School of Information and Communication Technology

Griffith University

Course code: 7821ICT – WIL Single Project

Interfaces for Sugarcane Planting AI System

Project Proposal

Team Name: NA_705 – Sugarcane AI

Date of Submission: 16/Apr/2021/T1

Industry Partner: Griffith University | School of Engineering and Built Environment

Client: **Andrew Busch**

Team members:

Team member 1: Ben Li

Team member 2: Aiqi Liu

Team member 3: Johnson Taylor

Team member 4: Singithi Lekamlage

Revision History

Date	Version	Author(s)	Comments
24/Mar	0.1	Ben Li	Detailed requirements from the client meeting
27/Mar	0.2	Aiqi Liu	Add team role
31/Mar	1.0	Ben Li	First edition of the complete version
13/Apr	2.0	Ben Li	First submission a version of a completed proposal
15/Apr	2.1	Ben Li	Add project plan section

Table -1

Table of Contents

1. INTRODUCTION

1.1. Project Overview

1.1.1 Project Background

The project is about to design and implement an interface for the Sugarcane AI system. The AI system is an image recognition system that required an interface to establish the communication between the user and system output. Our client has developed an AI system to identify the number of sugarcanes in the picture. This system is used to help Sugarcane planting machine operators to adjust the angle of the machine to control the cane number during the planting. Therefore, there must be a simple interface for the planting operator to read the AI system output result during the driving and plating. As well, the landowner also wants to read the AI system data at the end of the day to have the bigger picture about how is the land growth.

1.1.2 Client information

- **Name:** Andrew Busch
- **Email:** a.busch@griffith.edu.au
- **Phone number:** +61 7 3735 3868
- **Address:** Griffith University | Nathan campus | QLD 4111 | Building (N79) Room 3.07G
- **Client organisation:** Griffith University | School of Engineering and Built Environment
- **Designation:** Dr Andrew Busch | Senior Lecturer and Acting Deputy Head (L&T)

1.2. Team Overview

The Sugarcane Project team has four Master students from Griffith University. The team member role is a list below:

- Ben Li: Project Manager, Client Liaison, Web developer
- Aiqi Liu: Project Manager, document recorder, Network Security developer
- Johnson Taylor: Web developer, UI Designer
- Singithi Lekamlage: Data Visualization Researcher, UI Designer.

1.3. Definitions and Acronyms

Acronyms	Definitions
AI system	Sugarcane Planting AI system
Interface	AI system interfaces
UI	The user interface for the AI system
vscode	Visual Studio Code
git	distributed version control system

Table -2

2. PROJECT VISION

2.1. Product Vision

Interfaces for Sugarcane Planting AI System is:

For: Andrew Busch

Who: needs an interface to present AI system data output

The: AI system Interface

Is a: real-time visualization and analyzation application for live data input.

That: can indicate the driver to adjust machine angle and show the landowner the overall planting situation.

Unlike: general visualisation application

Our product: builds specifically for Sugarcane planting AI system. This interface meets different customer needs that are not available in the market.

2.2. Stakeholders

2.2.1 stakeholder identification

Stakeholders:	Roles
Landowner	Identify the overall sugarcane production
Machine driver/operator	Planting the Sugarcane
Client	Develop AI system
Team member	Develop interface

table -3

In table-3 shows, the list of stakeholders involved in this interface project. A client is a group of people who are developing the AI system. Landowner and Machine driver are both used for the interface. The project team member also contains four master students from Griffith University.

2.2.2 stakeholder analysis

Key	Organization	Name	Interest (1-5)	Power (1-5)
A	Landowner	N/A	3	3
B	Machine driver/operator	N/A	2	2
C	Client	Andrew Busch	5	5
D	Team member	Ben Li	5	5
E	Team member	Aiqi Liu	5	5
F	Team member	Johnson Taylor	5	5
G	Team member	Singithi Lekamlage	5	5

table - 4

In table 4, the list of stakeholders is given interest and power to the project. The rate number from 1 to 5 from least interest/ power to the most interest/ power.

