ICT Virtual Organization of ASEAN Institutes and NICT (ASEAN IVO)

Appendix 4.2

PJ2202 IVO Project - Agricultural IOT based on Edge Computing

KICK-OFF MEETING
Report/Minutes Form

I. Organizer:

Name:	Dr. Hoang Trong Minh （P1701R07)
Position:	Project Leader
Institution:	Posts and Telecommunciations Institute of Technology

II. Program:

Time: 8h00 AM – 10h00 AM (GMT+7, Hanoi time)
Date: 20 May 2022
Venue: Virtual Kick off meeting
Program Agenda:

Time	Content	Responsibility
8h00 – 8h05	- Guests greetings	International Coop Division, PTIT
8h05 – 8h10	- Opening speech	Assoc. Professor. Dr. Dang Hoai Bac, President of PTIT
8h10 – 8h25	- Reviewing on main work packages and tasks - Short introduction of members	Dr. Hoang Trong Minh, Project Leader
8h25 – 8h30	- Group photos in Google meet	
8h30 – 8h50	- Outlining the UMT research group - Describing the main responsibility work packages on the project - Presenting the planning and expected results	Professor. Dr. Norliza Mohd Noor, UMT, Malaysia
8h50 – 9h10	- Outlining the NECTEC research group - Describing the main responsibility work packages on the project - Presenting the planning and expected results	Dr. Chalee Vorakulpipat, NECTEC, Thailand
9h10 – 9h30	- Outlining the UET-VNU research group - Describing the main responsibility work packages on the project	Dr. Nguyen Trung Linh, AVITECH, Vietnam

9h30 – 9h50	- CRDA discussions - Shared drive & communication tool/channel - The next Event organization - Discussion on valuated comments from SC	Group discussion
9h50 – 10h00	- The closing statement	Dr. Hiroshi Emoto from the Secretariat

The first row of the table (partially visible at top):

| | - Presenting the planning and expected results | |

III. Participants:

Delegates from Posts and Telecommunications Institute of Technology (PTIT):

1. Assoc.Prof.Dr. Tran Quang Anh, Vice President (PTIT)
2. Assoc.Prof.Dr. Nguyen Tien Ban, Dean of Faculty of Telecommunication 1
3. Dr. Do Trung Anh, Deputy Head of the Office of Science & Technology Management and International Cooperation,
4. Nguyen Thi Thu Nga, International Coop Division

Delegates from NICT:

Dr. Hiroshi Emoto from the Secretariat of ASEAN IVO

Delegates from Project Team:

No	Full Name	Affiliation	ASEAN IVO member ID
1.	Dr. Hoang Trong Minh	Posts and Telecommunications Institute of Technology, Vietnam	P1701R07
2.	Assoc. Prof. Hoang Dang Hai	Posts and Telecommunications Institute of Technology, Vietnam	P2202R01
3.	Dr. Pham Anh Thu	Posts and Telecommunications Institute of Technology, Vietnam	P2202R02
4.	MSc. Nguyen Thanh Tra	Posts and Telecommunications Institute of Technology, Vietnam	P2202R03
5.	Dr. Tran Thi Thuy Quynh	VNU_University of Engineering and Technology Vietnam, Vietnam	P1802R07
6.	Dr. Pham Minh Trien	VNU_University of Engineering and Technology Vietnam, Vietnam	P2202R05
7.	Dr. Nguyen Le Khanh	VNU_University of Engineering and Technology Vietnam, Vietnam	P2202R13
8.	Dr. Chu Duc Ha	VNU_University of Engineering and Technology Vietnam, Vietnam	P2202R14
9.	Msc. Quach Cong Hoang	VNU_University of Engineering and	P2202R06

		Technology Vietnam, Vietnam	
10.	Dr. Ngo Khac Hoang	VNU_University of Engineering and Technology Vietnam, Vietnam	P2202R07
11.	Assoc. Prof. Nguyen Linh Trung	VNU_University of Engineering and Technology Vietnam, Vietnam	P1802R05
12.	Assoc. Prof. Nguyen Viet Ha	VNU_University of Engineering and Technology Vietnam, Vietnam	P1802R06
13.	Dr. Phung Manh Duong	VNU_University of Engineering and Technology Vietnam, Vietnam	P2202R15
14.	Dr. Norulhusna Ahmad	The Universiti Malaysia Terengganu	P1904R05
15.	Dr. Hazilah Mad Kaidi	The Universiti Malaysia Terengganu	P2202R12
16.	Prof. Norliza Mohd Noor	The Universiti Malaysia Terengganu	P2202R11
17.	Dr. Chalee Vorakulpipat	National Electronics and Computer Technology Center, Thailand	P1701R02
18.	Dr. Montida Pattaranantakul	National Electronics and Computer Technology Center, Thailand	P2202R09
19.	Dr. Soontorn Sirapaisan	National Electronics and Computer Technology Center, Thailand	P2202R10
20.	Dr. Takeshi Takahashi	National Institute of Information and Communications Technology, Japan	P2202R08

