

# An Application of Microsoft Kinect to translate Thai Sign language of fruits to help people with hearing loss and deafness.

Pollacha Jeakkhajom<sup>1</sup>, Supasit Menasin<sup>1</sup>, Warakorn Kropphet<sup>1</sup>, Izzati Muhimmah<sup>2</sup>, Julaluk Watthananon<sup>3</sup>  
Computer Science Branch Faculty of science and Technology Rajamangala University of Technology Thanyaburi  
39 Moo 1 Rangsit-Nakhonnayok Rd Thanyaburi Pathumthani 12110

Location Cooperative Education : Universitas Islam Indonesia Jalan Kaliurang KM 14,5, Umbulmartani, Ngemplak, Umbulmartani,  
Ngemplak, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55584

## Abstract

Under Research Competency-based Management for Persons with Disabilities' Education Development. By Ph.D Julaluk Watthananon. Hearing impaired people can not speak communicate. And do not understand the sentences of Thai language in communication. The problem of communication between the hearing impaired people want to communicate with the normal. which make a project An Application of Microsoft Kinect to translate Thai Sign language of fruits to help people with hearing loss and deafness. To reduce the gap of communication between the hearing impaired and the normal person.

Keywords: Microsoft Kinect, Thai Sign language, deafness, Application, Skeleton

## 1. Introduction

At present, Thailand has a large number of people with disabilities. People with disabilities usually suffer of activity limitations, and restrictions on participation. In living the lives of people with disabilities, there are many problems and obstacles in life. The first is self-help. The second is communication for the hearing impaired or deaf. Which currently there are 330,488 people with hearing disabilities in Thailand and 5,403 people with education. The researcher aims to solve the problem of communication between the hearing impaired people who want to communicate with normal people, so they have the idea to present and develop the application under the research project on development of evaluation system and performance indicators. By hand-to-hand communication via a smartphone, the program converts Sign language through mobile phones into text for easy

communication and makes people who do not understand the language understand what deaf people want to communicate with people. Developers will develop Thai language from Kinect Animation. And in the beginning, this simulates the verbs of tropical fruits. To work as a model. And in the future will develop to be able to transform all manner of gestures. To make the communication between the normal and the hearing impaired better.

## 2. Literature Reviews

### 2.1 Microsoft Kinect

Kinect is a line of motion sensing input devices by Microsoft for Xbox 360 and Xbox One. Kinect camera was released by Microsoft Corporation to interact with game consoles at the beginning of 2010 and the major idea behind was to develop an interface device to avoid hand-controller devices using depth data to transform player's movement into controls and also voices for spoken commands. The first version was released with Xbox 360 console. The second version was released in 2014 along with Xbox One console and more performances compared to the first one. Kinect has built-in devices such as webcams. To get a picture of the player and be able to record it. With the motor in the cradle, the camera and the entire mic can twist. Or rotate according to the user's face. And coordinate the work with IR (infrared) To detect various positions. 3-axis user body (W x L x H), 2 people simultaneously. Every user's movement will be processed. To send a command for interacting with the Xbox 360 with a microphone that can receive input audio of 360 degrees as well. [1]

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1 Pollacha Jeakkhajom, Supasit Menasin, Warakorn Kropphet

2. Izzati Muhimmah TEKNIK INFORMATIKA, TEKNOLOGI INDUSTRI, Universitas Islam Indonesia.

3. Julaluk Watthananon Supervisor Cooperative Education Computer Science, Rajamangala University of Technology Thanyaburi.

