APPLIED INFORMATION TECHNOLOGY AND COMPUTER SCIENCE
e-ISSN: 2773-5141

AITCS

Vol. 6 No. 2 (2025) 1915-1934
https://publisher.uthm.edu.my/periodicals/index.php/aitcs

Development of Virtual Reality Application on Pineapple Farm Exploration: PinExplore VR

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DOI: https://doi.org/10.30880/aitcs.2025.06.02.102

Article Info

Received: 21 July 2025
Accepted: 18 Nov 2025
Available online: 30 Nov 2025

Keywords

Pineapple, Virtual Reality, Windows, agriculture

Abstract

Virtual reality technology is now commonly employed to replicate the actual world in several businesses. Virtual reality technology is typically utilised for both agricultural education and enjoyment. Nonetheless, young farmers who wish to learn how to grow pineapples frequently employ old methods. Furthermore, by not utilising the available technologies for training, the learning approach is less successful. Thus, PinExplore VR, an agricultural exploration software that fully utilises virtual reality technology, will be created for the Windows operating system. Target users for this project are public aged 20 to 30 years old. The PinExplore VR application was developed using the Prototyping model methodology. The user should find this application entertaining and useful in imagining risk-free pineapple cultivation. The SUS approach will be used for testing and evaluation in order to determine whether usability is acceptable. The Acceptability Ranges of the average score is 70.63, which in the "acceptable" range and "Good" is the adjective rating. In the nutshell, the target users are satisfies with the application.

1. Introduction

Pineapple farming is a major part of Malaysian agriculture, with over 70% of the country's pineapples, especially the MD2 variety, grown in this state. Adding other varieties like Moris, N36, Josapine, Sarawak, and Yankee can further broaden its usefulness and appeal with the support of the Malaysian Pineapple Industry Board (MPIB) [1]. Productivity boost with the Ministry of Agriculture and Food Industries' (MAFI) Youth Agropreneur Grant programs seek to encourage sustainable farming practices and provide plantation equipment and agricultural inputs to young agropreneurs between the ages of 18 and 40 who cultivate pineapples in 2020 [2]. Youth farmers are trained in contemporary farming techniques and sustainable farming methods through contract farming programs, enabling them to successfully and sustainably manage their own pineapple plots.

Virtual Reality (VR) is an effective technique that enables people to engage with realistic 3D surroundings [3]. Users can move around and interact with objects as if they were in the actual world thanks to these computer-generated and VR headset-accessible experiences [4]. Although virtual reality (VR) has various applications, including gaming, healthcare, and education, its use in agriculture is currently very small. VR in farming is necessary to give new farmers practical training and help them hone their skills in a realistic virtual environment. There are three types of VR technology which are non-immersive VR, semi-immersive VR and fully immersive VR. These days, virtual reality (VR) is widely used in a variety of industries for business, entertainment, gaming, and education. Currently, in agriculture industries still using traditional method to learn and practice in farm. The farmers are unable to interact with it because of this.

Therefore, this project aims to design a PinExplore VR application, develop a VR-based PinExplore VR farm exploration application, and perform the functionality and user acceptance testing of the proposed application. The proposed application is designed for the new farmers to help them practice the planting and harvesting through a virtual hands-on experience. The fully immersive is implemented to visualize and interact with the tools and object. PinExplore application contains two modules: the Farm Exploration Module and the Gallery Exploration Module. By using Prototype methodology, a systematic process is followed throughout the development process. Thus, the proposed application could be used for the beginner farmers that would like to experience simulation that do not have often in practice as a learning aid to help better understanding while learning about it. In addition, it raises cultural awareness and pushes for the adoption of sustainable agricultural methods, which are crucial for combating climate change.

The rest of the paper is arranged as follows: Section 2 covers the domain of study, the technology used, and the result of the comparative analysis. Section 3 describes the Prototype methodology that has been chosen to be used in this project, as well as the output of the analysis and design phases of this project. Furthermore, Section 4 discusses the result and discussion, while Section 5 states the conclusion of the current progress.

2. Related Work

This section discusses the background of the study, the technology used, and the result of the comparative Analysis.

2.1 Pineapple Farm

A major component of Malaysian agriculture is pineapple cultivation; because to its peat soil and emphasis on well-known types like MD2, Johor produces more than 70% of the country's pineapples [5]. Even so, there are nonetheless issues like managing soil, comprehending growth cycles, and guaranteeing sustainability. Textbooks and videos are examples of traditional teaching strategies that frequently fall short in terms of actively engaging students. By producing a farming exploration, virtual reality (VR) provides a solution that enables users to investigate pineapple farming procedures, from planting to harvesting, and test out various methods in a risk-free setting [6]. By teaching environmentally friendly techniques like water conservation and organic farming, virtual reality (VR) also encourages sustainable farming by preparing next farmers for productive and conscientious farming [7].

2.2 Virtual Reality

Virtual Reality (VR) is the process of interacting with a synthetic three-dimensional (3-D) visual or other sensory environment through computer modelling and simulation. By interactive devices, which can be worn as goggles, headsets, gloves, or body suits. VR applications immerse the user in a computer-generated environment that mimics reality. In a standard VR format, a user watches animated images of a simulated environment while donning a helmet with a stereoscopic screen [8]. Virtual reality develops an effective framework that replaces an immersive simulation for our natural "real-world" environment. VR solutions substitute a computer-generated view for our actual one using a combination of hardware and software. To make the experience realistic and immersive, virtual reality systems use a combination of cameras, screens, motion sensors, and infrared LEDs. This enables a headset to collect essential data and display it to the user's eyes. Some techniques may use add-ons such as spatial audio and haptic feedback systems to enhance immersion [9].

2.3 Comparative Analysis

Comparative analyses were conducted on three related applications to the proposed system. The three applications are FarmVR [10], Farming Simulator [11], and Across the Valley [12], as shown in Fig. 1(a), (b), and (c), respectively. Table 1 shows the result of the comparative analysis.