2.3. Customers and Benefits

The sugarcane planter is facing the difficulty of plant the optimal number of sugarcanes in the land. Therefore, the Sugarcane AI system is invented to help plating machine operator monitor the real-time plating condition, and visualized AI system data to provide an overall plating condition to the landowner. The AI system interface is primarily used for the machine operator to adjust the plating machine, as well as give the landowner a bigger picture of the overall panting completion and satisfaction.

2.4. Key Factors to Judge Quality

The judge quality for the interface project will be performance, reliability and scheduling. Each of this quality is significant to determine the project is successfully or not. The interface should be able to perform in cross-platform such as desk PC, Android and IOS mobile device. The interface should be scalable to fit the different screen size. During the interface operation, the interface should be reliable for at least 100 hours of implementation without a crash. As well, the interface project should be complete within 10 weeks which include the development, testing, version update, implementation and user training if required.

2.5. Key Features and Technology

The key technology used for the AI system interface is VScode and git. The web-based interface is required for this project, hence the VScode is used for writing the web application. Git is used for group communication and version control.

The key features are required are a gauge indicator and a map view that applies to the web application. The gauge indicator should display the AI system output in real-time. The map view function will show data visualisation in a GPS map with a set of AI system output. In concludes, the list of key features shows below:

- The interface is shown in the web application
- The Interface can display the real data input
- The interface is indicating the data input clearly with gauge animation
- The interface should have a map view to display the data in GPS map
- The CSV database should be able to write, read and delete.
- The database should store one image per square meter from the AI system

- The interface should be able to open on an 8-inch Android device
- The interface should be able to open in IOS mobile device

2.6. Other product factors

The secondary factors for AI system interface are the factors that not directly related to product factors, however, these requirements are also essential for keeping the project successful. The list of the secondary factors shows in the list below:

- The gauge indicator should have a small amount of time lag within 100ms.
- Map view site should be able to change the data input
- The user login function is required for different user
- The gauge indicator can show data change in 100ms lag
- The interface is cross-platform, should apply to the android and IOS platform.
- When the user clicks the flag in map view, the detailed image display.
- The interface should have a git repository to record each version control during development.
- The proper document should be done during the project
- The user information generates by the system should be handle properly secreted.

3. PROJECT ORGANISATION

3.1 Organisational Structure

The project team is using a flat and agile organisation structure which means each group member has their task and deadline for each week. Therefore, each member takes their responsibility to complete the task and meet once a week to update their progress. If any group member fails to deliver for the deadline, Ben will pick up their task and work for the next alteration. The team has four group members, each member has multiple roles that overlap each other to reduce the project risk (5). The diagram shows below:

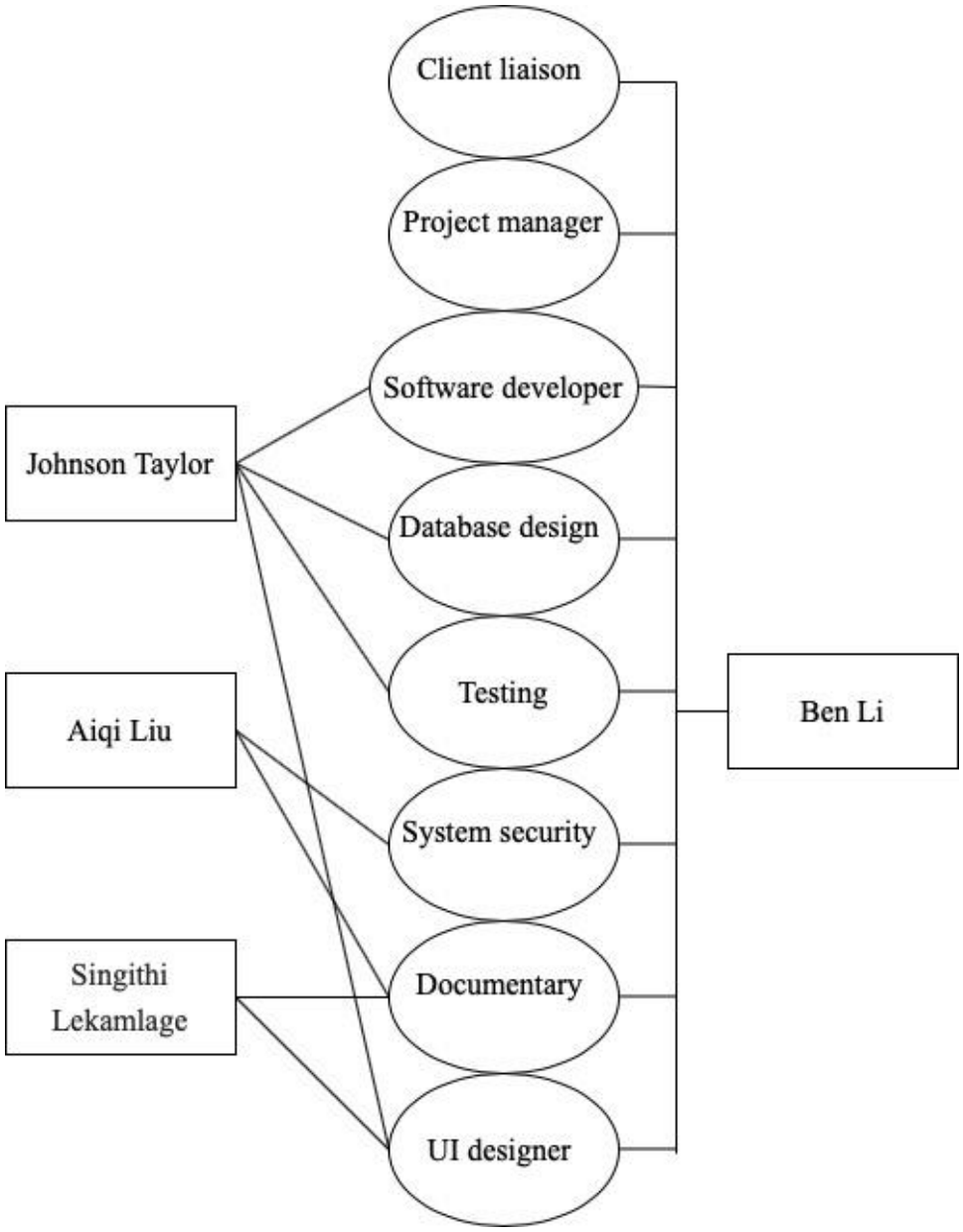


Figure - 1

From diagram 2, the team project manager and client liaison will work with stakeholders from external groups and responses to deliver updated information for each group members.

3.2 Project Responsibilities

The list of roles needed for the interface project is shown in diagram 2 which includes: client liaison, project manager, software developer, database designer, testing, system

security, documentary, UI designer. The list of responsibilities related to each group member will be based on diagram 2. The project responsibilities table shows below:

Name	Roles	responsibilities
Ben Li	Team member	Manage project life cycle by using proper management tools, with document recorded and delivered to the client within the deadline. Then deliver the client requirements to group member and assign them reasonable task for each cycle. Also, response to develop the user interface, database and test the interface.
Aiqi Liu	Team member	Design the system security method, record project document uses proper project management tools. Contribute to the UI design ideas.
Johnson Taylor	Team member	Develop the user interface, database design and perform the proper testing for the user interface
Singithi Lekamlage	Team member	Keep document for project management and design the user interface for the AI system.
Andrew Busch	client	Develop the AI system and review the interface development. Decide the final prototype of the interface.
David	Interface user	Give feedback after using the interface.

table – 5

3.3 Identification of Skill Needs

The skills needed for an interface project is divide into three main categories which are programming languages, database design and other soft skills. The programming language is used for developing the actual web application, the database design is used to improve the interface usability durability and flexibility. Soft communication skills are sued for delivering the project in the best way to the customer and client. The list of skill needed for this project is shown below:

- Program Language required:

    - HTML
    - CSS
    - Python
    - JavaScript
- Database knowledge required:
    - CSV
    - JSON
- Other skills
    - Documents
    - Project management
    - Communication

3.4 Satisfaction of Skill Needs

This skills matrix is mapping the proximate rate of group skills that meets the requirements. Each skill is representing all four members' knowledge. This skill rate is a team self-analysis based on overall team member awareness. The skills matrix is used to have a general idea for use of the project in project planning and risk management. Skills matrix shown in table -6 below:

	unknown	Basic	Good	Master
HTML		O		
CSS		O		
Python			O	
JavaScript	O			
CSV		O		
JSON	O			
Documents			O	
Project management			O	
Communication			O	

table – 6

3.5 Success criteria

The cusses' criteria show below:

1. The web interface should respond to the data input not late than 100ms.
2. The user should be able to recognize the number change quickly
3. The interface can visualize the data on maps
4. The interface should be coupling and cohesion
5. The interface should be work as an individual module
6. The interface should be work with an AI system with a proper port connection.

