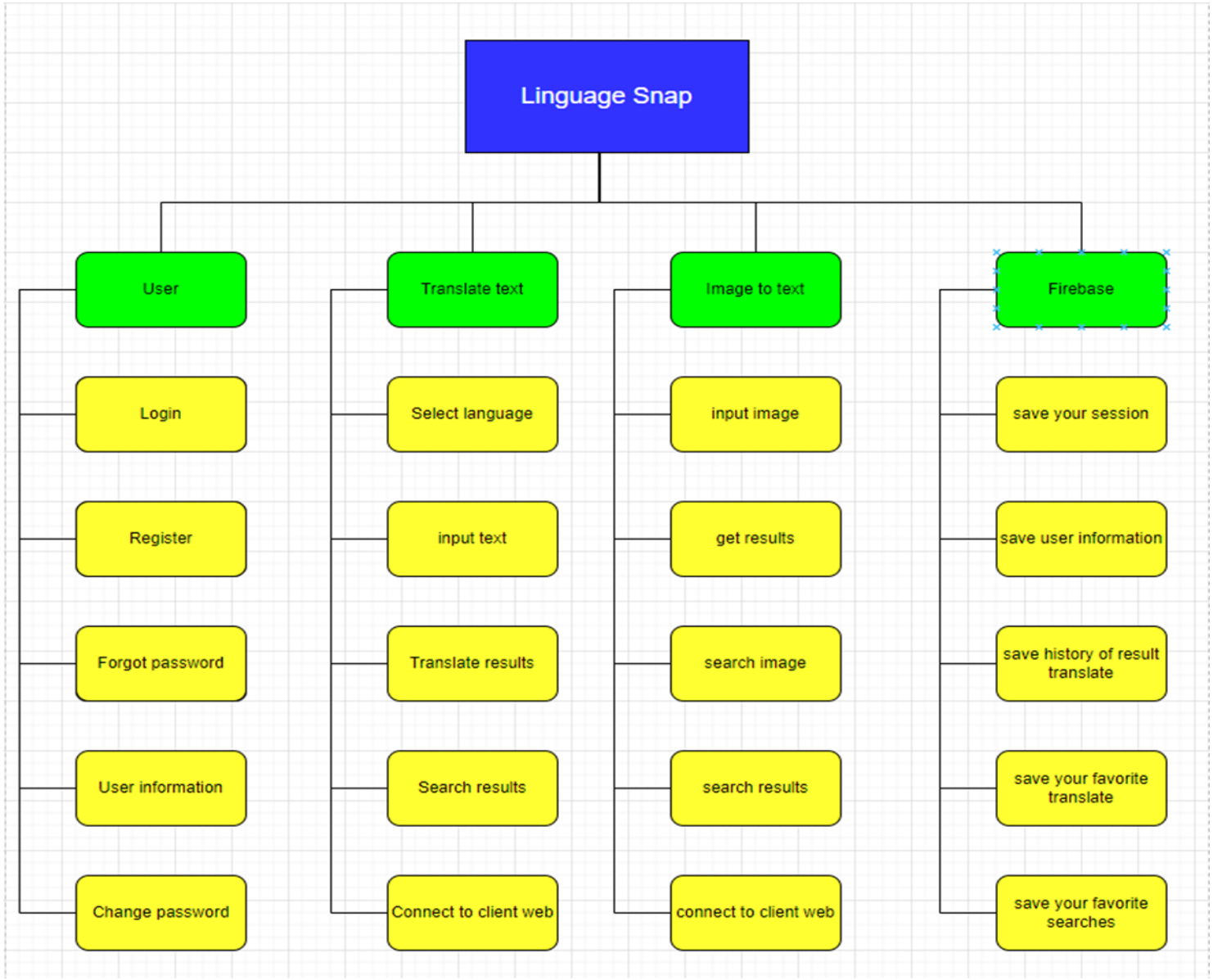
3.3. Schedule

3.3.1. **Project Milestone & Deliverables**

NO	Task Name	Duration	Start	Finish
1	Initial	4	25/02/2023	03/03/2023
	Gathering Requirement	3	27/02/2023	02/03/2023
	Create Proposal Document	1	03/03/2023	03/03/2023
2	Start Up	3	06/03/2023	08/03/2023
	Create documents for project	3	06/03/2023	08/03/2023

3	Development	56	09/03/2023	26/05/2023
	Sprint 1	21	09/03/2023	07/04/2023
	Sprint 2	21	08/04/2023	09/05/2023
	Sprint 3	14	10/05/2023	30/05/2023
4	Project's Retrospective Meeting and final release	1	31/05/2023	31/05/2023
5	Total	64		