IV. Summary of the activities corresponding to the objectives

No.	The activities corresponding to the objectives stated as the proposal	Actual status
1.	The project leader formally informed for all project members that the project was underway.	Done
2.	The project leader made the introduction to the team and provided them with background information about the project's requirements, experience, and roles	Done
3.	The representatives of collaborated institutions discussed the work packages assigned, project plan, and CRDA signing	Partial done[1]
4.	The members were together focused on favor solutions to adapt the valuated comments from SC	Partial done[2]
5.	The members agreed the organisation of the next academic event	Done
6.	The formal working media was introduced to make the efficient cooperation such as shared drive & communication tool/channel.	Done
7.	The project members received more detailed guidelines from IVO SC to finalize specific work plans in the project	Done

1. The representatives of collaborated institutions discussed the work packages

assigned, project plan, and CRDA signing as follows:

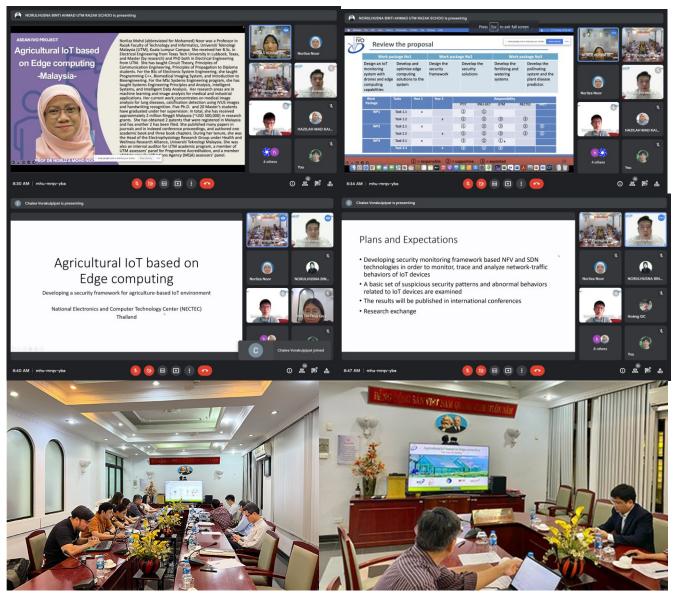| Year	Activity	1	2	3	4	5	6	7	8	9	10	11	12
2022	The kick-off meeting (Online)					■							
	The next Academic Event										■		
	Collect comments on CRDA from each party						■	■	■				
	Submit CRDA to NICT									■			
	Design an IoT monitoring system with drones and edge computing capabilities									■	■	■	■
	Design the security framework										■	■	■
	Develop the fertilizing and watering systems											■	■
	Conference attendance, publication									■	■	■	■
2023	Develop and optimize edge computing solutions to the system		■	■	■	■	■	■	■	■	■	■	■
	Develop the security solutions		■	■	■	■	■	■	■	■	■	■	■
	Develop the pollinating system and the plant disease predictor	■	■	■	■	■	■	■	■	■	■	■	■
	Data collection and analysis	■	■	■	■	■	■	■	■	■	■	■	■
	Workshop						■	■					
	Research exchange (to NICT)												■
	Conference attendance, publication									■	■	■	■
2024	Data collection and analysis	■	■	■									
	Publication		■										
	The final meeting			■									

2. The members were together focused on favor solutions to adapt the valuated comments from SC

- The proposal for the edge computing for indoor smart farm need to be more specific on the use of drone (2 drones) in this experimental setting:
  In the vertical farming, there are several layers of vegetables. Therefore, the indoor drones with cameras could be used to monitor the growth and diseases of vegetables.

- IP and knowledge transfer: Intellectual property and knowledge transfer after signing the agreement:
  IP belongs to the parties which design and create the system but knowledge will be transfer to all parties.

- Data collection:
  In order to monitor the growth and diseases of vegetables, a lot of data need to be collected for the machine learning model which will classify the disease.