The comparison is based on eight different features of the application. The first feature that is being discussed is the technology used, followed by the platform used, content, learning module, activity module, operating system, and payment charges. In comparison, PinExplore VR implements a fully immersive virtual reality within the application to give users the feeling of being physically present in the virtual world and experiencing firsthand events. PinExplore VR application is available on desktop and is free of charge, unlike the other three existing applications.

(a) **(b)** **(c)**

Fig. 1 *(a)FarmVR [10]; (b) Farming Simulator [11]; (c) Across the Valley [12]*

Table 1 *Application Comparison*

Applications/Elements	FarmVR	Farming Simulator VR	Across the Valley	Pineapple Farm Exploration VR
Platform Used	Meta Quest, PICO	PC with VR tools	PlayStation VR2, SteamVR	Meta Quest
Technology VR	Yes, or AR	Yes	Yes	Yes
Module Activities	• Virtual Farm Tours • Crop Management	• Managing crops, livestock, and machinery	• Planting, watering, milking cows and raise animals.	• Farm Exploration • Gallery Explore
Operating System	Windows, Android	Windows	Windows	Windows
Payment Charges	Free	Pay	Pay	Free
Perspective View	First person view	First person view or Third person view	First person view	First person view

3. Methodology

The PinExplore VR application has been developed using the Prototype methodology, as depicted in Fig. 2. This is so because VR application development is the focus of the Prototype methodology [13] and for its comprehensive coverage of the development process. The six phases of this methodology are the requirement phase, quick design phase, build prototype phase, user evaluation phase, refine prototype phase, and implementation and maintenance phase. Table 7 in Appendix A provides a summary of the output of the six phases of the Prototype methodology.

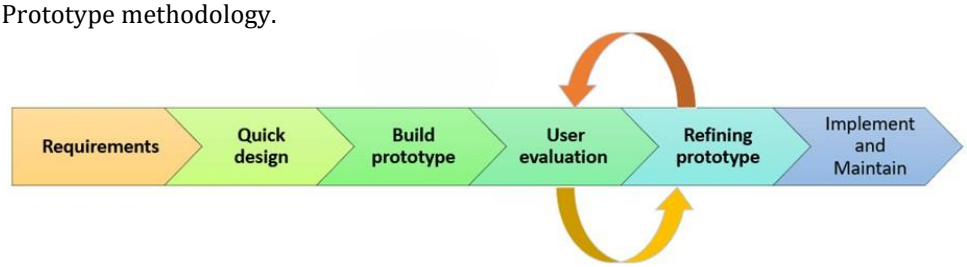


Fig. 2 *Prototype Methodology* [13]

3.1 Requirement Phase

In this first phase, the requirements needed for the development of the PinExplore VR application are determined. This phase involved reviewing existing applications, interview with Subject Matter Expert (SME). An interview session has been conducted with SME Mr Faizul bin Abdul Ghani, who is Manager at Pineapple Plantations Sdn. Bhd... As a result, Table 2 shows the user analysis extracted from an interview with SME. Table 3 and Table 4 show the Functional and Non-functional requirements. Table 5 show the hardware and software requirements for develop the application. The interview was transcribed, can be found in Appendix B. The system flowchart and navigation structure are shown in Appendix C and Appendix D.

Table 2 *User Analysis*

Subject Matter Expert (SME)	Position	Suggestion	Action needed
Mr Faizul Bin Abdul Ghani	Manager, Pineapple Plantation Sdn. Bhd.	User-friendly interface	Design an easy and simple interface
		Multimedia elements	To include the information through audio, graphics and text.

Table 3 *Functional requirements*

Functional Requirement	Module	Description
Autonomous system activities	Farm Exploration Module	• The exploration of the farm should be displayed when users enter the virtual world.
	Gallery Exploration Module	• The information about the variety of pineapple types, and the product that can be produced from pineapple.
	Audio	• Background music should play when the users enter all the modules.
User interaction support	Main Interface	• The application allows users to click the start button to start the application.
	Main Menu	• The application allows users to select the
	Farm Exploration Module	• The application allows users to virtually explore the farm after entering the virtual world to provide an immersive experience.
	Gallery Exploration Module	• The application allows users to explore the gallery and interact with the object.

Table 4 *Non-functional requirements*

Non-functional Requirements	Descriptions
Performance	• The application should be able to load all modules.
Usability	• The application should be user-friendly and easy to use
Operational	• The application shall be able to operate with Windows
Cultural	• The application should be developed in Bahasa Melayu

Table 5 *Hardware and software requirements*

Requirements	Item	Description
Hardware	Laptop (ASUS TUF Gaming F15)	Operating System: Windows 11 Processor: 11th Gen Intel(R) Core (TM) i5-11400H @ 2.70GHz 2.69 GHz GPU: NVIDIA GeForce RTX3050 Ti RAM: 16GB Storage: 512GB SSD
	VR Headset	RAM: 4GB and above Storage: 128GB Video output: DisplayPort 1.2 or newer Operation System: Windows 10 or above USB port 1x USB 3.0 or newer
Software	Canva	To design storyboard, button and info graphics.
	Blender	To create 3D model.
	Unity 3D	To integrate the asset of the application.
	Visual Studio 2019	To write the C# script the application.

3.2 Quick Design Phase

The major goal for this stage is to create a rapid or early design based on findings. Although it is not the final design, it is the only one that gives users a quick overview of the system. Determining the essential components of the prototype model is made possible in large part by this design. To produce concept design, an initial draft of storyboard has been created to provide a preliminary visualization of the PinExplore VR application. Table 6 shows the button design.