## 2.2 Thai Sign Language

Sign language is a language that uses combinations of hand-shapes, orientation, movements, arms, body, position, facial expressions and lip patterns to communicate without using sound. Like spoken or written languages, sign languages used in different countries are different and standard. For example, American Sign Language (ASL) is used by approximately one-half million deaf people in the United States and Canada [10]. ASL is one of the most complete sign systems in the world. British Sign Language (BSL) has been used in England while Thai Sign Language (TSL) has been used by approximately 56,000 deaf people in Thailand Like Thai, TSL is considered to be a national language for Thai deaf people. However, TSL has its own syntax and semantics as each Thai spoken language does, therefore, performing a sign correctly is as important as pronouncing a word correctly.[2]

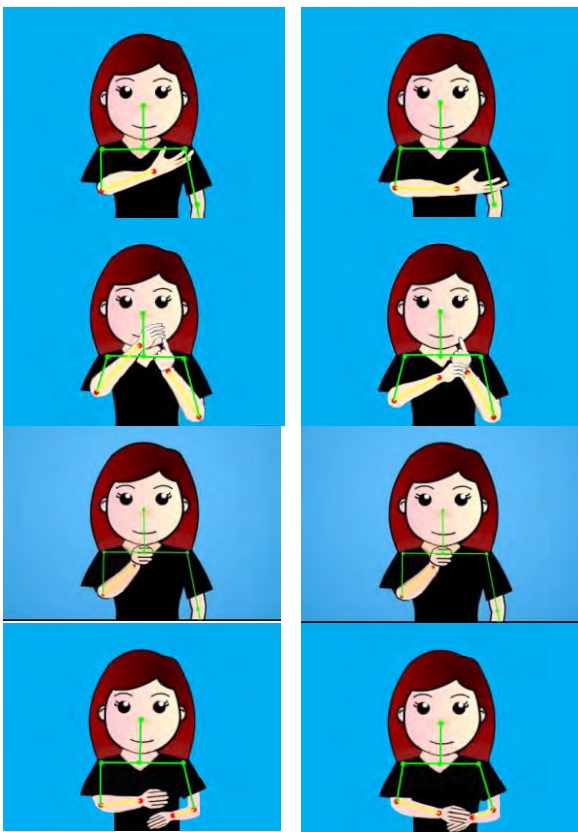


Figure.1 Examples of Sign Language used in the system.

## 3. Method

Implementation and research project. Design and development of information systems for help the hearing impaired in communication with normal people. And can be systematically stored. To increase the convenience and accuracy of communication. The Kinect device can be summarized as follows.

1.) Feasibility study of the project. This research project, the subject Information systems to solve problems in the communication between deaf and normal individuals.

Study of guidance on how to fix and prevent problems, and store data in a systematic way.

2) Needs analysis and design of information systems. Analysis of the data that user want to work in some form. And to design systems that users require it. To make it easier to design web pages. And to prioritize content.

3) Development and information systems, systems that generate it directly as researchers have designed and made as real as a form of systems previously.

4) Check and correct the accuracy of the system. The system checks that there is an error in the section? If it encounters an error within the system, then the edit system accuracy. So no errors occur within the system again.

5) Test the program by a group of samples that are used in the test is hearing impaired and normal person 10 people each. To test the efficiency of the system, and find the error. To do the update.

6) Summary of results and preparation of the instruction manual to be used as a guide to the study, knowledge and understanding of the work process of design/tool.

## 4. Experimental results

Depth gauges take the brightness level of infrared light falling on the object. send to a sensor to measure the depth of the axis Z (Axis-Z). the environment can be simulated in three dimensions. when the brightness is high, the object is near, on the other hand, if the brightness is lower, the object is far away. Kinect sensors can separate the player from the room environment. such as wall, sofa, or even the identification of the player's hand is in front or behind. The environment of the working area should be open space.

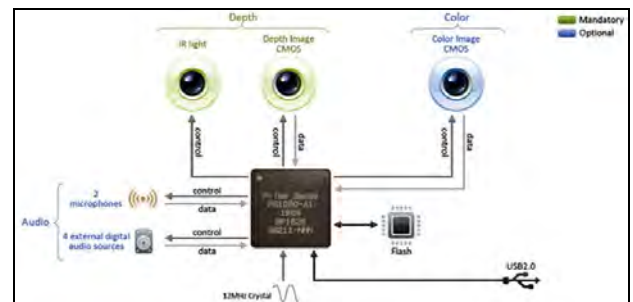


Figure.2 Overview of Kinetic Works.