V. Others

- *The link for the event:*
  https://portal.ptit.edu.vn/eng/posts-and-telecommunications-institute-of-technology-launch-the-research-project-agricultural-iot-system-based-on-edge-computing-under-asean-ivo-program/
- *Here are some pictures at the kick-off meeting:*

- *The introduction slide by the project leader:*

Agricultural IoT based on Edge computing
The kick-off meeting

May 20 2022

Agenda

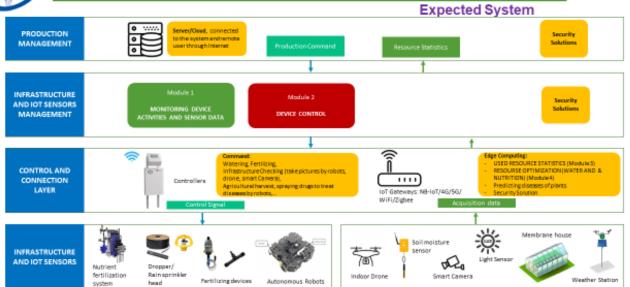| Time	Content	Responsibility
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9h10 – 9h30	- Outlining the UET-VNU research group - Describing the main responsibility work packages on the project - Presenting the planning and expected results	Dr. Tran Thi Thuy Quynh, AVITECH, Vietnam
9h30 – 9h50	- CRDA discussions - Shared drive & communication tool/channel - Event organization - Discussion on valuated comments from SC	Group discussion
9h50 – 10h00	The closing statement	Dr. Hiroshi Emoto from the Secretariat of ASEAN IVO

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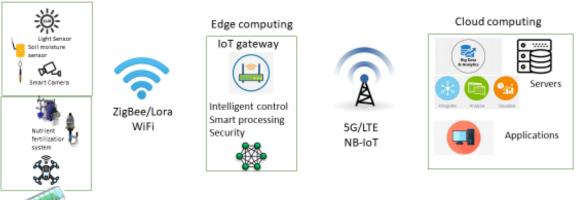## Review the proposal and Plan

Expected System

Review the proposal and Plan

WP1: New intelligent edge computing solutions for data collection and local response control in smart farming

WP2: An agricultural IoT security framework based on authentication, data preservation, and encryption

WP3: An automatic agricultural system for indoor smart farms with the involvement of robot arms and drones

Review the proposal and Plan

Work package No1		Work package No2		Work package No3	
Design an IoT monitoring system with drones and edge computing capabilities	Develop and optimize edge computing solutions to the system	Design the security framework	Develop the security solutions	Develop the fertilizing and watering systems	Develop the pollinating system and the plant disease predictor.

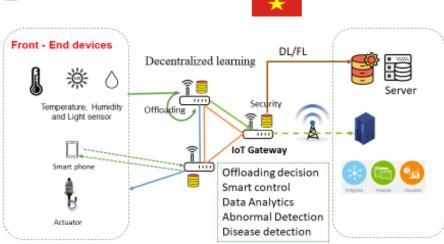| Work Package	Tasks	Year 1	Year 2	Responsibility				
				PTIT	VNU-UET	UTM	NECTEC	NICT
WP1	Task 1.1	x		②	①			
	Task 1.2		x	①	②	③	③	
WP2	Task 2.1	x		①	②	③	②	②
	Task 2.2		x	①	②	③	②	②
WP3	Task 3.1	x		③	②	①		
	Task 3.2		x	②	①	②		

① = responsible   ② = supportive   ③ = exploited

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Review the proposal and Plan

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Review the proposal and Plan

Front - End devices

Temperature, Humidity and Light sensor

Smart phone

Actuator

Decentralized learning

Offloading

DL/FL

Security

IoT Gateway

Offloading decision
Smart control
Data Analytics
Abnormal Detection
Disease detection

Server

Integrate Analyze Visualize

Objectives
Offloading strategies, Authentication and Abnormal detection.
Methods
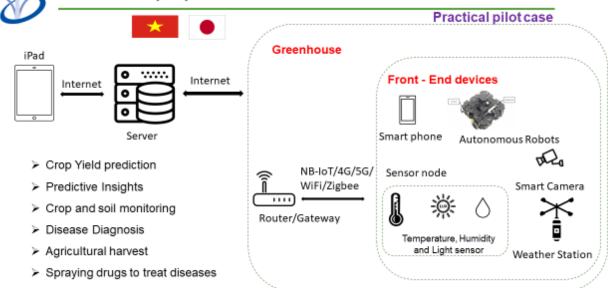Analytics, federated learning and swarm learning.
Planning (6-18 months)
- Optimize offloading problems based on heuristic algorithms.
- IDS based DL/FL (Test on IoT 23 database). Down scale to Edge Devices.
- Apply miniAI model to Pi.
- Smart control based on FIS/HA.

Expected Results
Model and testbed.