Table 6 *Button Design*

Button	Description
	• This is the start button. • It will bring the users to the 3D virtual environment.
	• This is the settings button. • It allows the user to go to audio settings.
	• This is the quit button. • Exit the application.
	• Go to the Farm scene.
	• Go to the Gallery scene.
	• It will the menu interface.
	• This is the back button. • It will go back to the main menu.
	• This is the close button. • It closes the user interface.

3.3 Build Prototype Phase

The main objective of the proposed application is developed in this phase. The main modules which are the Farm Exploration Module and the Gallery Exploration Module. The Farm Exploration module facilitates users to explore the farm which also indirectly users able to learn about the farm from cultivation to harvesting the pineapple fruit. The Gallery Exploration module encourages users to gain knowledge about the e variety of pineapple fruit, the product made from pineapple fruit, and the location of pineapple fruit grown. In addition, the prototype includes the visual, audio and user interface that enable the user to fully immerse themselves. The interfaces design are shown in Appendix E. The application asset development shows in table 7 and the integration in Unity shows in Table 8.

Table 7 *Application Asset Development*

Assets	Development	Description
Graphics		Canva platform was used to design the storyboard and interface of the application.

Table 7: *(Continued)*

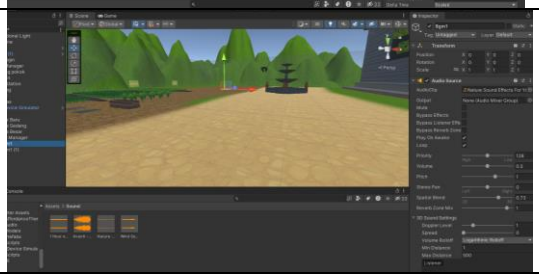
Assets	Developement	Description
3D Model		Blender software was used to create and design 3d model for the application.
Particle System		Many types of particle system have been created in Unity for the used of VR activities.
Audio		The audio files are saved in Moving Pictures Experts Group Layer-3 Audio (MP3) format.

Table 8 *Integration in Unity*

Function	C# Script	Description

Plant Grow	public class PlantGrow : MonoBehaviour {
	public Vector3 finalScale = new Vector3(1.5f, 1.5f, 1.5f);
	public float growSpeed = 1f;
	private bool isGrowing = false;
	
	void Update() {
	if (isGrowing)
	{
	transform.localScale = Vector3.MoveTowards(transform.localScale, finalScale, growSpeed * Time.deltaTime);
	if (transform.localScale == finalScale)
	isGrowing = false;
	}
	}
	
	public void StartGrowing() {
	if (!isGrowing)
	{
	isGrowing = true;
	Debug.Log("Triggered plant growth!");
	}
	}
	}
		Plant Grow script allow the plant to grow after it interact with the water particle system.

Fertilizer Plant	public GameObject finalStagePrefab;
	public FertilizerPourController pourController;
	
	private void OnTriggerStay(Collider other) {
	// Check if the object entering has the tag "Plant"
	if (pourController != null && pourController.isFertilizingReady) {
		Fertilizer plant script enable the plant change into final stage plant.

Table 8: *(Continued)*

Function	C# Script	Description

Fertilizer Plant	// Check if it's a regular plant first
	if (other.CompareTag("Plant"))
	{
	Vector3 pos = other.transform.position;
	Quaternion rot = other.transform.rotation;
	Destroy(other.gameObject);
	Instantiate(finalStagePrefab, pos, rot);
	}
	// Check if it's a final plant and can grow more
	else if (other.GetComponent<FertilizeGrow>())
	{
	other.GetComponent<FertilizeGrow>().ApplyFertilizer();
	}
	
	pourController.isFertilizingReady = false;
	}
	}
	}	

Harvest the plant	public class Harvest : MonoBehaviour
	{
	public GameObject harvestedObjectPrefab;
	public Transform dropPoint;
	public ParticleSystem harvestEffect;
	
	private bool isHarvested = false;
	
	private void OnTriggerEnter(Collider other)
	{
	if (!isHarvested && other.CompareTag("Machete"))
	{
	isHarvested = true;
	Debug.Log("Pineapple harvested!");
	
	// Play harvest effect
	if (harvestEffect != null)
	{
	Instantiate(harvestEffect, transform.position + Vector3.up * 0.5f, Quaternion.identity);
	}
	
	// Drop harvested object (like pineapple)
	if (harvestedObjectPrefab != null && dropPoint != null)
	{
	Instantiate(harvestedObjectPrefab, dropPoint.position, Quaternion.identity);
	}
	
	// Remove the harvested plant
	Destroy(gameObject);
	}
	}
	}
		The Harvest script enable when the plant is in the final stage, the harvest activities could proceed.

Table 8: *(Continued)*

Function	C# Script	Description

Hover UI Scale	public class HoverScaleUI : MonoBehaviour, IPointerEnterHandler, IPointerExitHandler
	{
	private Vector3 originalScale;
	public Vector3 hoverScale = new Vector3(1.2f, 1.2f, 1.2f);
	private void Start()
	{
	originalScale = transform.localScale;
	}
	public void OnPointerEnter(PointerEventData eventData)
	{
	transform.localScale = hoverScale;
	}
	public void OnPointerExit(PointerEventData eventData)
	{
	transform.localScale = originalScale;
	}}
		The Hover UI Scale script enable the image to have bigger scale than the original size when the ray pointer is point to the UI.

3.4 User Evaluation Phase

At this point, the PinExplore VR is tested by the customer and end users, among other stakeholders. They give the developers comments after pointing out its advantages and disadvantages. The prototype is improved by the developers using this information. The Prototype methodology allows for flexibility in testing, collect feedback and identify issues, missing features, and improvement areas. System Usability Scale (SUS) method was used during the testing the application with the user. The evidence of user acceptance testing is shown in Appendix F.