3.6 Standards for work products

The team will be fowling ISO, Griffith University and ACS standers for the interface. By doing this, the project manager will ensure all team member aware of the standard criterion and the git repository will set to private use.

4. PROJECT PLAINING

4.1 Work Breakdown Structure

The work breakdown structure for the interface project is shown below:

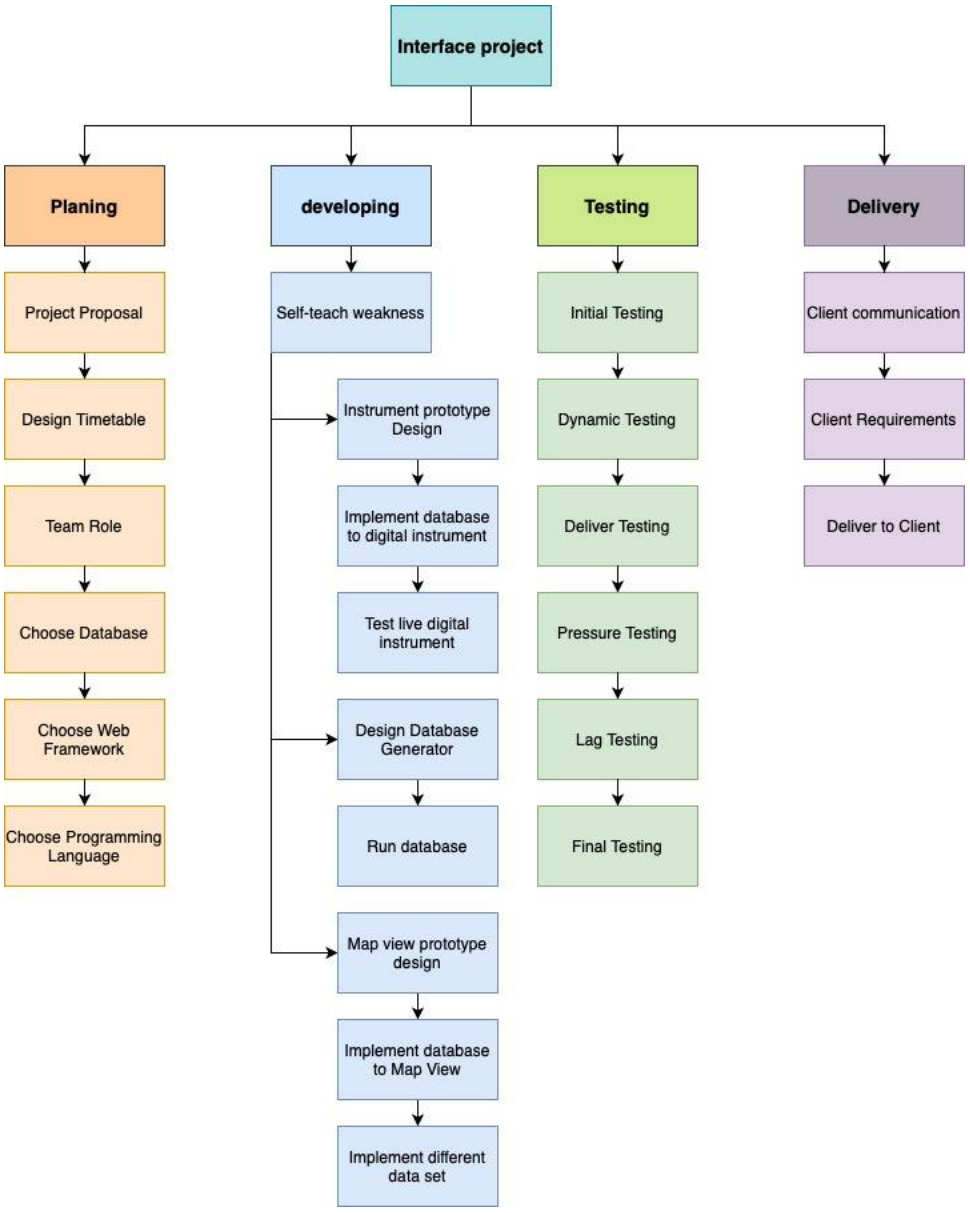


figure -2

4.2 Gantt Chart

According to the work breakdown structure, the list of key tasks involved in the Gantt chart is list below, the Gantt chart will design based on the list below:

Interface Project

- Planning
    - Initial meeting
    - Project proposal
    - Design timetable
    - Decide team role
    - Choose database
    - Choose web framework
    - Choose Programming Language
    - Second meeting
- Developing
    - Self-teach weakness area
    - Instrument prototype design
    - Implement database to digital instrument
    - Test live digital instrument
    - Design Database
    - Test database
    - Group meeting
    - Develop map view prototypes
    - Implement database to Map view
    - Implement different data set
- Testing
    - Initial testing
    - Lag test
    - Pressure testing
    - Final test
- Delivery
    - Clients communicate
    - Deliver to client

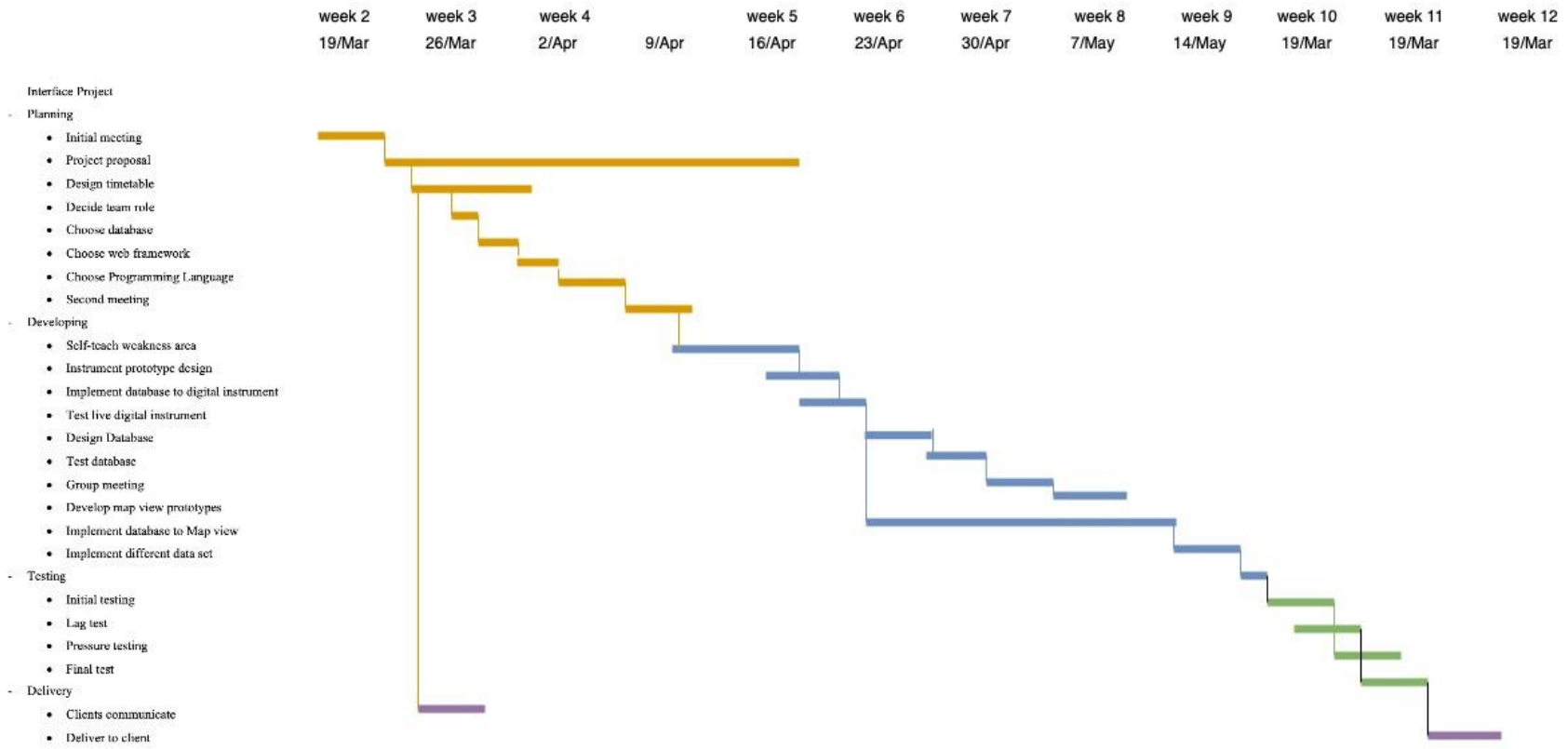

week 2
19/Mar
week 3
26/Mar
week 4
2/Apr
9/Apr
week 5
16/Apr
week 6
23/Apr
week 7
30/Apr
week 8
7/May
week 9
14/May
week 10
19/Mar
week 11
19/Mar
week 12
19/Mar
Interface Project
- Planning
  - Initial meeting
  - Project proposal
  - Design timetable
  - Decide team role
  - Choose database
  - Choose web framework
  - Choose Programming Language
  - Second meeting
- Developing
  - Self-teach weakness area
  - Instrument prototype design
  - Implement database to digital instrument
  - Test live digital instrument
  - Design Database
  - Test database
  - Group meeting
  - Develop map view prototypes
  - Implement database to Map view
  - Implement different data set
- Testing
  - Initial testing
  - Lag test
  - Pressure testing
  - Final test
- Delivery
  - Clients communicate
  - Deliver to client

Figure 3

In figure 3, the Gantt chart shows a time management plan, the longest path of figure 3 is the critical path.

5. RISK MANAGEMENT

5.1 Risk factors identification

The list of potential risk for the project will be shown below:

1 Failed to complete the project on time

2 Failed to deliver the project with Map view

3 The gauge design is failed to real live data

4 Unable to show the detail image in map view

5 Unable to change data set in map view

6 The UI is unscalable due to different screen size

7 Overuse of human resource

8 Insecure database

9 Unable to fail the client satisfaction