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Review the proposal and Plan

Practical pilot case

iPad

Internet — Server — Internet

> Crop Yield prediction
> Predictive Insights
> Crop and soil monitoring
> Disease Diagnosis
> Agricultural harvest
> Spraying drugs to treat diseases

Greenhouse

Front - End devices

Smart phone   Autonomous Robots

NB-IoT/4G/5G/
WiFi/Zigbee   Sensor node

Router/Gateway

Temperature, Humidity and Light sensor

Smart Camera

Weather Station

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Review the proposal and Plan

Practical pilot case

Integration of Coding-FL-DL for Plant Disease Detection

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Introduction of Members

No	Full Name	Specialized Field/Role	Affiliation	Country
1	Dr. Hoang Trong Minh (Project Leader	Communication networking, security, edge computing/Be responsible for the whole project, the adaptation of the IoT system to Vietnam's agricultural practice, and the development of edge computing capabilities, support the development of security solutions.	PTIT	VIETNAM
2	Assoc. Prof. Hoang Dang Hai	Communication networking, security/Be responsible for the PTIT team, oversee the technological development of the PTIT team.	PTIT	VIETNAM
3	Dr. Pham Anh Thu	Communication networking and edge computing/Be responsible for the development of optimization algorithms based on heuristic methods.	PTIT	VIETNAM
4	MSc. Nguyen Thanh Tra	Communication networking and edge computing/Be responsible for the development of optimization algorithms based on analytical methods.	PTIT	VIETNAM
5	MSc. Tran Thi Huong Giang	Associated member/Be responsible for the planning, logistical set up and execution of project meetings, workshops and other academic events	PTIT	VIETNAM
6	Dr. Dinh Tran Hiep	Computer vision, robotics/ Support the development of object detection and navigation algorithms.	VNU-UET	VIETNAM
7	Dr. Tran Thi Thuy Quynh	Wireless communication, practical implementation of IoT security/ Support the development of security solutions	VNU-UET	VIETNAM
8	Dr. Pham Minh Trien	Agriculture technology/ Be responsible for developing the pollinating system and the plant disease predictor, support the translation of technological developments to agricultural practice in Vietnam, exchange agricultural experience with the UTM team and others	VNU-UET	VIETNAM
9	Dr. Nguyen Le Khanh	Agriculture technology, specialist in protected agriculture and plant factory/ Support the translation of greenhouse systems to agricultural practice in Vietnam	VNU-UET	VIETNAM
10	Dr. Chu Duc Ha	Biological technology/ Support the choosing the plant care routine of agricultural crops.	VNU-UET	VIETNAM
11	Msc. Quach Cong Hoang	Robotics/ Be responsible for the development of localization and navigation algorithms.	VNU-UET	VIETNAM

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Introduction of Members

No	Full Name	Specialized Field/Role	Affiliation	Country
12	Dr. Ngo Khac Hoang	Wireless communication, communication networking/Support the development of edge computing capabilities.	VNU-UET	VIETNAM
13	Assoc. Prof. Nguyen Linh Trung	Signal processing, wireless communication, communication networking, AI, IoT security/ Be responsible for VNU-UET team, oversee the technological development for the VNU-UET team, support the development of security solutions	VNU-UET	VIETNAM
14	Assoc. Prof. Nguyen Viet Ha	Computer science, software engineering, artificial intelligence and security/ Support the development of AI and security solutions	VNU-UET	VIETNAM
15	Dr. Phung Manh Duong	Wireless communication, communication networking/Support the designing of robot and drone system for pollinating and plant disease prediction	VNU-UET	VIETNAM
16	Dr. Norulhusna Ahmad	Wireless communication, communication networking, IoT/ Support the for developing IoT monitoring system (the fertilizing and watering systems).	UMT	MALAYSIA
17	Dr. Hazilah Mad Kaidi	Wireless communication, communication networking, IoT/ Be responsible for developing IoT monitoring system (the fertilizing and watering systems).	UMT	MALAYSIA
18	Prof. Norliza Mohd Noor	Signal processing, AI/ Be responsible for the UTM team, oversee the development of the IoT monitoring system	UMT	MALAYSIA
19	Dr. Chalee Vorakulpipat	Information security/ Be responsible for NECTEC team and the development of security solutions	NECTEC	THAILAND
20	Dr. Montida Pattaranantakul	Information security/ Support the development of security solutions.	NECTEC	THAILAND
21	Dr. Soontorn Sirapaisan	Information security/ Support the development of security solutions.	NECTEC	THAILAND
22	Dr. Takeshi Takahashi	Cybersecurity, machine learning/ Support the development of security solutions	NICT	JAPAN

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Discussion

1. The evaluation comments from the SC
- Operation and communication of control devices (drone, robot arm, etc) UMT and UET
- Significant of the IoT security and NVF at this time. NECTEC
- Member will contribute to the project.
- Relevant information (IP and knowledge transfer) is not provided in the proposal.

2. Collaborative Research and Development Agreement (CRDA)
- Deadline, September 2022
- Intellectual property (IP)

3. Shared drive & communication tool/channel
- Email; viber/telegram/whatsapp

4. Next academic event
- Hanoi, October 2022

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Thank you for your attention!

Hoang Trong Minh