3.5 Refine Prototype Phase

In this stage, the PinExplore VR app has been enhanced in response to user feedback. During this stage, bugs are fixed, the app is made more user-friendly, and features are added to satisfy user demands. For example, the VR exploration might be modified to include simpler processes, such as planting, and harvesting. More details regarding pineapple types, and their cultural significance are now included in the gallery. Additional testing is carried out following each modification to ensure the changes function properly. Until the software satisfies all requirements and is prepared for the final release, this process keeps going.

3.6 Implementation and Maintenance Phase

In the stage, the approved prototype is developed into a complete product. The app is tested to ensure it functions properly once developers finish the coding and finalize the design. The PinExplore VR app is completing all its features, including the gallery and farmland exploration, and making sure everything runs well. After the program is out, it undergoes routine maintenance to add updates, enhance performance, and address any bugs. Additionally, maintenance guarantees that the application continues to suit user needs over time and remains compatible with new devices. This stage keeps the application dependable and beneficial for users. The functionality testing shows in Table 9.

Table 9 *Functionality Testing*

Test	Expected Result	Actual Result	Corrective Action
Start Button	Start the virtual world and change the users interface.	Works properly	No needed
Settings Button	Go to setting users interface.		
Farm Button	Go to the Farm scene virtual world.		
Gallery Button	Go to the Gallery scene virtual world.		
Exit Button	Exit the application.		
Back Button	Back to the previous interface.		
Close Button	Close the interface.		
Audio	Play audio		

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Table 9: *(Continued)*

Test	Expected Result	Actual Result	Corrective Action
Change Scene	Can change scene	Works properly	No needed
XR Grab Intraction	Can grab all the objects that needed.		
Particle System	Trigger the particle system to work	The particle system cannot trigger without interaction zone.	Add sphere collider at the zone that will burst the particle system.

4. Results and Discussion

User acceptance testing is performed to ensure that the application works as designed. Each module's performance was examined. System Usability Scale (SUS) is used to evaluate the system usability of the performance for the product [14]. The System Usability Scale (SUS) is a ten-item question scale designed to provide a global view of subjective usability evaluation. A total of 20 respondents with different ages, genders, and experience levels are involved in the usability testing to get more varied and useful feedback..

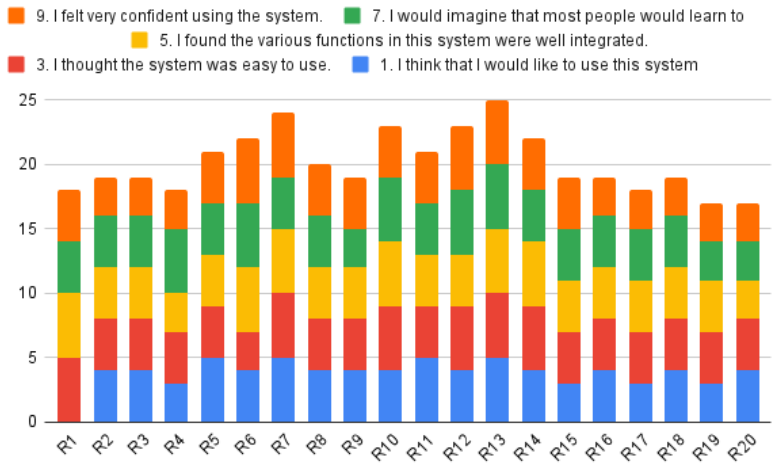

Fig. 3 *System Usability Scale Output (Odd Number)*

Question 1: I think that I would like to use this system frequently.
Question 3: I thought the system was easy to use.
Question 5: I found the various functions in this system were well integrated.
Question 7: I would imagine that most people would learn to use this system very quickly.
Question 9: I felt very confident using the system.

Fig. 4 *System Usability Scale (Odd Number)*

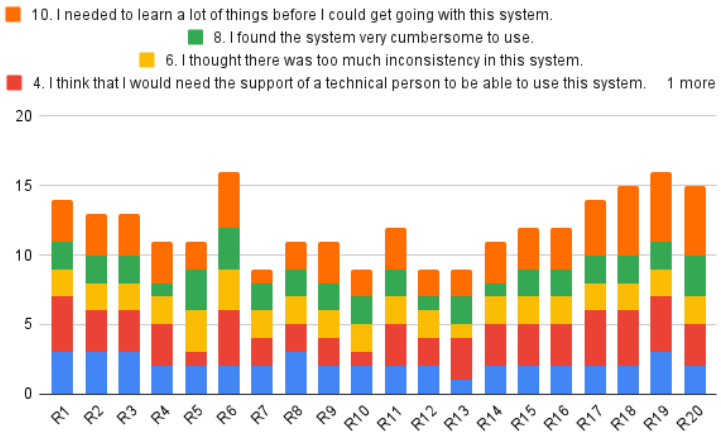

Fig. 5 System Usability Scale Output (Even Number)

Question 2: I found the system unnecessarily complex.
Question 4: I think that I would need the support of a technical person to be able to use this system.
Question 6: I thought there was too much inconsistency in this system.
Question 8: I found the system very cumbersome to use.
Question 10: I needed to learn a lot of things before I could get going with this system.