When using the system, the experimenter must sit and not stand. Appropriate seating should be away from the camera between 59-79 centimeter. The hands distance from the camera are in between 35-53 centimeter. Windows size is (1280, 480, 2048) Used kinect version1, as can be seen in Figure 5. To be recognized, users simply

need to be in front of the sensor, making sure the sensor can see their head and upper body; no specific pose or calibration action needs to be taken for a user to be tracked. The image of user and environment can be seen in Figure.3

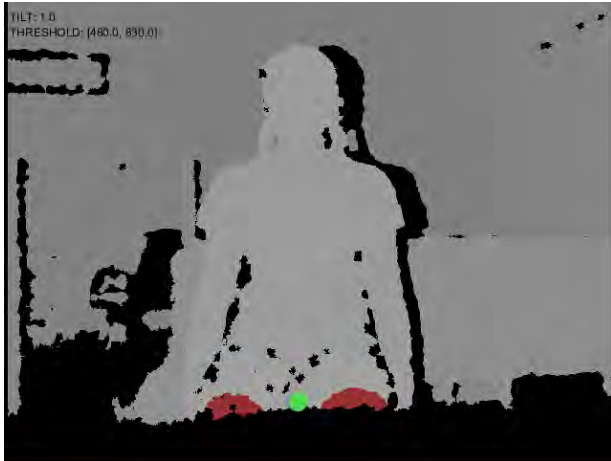


Figure.3 Experiments in normal environments.

When sitting in a designated distance. Show only body users is yellow. background is black can not see the environment and there will be tracking points on the user. pink hand and green hand are a equal distance. pink hand is left hand. Green hand is right hand. pink dots will focus on the head. purple dots focus on the left hand and red dots focus on the right hand. The image of user can be seen in Figure.4



Figure.4 The relationship of the points to the body focus.

## 5. Conclusion

This project we develop under the Competency - based Management for Persons with Disabilities' Education Development by Julaluk Watthananon Ph.D. And we want solve the problem of communication between the hearing impaired people. We develop system by image processing technic according to

1. Separate the body area from the surrounding area and the area of both hands.

2. Calculate the center of each area. Include Area of body and area of both hands.

3. Make the point color for show position center. Which we have 3 points include the head and both hands.

4. Make the point color tracking for follow body user and keep values in the system.

## 6. Future Work

In this project we have 3 point of tracking body and in future we must tracking throughout the body for calculate the error. In the future, this project will be developed to allow the sign language used in daily life. For help to disabilities with people to communicate.

## REFERENCES

- [1] Niyonsaba Eric and Jong-Wook Jang "Kinect Depth sensor for Computer Vision Applications in autonomous Vehicles", 2017 Ninth International Conference on Ubiquitous and Future Networks (ICUFN), 27 July 2017.
- [2] Thammanoon Ditcharoen, Kanlaya Naruedomkul, Nick Cercone and Bundit Tipakorn "TSTMT: Step towards an Accurate Thai Sign Translation",

## Author Biography

Miss. Pollacha Jeakkhajorn



Computer Science Branch.  
Rajamangala University of Technology  
Thanyaburi.  
415 Moo.7 Banna, Kapoe, Ranong  
85120  
Tel. : (+66)96-143-9396  
E-mail : polnatcha@gmail.com

Mr. Supasit Menasin



Computer Science Branch.  
Rajamangala University of Technology  
Thanyaburi .  
43 Moo.12 Banlen, Bang Pa-In,  
Ayutthaya 13160  
Tel. : (+66)97-108-3598  
E-mail : ember097108@gmail.com

Mr. Warakorn Kropphet



Computer Science Branch.  
Rajamangala University of Technology  
Thanyaburi .  
20 M.4 T.Hinpak, Banmi, Lopburi 15110  
Tel. : (+66)80-109-4263  
E-mail : bongspiganwork@gmail.com