3.3.2. Work Breakdown Structure


Linguage Snap
User
Login
Register
Forgot password
User information
Change password
Translate text
Select language
input text
Translate results
Search results
Connect to client web
Image to text
input image
get results
search image
search results
connect to client web
Firebase
save your session
save user information
save history of result translate
save your favorite translate
save your favorite searches

3.3.3. Detailed Schedule

No.	Task Name	Duration (Days)	Start	Finish	Assign to
1.	**Initial**	7	25/02/2023	08/03/2023	Team, Mentor
1.1	Project's Kick-off Meeting	1	27/02/2023	27/02/2023	Team, Mentor
1.2	Collect and analyze requirements	1	28/02/2023	01/03/2023	Team
1.3	Setup Development Environment	1	02/03/2023	02/03/2023	Team
1.4	Research Technical	1	03/03/2023	03/03/2023	Team
1.5	Create documents	3	06/03/2023	08/03/2023	Team
2	**Development**	56	09/03/2023	26/05/2023	Team
2.1	Sprint 1	21	09/03/2023	07/04/2023	Team
2.1.1	Design App Theme				Team
2.1.2	Code OCR API				Team
2.1.3	Crop Image				Team
2.1.4	Take full-scale Image				Team
2.1.5	Code Firebase Authentications				Team
2.1.6	Basic Login				Team
2.1.7	User Register				Team
2.1.8	Login Sessions				Team
2.1.9	Forgot password				Team

2.1.10	Code Translate API				Team
2.1.11	Spinner List selection				Team
2.1.12	Auto Detect Language				Team
2.1.13	Code App UI				Team
2.1.14	Integrate into basic app				Team
2.1.15	Update Project Plan				Team
2.1.16	Update Product Backlog				Team
2.1.17	Create Sprint Backlog				Team
2.1.18	Sprint meeting				Team
2.1.19	Sprint Retrospective				
2.2	Sprint 2	21	08/04/2023	09/05/2023	Team
2.2.1	Search Image				Team
2.2.2	Data Collection				Team
2.2.3	Auto-Translate				Team
2.2.4	Update Integrated App				Team
2.2.6	Update Architecture Document				Team
2.2.7	Update Database Design				Team
2.2.8	Update User Interface Design				Team

2.2.9	Update Sprint Backlog				Team
2.2.10	Text to Speech API				Team
2.2.11	Speech to Text API				Team
2.2.12	Setup character limit				Team
2.2.13	Dictionary API				Team
2.2.14	Save used languages				Team
2.2.15	Spell checker API				Team
2.2.16	Update Main page design				Team
2.2.17	Search text result				Team
2.2.18	Design “Image to text” page				Team
2.2.19	Translation History				Team
2.2.20	Change password				Team
2.2.21	Design Login/Forgot password/Register page				Team
2.2.22	Design menu in main page				Team
2.2.23	Sprint meeting				Team
2.2.24	Sprint Retrospective				Team
2.3	Sprint 3	14	10/05/2023	30/05/2023	Team

2.3.1	Bookmark				Team
2.3.2	View/Edit user information				Team
2.3.3	Swap languages				Team
2.3.4	Copy translated text				Team
2.3.5	Fix bug/Error				Team
2.3.6	Update Test Case				Team
2.3.7	Update User Story				Team
2.3.8	Update Integrated App				Team
2.3.9	Sprint meeting				Team
2.3.10	Sprint Retrospective				Team
2.3.11	Wrapping up app project				Team
2.3.12	Update and Finalize Sprint Backlog				Team
3	**Delivery and close project**	**1**	31/05/2023	31/05/2023	Team, mentor

3.3.4. Project Schedule

The detail project schedule is available in The Sprint Backlog.

3.4. Resource

Position	Member	Effort
Back-end Developer	All Member	
Front-end Developer	All Member	
Designer	All Member	

Data Engineer	All Member	
Tester	All Member	

3.5. Infrastructure

Work/Product	Purpose	Expected Availability by	Note
Development Environment			
Windows 11	Operating System	Initiation stage	
Google Cloud	Flatform	Initiation stage	
Android Studio	IDE	Initiation stage	
Firebase	DBMS	Initiation stage	
Java	Development language for native Android develop	Initiation stage	
Hardware & Software			
4 Personal Laptop	Design, Develop and emulation	Initiation stage	
2 Android phone	Testing	Initiation stage	
Other Tools			
Git	Source version control	Definition stage	
Trello	Task tracking	Initiation stage	