Fig. 6 *System Usability Scale (Even Number)*

Table 10 *Respondent's Score*

Respondent	Item Score										TOTAL
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SCORE
R1	3	3	5	4	5	2	4	2	4	3	67.5
R2	4	3	4	3	4	2	4	2	3	3	65
R3	4	3	4	3	4	2	4	2	4	3	67.5
R4	3	2	4	3	3	2	5	1	3	3	67.5
R5	5	2	4	1	4	3	4	2	4	2	77.5
R6	4	2	3	4	5	3	5	3	5	4	65
R7	5	2	5	2	5	2	4	2	5	1	87.5
R8	4	3	4	2	4	2	4	2	4	2	72.5
R9	4	2	4	2	4	2	3	2	4	3	70
R10	4	2	5	1	5	2	5	2	4	2	85
R11	5	2	4	3	4	2	4	2	4	3	72.5
R12	4	2	5	2	4	2	5	1	5	2	85
R13	5	1	5	3	5	1	5	2	5	2	90
R14	4	2	5	3	5	2	4	1	4	3	77.5
R15	3	2	4	3	4	2	4	2	4	3	67.5
R16	4	2	4	3	4	2	4	2	3	3	67.5
R17	3	2	4	4	4	2	4	2	3	4	60
R18	4	2	4	4	4	2	4	2	3	5	60
R19	3	3	4	4	4	2	3	2	3	5	52.5
R20	4	2	4	3	3	2	3	3	3	5	55
Average Score											**70.63**

Table 10 shows the analysis response's score from the System Usability Scale (SUS).

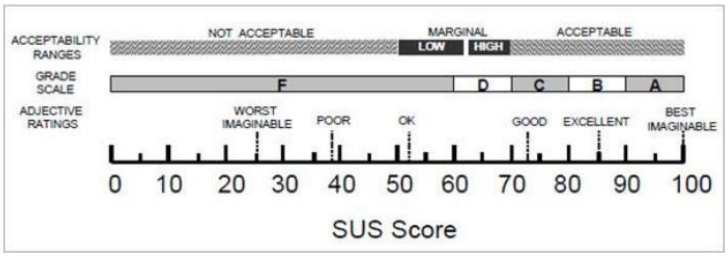

Fig. 7 *System Usability Scale (SUS) [14]*

A method based on the System Usability Scale (SUS) was used to get the overall scores for each question in the user testing. The average score of 70.63 falls inside the "acceptable" range according to the Acceptability Ranges score system. "Good" is the adjective rating, while "C" is the grade scale. All things considered, the integrated application successfully meets the needs of the intended users. The improvement for usability need to be more engaging during activity in Farm Exploration Module.

5. Conclusion

In conclusion, the PinExplore application is successfully developed. Based on the results, PinExplore VR application is suitable for target users to increase the understanding about the pineapple cultivation. The three objectives of this project are successfully achieved by implementing 3D models and design. Second, successfully

develop the PinExplore VR application using VR technology. Lastly, after the development phase of the project was completed, functional and user acceptance testing finally is performed.

Table 11 *Advantages and Limitations of Application*

Advantages	Limitations
PinExplore VR application had simplicity design.	Lack of realism environment world for the application.
PinExplore VR is for local users.	Only included one type of pineapple in cultivation method.
PinExplore VR mainly focus of the knowledge on pineapple fruit.	Users may not be able to simulate different soil types, climates, or pineapple varieties beyond what is programmed.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Muhammad Adib Mohammad Faiz, Suriawati Suparjoh;* ***data collection:*** *Muhammad Adib Mohammad Faiz, Suriawati Suparjoh;* ***analysis and interpretation of results:*** *Muhammad Adib Mohammad Faiz, Suriawati Suparjoh;* ***draft manuscript preparation:*** *Muhammad Adib Mohammad Faiz, Suriawati Suparjoh. All authors reviewed the results and approved the final version of the manuscript.*

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Appendix A: Summary of The Output of The Six Phases of the Prototype Methodology

Table 12 *Application Development Workflow*

Phases	Activity	Output
Requirement Stage	• Identify user needs. • Conduct interviews with stakeholders. • Research similar applications for features and usability. • Define functional and non-functional requirements.	• Detailed requirement specification document. • Initial feature list and app scope.
Quick Design Stage	• Create wireframes for user interface (UI). • Design the storyboard. • Outline the VR environment structure and content modules.	• Low-fidelity wireframes. • Storyboard • Interaction flow diagrams.
Building Prototype Stage	• Develop 3D models and environment. • Implement limited visuals and interactions. • Use simple assets for testing core functionality. • Test the prototype's technical feasibility.	• A working prototype with limited but functional features. • Basic VR environment for initial testing.
User Evaluation Stage	• Organize user testing sessions with stakeholders. • Observe users interacting with the prototype. • Collect qualitative and quantitative feedback. • Identify usability issues, missing features, and improvement areas.	• Comprehensive feedback report. • List of required refinements and suggestions. • Insights into user expectations.
Refine Prototype Stage	• Address feedback by updating and enhancing the prototype. • Improve visuals, interactivity, and usability. • Add or tweak features based on stakeholder input. • Perform additional testing to validate improvements.	• Enhanced prototype with refined features. • Updated design and functionality. • Testing results confirming improvements.
Implementation Product and Maintenance Stage	• Develop the final app based on the refined prototype. • Conduct thorough testing for performance, compatibility, and stability. • Launch the application on targeted platforms. • Roll out updates to improve functionality and content.	• Fully developed and functional VR application. • Regular updates and bug fixes. • Long-term maintenance plan.