10 Unable to deliver proper document for the project

5.2 Possible risk impact

By analysing the impact of each risk, the risk is calories into two dimensional includes likelihood and time delay. From section 5.1, the number of risk factor will be pass into table 7. The red and yellow colour is the most significant risk that impact the project the most, the green and blue is the less impact risk to interface project. The risk matrix is shown below:

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
	12 Hour delay	1-day delay	5 days delay	15 days delay	30 days delay
Almost Certain 100%	No.7	N/A	N/A	N/A	N/A
Likely 20%	No.1	No.1	No. 8 No.1	No. 1	No.1
Possible 5%	No.1	No.5	No.4 No.9	No.5	N/A
Unlikely 1%	No.2	No.5	No.2	No.2	No.9
Rare 0.1%	No.2	No.6	No.3	N/A	N/A

table -7

5.3 Risk avoiding strategies

From table 6, the team skill compares to the project requirements is below average. Moreover, table – 7 shows the most significant risk will be unable to deliver the product to the customer. By avoiding these, the self-teaching procedural will become significant at the beginning of the project. Each team developer needs to have a deep understanding of HTML, CSS, Python, JavaScript, web structure and database design to start the develop the project. If the team member failed to self-teach the programming skills, the delivery criteria's must be discussing with a client at an early stage.

The proper timetable and WBS are also used for avoiding the time management risk for the project. With proper project management tools such as the Gantt chart, this can help project manager have better control of the team progress. The one week padding time needs to be left for testing the project.

6. CHANGE CONTROL MANAGEMENT

The git will be the primary tools for manage the changes and updates. The git-hub will be used for the team to communicate and update each change for interface development.

7. INTELLECTUAL PROPERTY

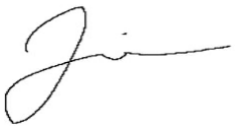
The intellectual property agreements for this project are captured in the Deed of License document.

8. AGREEMENTS

X _____

Client

Zhuoheng Li



Johnson Taylor

Singithi Lekamlage

Aiqi Liu