3.6. Training Plan

Training Area	Participants	When, Duration	Waiver Criteria
Technical			
Java Language	All members	7 days	If already trained
Detect harmful contents	All members	10 hrs	If already trained
Firebase	All members	5 hrs	Mandatory
Process			
Quality system	All members	3 hrs	If already trained
Configuration management(Git and bitbucket tool)	All members	2 hrs	If already trained for CC. For others, on-the- job training
Group review	All members	4 hrs	If already trained
Defect prevention	All members	4.5 hrs	Mandatory
UI Automator	All members	4.5 hrs	If already trained
Agile Scrum	All members	2 hrs	Mandatory

4. PROJECT ORGANIZATION

4.1. Organization Structure

Role	Responsibility	Name
Scrum Master	- Communicate the value of Scrum - Teach the organization on Scrum to maximize business value - Preserve the integrity and spirit of the Scrum framework - Serve as a coach and mentor to members of the Team	

	- Respectfully hold the Team, Product Owner and Stakeholders accountable for their commitments - Continually work with the Team and business to find and implement improvements - As a timekeeper - Helping the team agree on what they can achieve during each development sprint (or other period of time). - Facilitating the daily standup (sometimes called the daily scrum) and helping the team reach consensus on each of the three questions. - Helping the team continuously make progress on the project by making sure each person is working on the right tasks, helping to remove any obstacles to the team members' progress, and protecting the team from distractions.	
Product Owner	- A spokesperson for the customer and needs to represent them - Gathers, manages, and prioritizes the product backlog. - Has technical product knowledge or specific domain expertise. - Tracks progress towards the release of a product.	
Developer	- Responsible for quality - Responsible for delivering the potentially shippable product of the Application each sprint - Report progress based on the remaining time - Self-organized	All members

	- Owns the Sprint backlog	
Mentor	- Guide on the process. - Monitoring all activities of the Team. - Help with anything. - Reviews project documents - Reviews product	Man, Nguyen Duc

4.2. Project Team

Full Name	**Position**
Man, Nguyen Duc	Mentor
Dat. Nguyen Thanh	Scrum Master, Dev-team
Truong, Vu Dinh	Product Owner, Dev-team
Long, Pham Ba Hoang	Dev-team
Kha, Nguyen Ngoc	Dev-team

5. COMMUNICATION & REPORTING

Audience / Attendees	**Topic / Deliverable**	**Frequency**	**Method**
Scrum Master, Members	Daily meeting	Daily	Face to Face / Zoom Meeting / Slack Chat
Scrum Master, Members	Sprint Planning Meeting	When starting a sprint	Zoom Meeting

Scrum Master, Members, Mentor	Sprint Review Meeting	When finishing a sprint	Face to face, Zoom Meeting
Scrum Master, Members	Sprint Retrospective	When the sprint review finish	Face to Face
Scrum Master, Members	Individual Meeting	When need	Face to Face, Zoom Meeting, Message
Scrum Master, Members, Mentor	Working report, review problems	Once a week	Face to face

6. CONFIGURATION MANAGEMENT

Github link: https://github.com/ismekakawin9/LinguaSnap/branches

7. SECURITY ASPECTS

- The credential data is carefully secured by multi-layer encryption and data integrity is ensured. Regularly back up system data.
- Research on network attack prevention solutions to ensure data security, avoid being exploited and stolen data by hackers.
- Deploy project architecture with a high priority in security. Optimized architectural solutions enable the deployment of data security with 99% reliability.
- Social media, sharing and use of data must be approved by the end user and verified by the organization's management.

REFERENCES

No	Reference item	Issued Date	Source	Note
1	Agile Scrum	04-Apr-21	https://www.atlassian.com/agile	
			https://www.cprime.com/resources/what-is-agile-what-is-scrum/	
			https://www.agilealliance.org/agile101/	
			The Scrum Framework by International Scrum Institute	

2	COCOMO II	04-Apr-21	https://www.rose-hulman.edu/class/csse/csse372/201410/SlidePDFs/session12.pdf	
3	Software Standards	05-Apr-21	https://www.nws.noaa.gov/oh/hrl/developers_docs/General_So ftware_Standards.pdf	
			https://standards.ieee.org/standard/12208-2017.html	
			https://sw-eng.larc.nasa.gov/	

DEFINITIONS AND ACRONYMS

Acronym	Definition	Note
PM	Project Manager	
PTL	Project Technical Leader	
QA	Quality Assurance Officer	
CC	Infrastructure Configuration Controller	
DV	Developer	
URD	User Requirement Document`	
ADD	Architecture Design Document	
TP	Test Plan	
TC	Test Case	
SC	Source Code	
CM	Configuration Management	
CI	Configuration Item	