Appendix B: Transcript interview with SME

Adib:	Assalamualaikum and good morning, sir. My name is Muhammad Adib bin Mohammad Faiz, and I am degree student at UTHM. Currently preparing for my final year project. In this project, I need to develop a virtual reality application for pineapple farm, I am here to invite you to participate in this interview session to help me complete this project. Before we start, could you please introduce yourself?
Mr. Faizul:	Sure, I am Mr. Faizul, I am currently working at Pineapple Plantation Sdn. Bhd. in Simpang Renggam, Johor.
Adib:	Mr. Faizul, how long usually take for pineapple fruit until it ripens?
Mr. Faizul:	Usually, it takes about 14 months for pineapple fruit to grow until it ripens.
Adib:	Alright, what tools are used to plant and harvest pineapples?
Mr. Faizul:	The tool that uses when planting is mini shovel and when harvest it, we are using machete basket and wheel burrowed.
Adib:	I see. Then, is there the difference between pineapple varieties in determining the level of ripeness?
Mr. Faizul:	There is no difference between the varieties of the pineapple to know when it ripens. Because the pineapple like MD-2 only takes about 14 months and N-36 takes around 10 or 11 months to grow. And, if the fruit is big, it means it is growing healthily.
Adib:	How often should pineapple plants be watered, and how to ensure the right amount of water?
Mr. Faizul:	During pineapple planting, watering does not happen to the pineapple because it is planted in peat soil and the pineapple plant also does not need too much water when it grows. This peat land is suitable because it has its own water system.
Adib:	I understand it. How is the pineapple grown; does it use the stem of the pineapple tree?
Mr. Faizul:	Not really, this pineapple tree is planted using pineapple torches or pineapple crests.
Adib:	I am designing a VR application. Do you think it is suitable for the new farmers has a chance to practice?
Mr. Faizul:	Yes, I think this is a great idea. Virtual reality could offer immersive experiences, allowing farmers to virtually practice and explore the farm.
Adib:	Is there any content that related to farm that I should have in the application? Do you think planting and harvesting is important?
Mr. Faizul:	I think it is important to the farmers get to know first how to plant and harvest before they could do in real world.
Adib	Okay. Now, please allow me to share my storyboard which is the design of the application with you.
Mr. Faizul	Sure, go ahead.
Adib:	Do you have any advice of my information that contain in my storyboard?
Mr. Faizul:	The information can be delivered using image and need to be simple and easy to understand. You should make sure the users read the instruction before doing the activities.
Adib:	Noted. Mr Faizul, I will try to modify that. Do you have anything to add?
Mr. Faizul:	I think that is all for me.
Adib:	Alright, sir. Thank you so much for lending your time to me. Assalamualaikum.

Fig 8 Transcript of interviewer

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Appendix C: System Flowchart

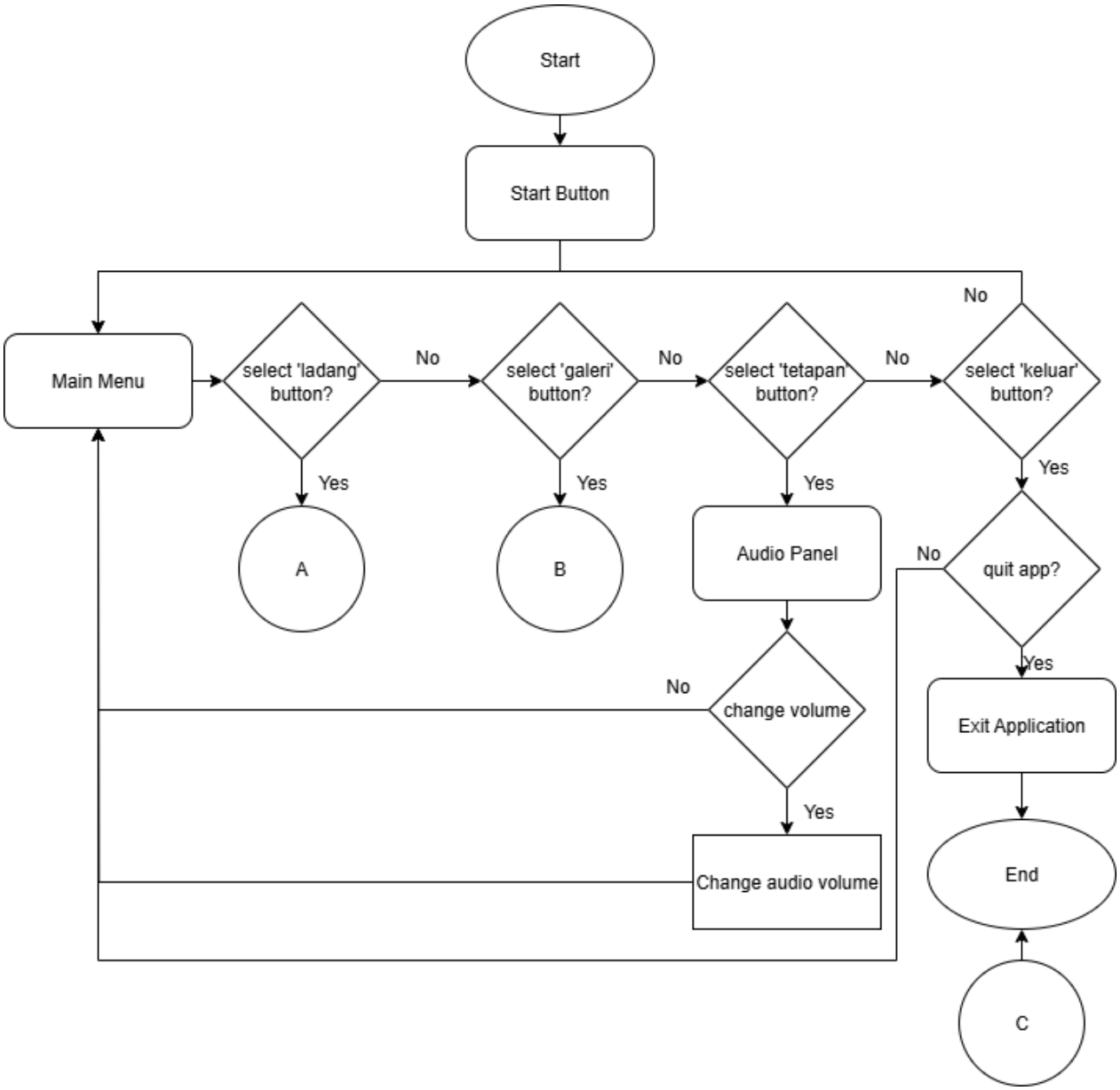

Fig. 9 *System Main Flowchart*

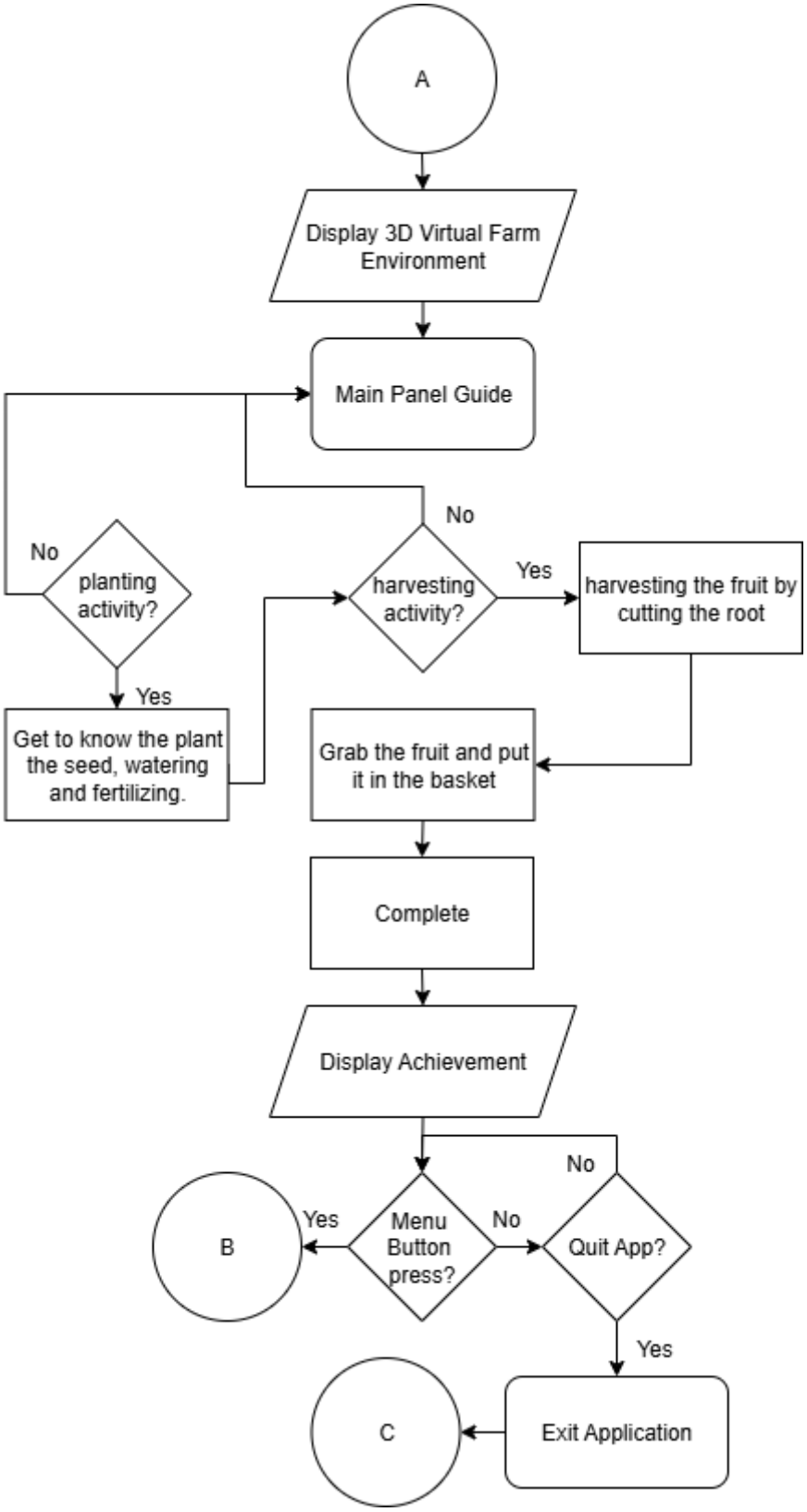

Fig. 10 *Farm Module Flowchart*

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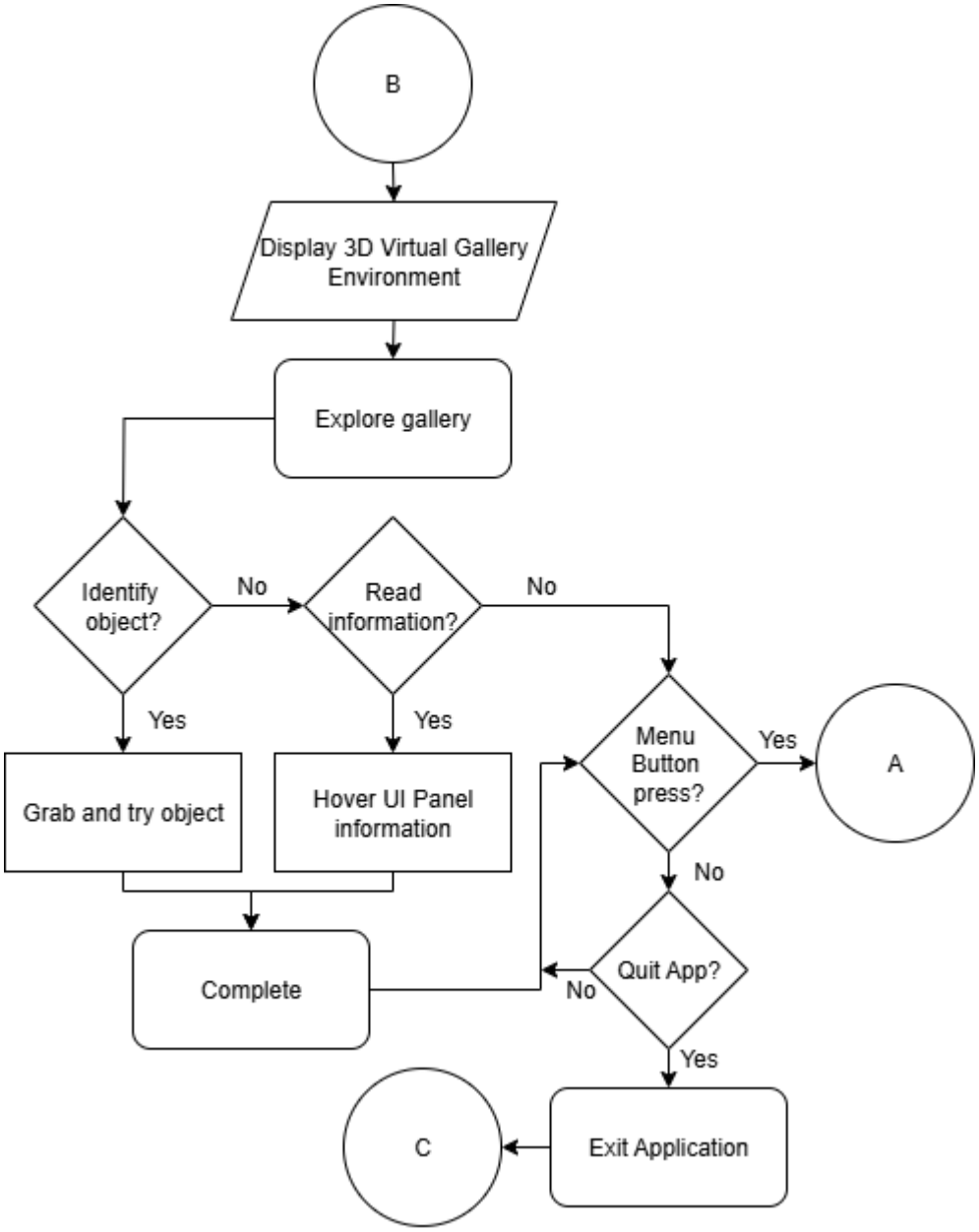

Fig. 11 *Gallery Module Flowchart*

Appendix D: Navigation Structure

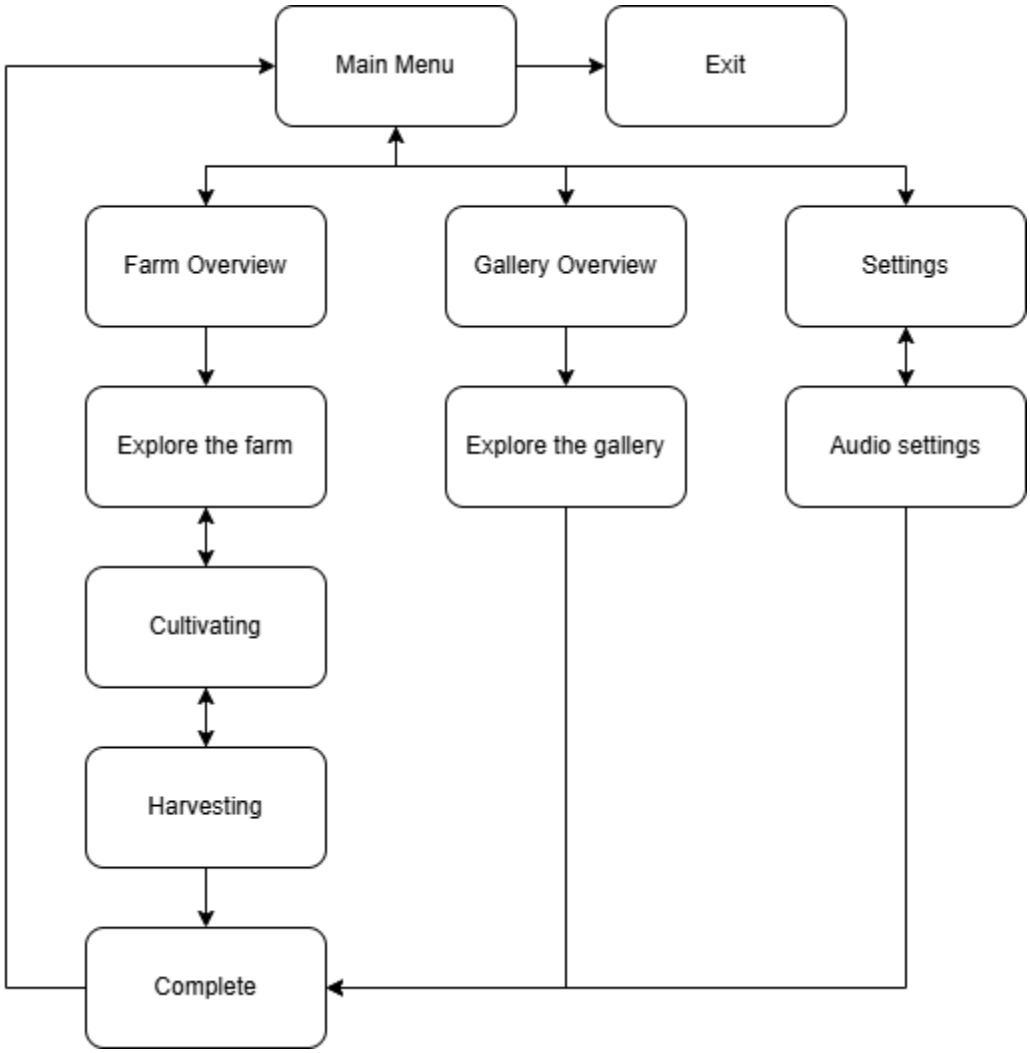

Fig. 12 *Navigation Structure*

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Appendix E: Interface Design

Fig. 13 *Main interface in the application*

Fig. 14 *Main menu in the application*

Fig. 15 *Settings interface in the application*

Appendix F: Evidence of User Acceptance Testing

Fig. 16 *Evidence of usability testing*