**MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

**Vietnamese Sign Language Recognition**

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| **Group 05** | |
| **Group members** | Nguyễn Hữu Kỳ Long – Team leader – SE60984  Nguyễn Đình Tân – Team member – SE61115  Nguyễn Xuân Ý – Team member – SE60869  Lê Phương Bình – Team member – SE61049 |
| **Supervisor** | Mr. Đỗ Đức Minh Quân |
| **Ext. Supervisor** | N/A |
| **Capstone Project code** | VSLR |

-Ho Chi Minh City, 24/05/2015-

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# Definitions, Acronyms, and Abbreviations

|  |  |
| --- | --- |
| **Name** | **Definition** |
| VSLR | Vietnamese Sign Language Recognition |
|  |  |
|  |  |
|  |  |

# Report No.2 Software Project Management Plan

# Problem Definition



### Name of this Capstone Project

* Vietnamese Sign Language Recognition

### Problem Abstract

As we know, in the daily life, there is a lot of ways people can understand others such as speech, expression of act, gesture or feelings, etc. However, it is better to express oneself in speech. At the same time, it is an actual matter to mute people to get other people and in the opposite way. The current solution for them is sign language but that means it requires everyone to know sign language of mute people or need someone play as a translator. But these solutions just solve the problem at that time, these are not a long-term strategy. It expects a long time and high cost for preparation from them to solve the problem. In additional, there still are some temporary solutions such as handwriting or using familiar signs, but these way will not produce the desired effect and requires lots of time or effort.

To solve those problems mentioned above, we propose a solution which can help dump person to express themselves in speech or text. That is a device playing a translator and act as intermediary role.

### Project Overview

#### Current Situation and Disadvantages

Below are some current behaviors of user:

* Handwriting:
* People will use something can write on as vehicle for communication.
* They can write out exactly what they want to say to the recipient.
* The recipient can receive and read the content immediately.
* Familiar signs:
* Speakers will describe the word which they want say through action, describe the shape, body language.
* Listeners observe the speaker's actions. They predict information that the speaker shown.
* Interpreters:
* Act as intermediary to translate the content of communication.
* Speakers express words by their language, the interpreter receive information from the speaker and then convey that information by the language of the listener.
* Degree of accuracy of translated content is quite high for both two sides.

Below are the disadvantages of current situation:

* Hand-writing :
* Users must use an intermediary for communication such as paper, pens. However, these things are not always available.
* Users spend more time to write out all their wishes and read them.
* User can meet difficulties about different languages.
* The error can be caused by user handwriting.
* Using familiar signs :
* Maybe be misleading because the symbols are not standardized.
* It is trending towardspersonally identifiable user.
* It is difficult to show all wishes of communicator.
* Time consuming for understanding the content is long.
* Translator :
* Hiring a translator must be costly.
* Translator who work only in the fixed time, thus not always can meet user's demands.
* Translator must be a experienced person.
* Number of translator is limited.

Analyzing image is the most common way to solve many problems in the real life. One of those problems is recognition. Today, with growth of support analyzing image library and algorithms provided to process image is widespread, tracking and recognition can be performed more easily. Our project is taking into consideration about it to recognize hand signs to help people can communicate with another people.

* Advantages:
* Can be implemented on many different platforms.
* Operating costs less expensive.
* Implemented quickly by many image processing algorithm diversity.
* Disadvantages:
* Analyzing image still remains restriction on process environment, point of view.
* Recognition have still not covered every cases yet. Withhin weird characterises, the result maybe not high accurate.
* Currently, analyzing image and recognition just detect and recognize hand signs without motion.
* To get high degree of accuracy, it requires some accesories from users.

#### The Proposed System

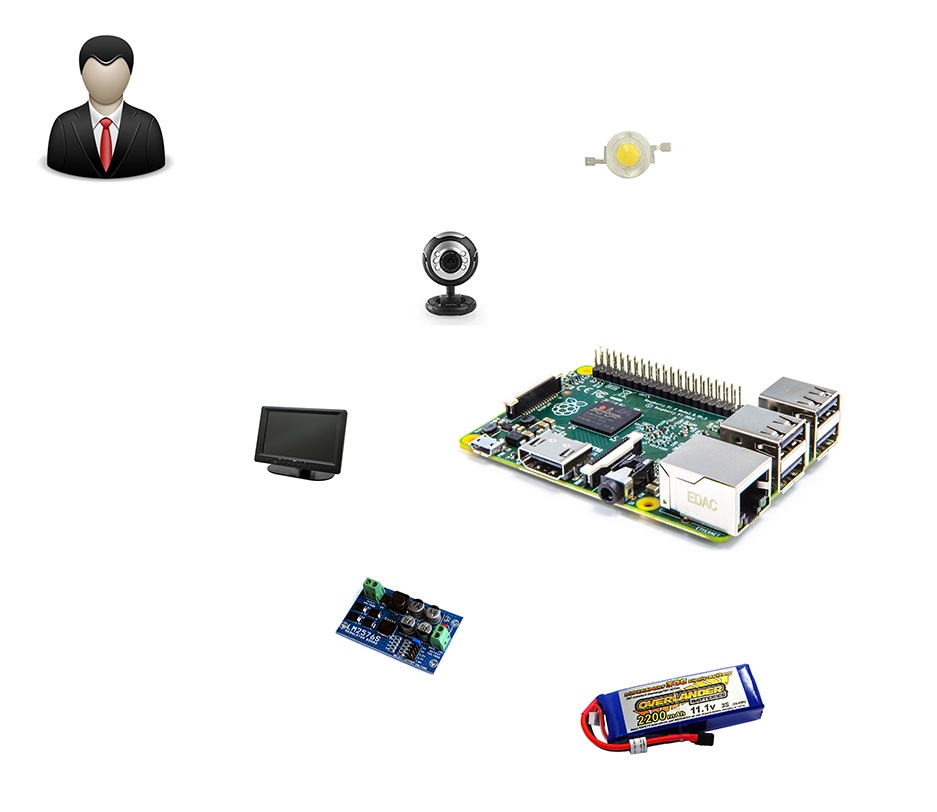
Exploiting the development of embedded technology and the growing of image analysis, we put forward a system to solve the problem. This system includes a camera capturing hand signs and a board to analyze these captures and process some different functions.

##### Hand Tracking

##### Hand Features Taking

##### SVM

#### Boundaries of the System



**Figure 1: Boundaries of the System**

#### Development Environment

##### Hardware requirements

* Raspberry Pi B2
* Camera module of raspberry kit
* LCD 7 inch
* LM2576ADJ-Board
* Lipo Battery
* Led 1W

##### Software requirements

* Linux: operating system and platform for deploy
* Gnu compiler collection: g++
* Remote Desktop: application for remoting to work on raspberry
* QT Creator: is to develop c++ application and Linux GUI
* Githup and TortoiseSVN and Rabbit VCS: used for source control
* Skype: used for communication and meeting

## Project organization

### Software Process Model

Project is developed under scrum model. We choose this model because the unpredictable properties of the project, when the requirement changes day by day and technology need to be research to adapt the scope of the project.

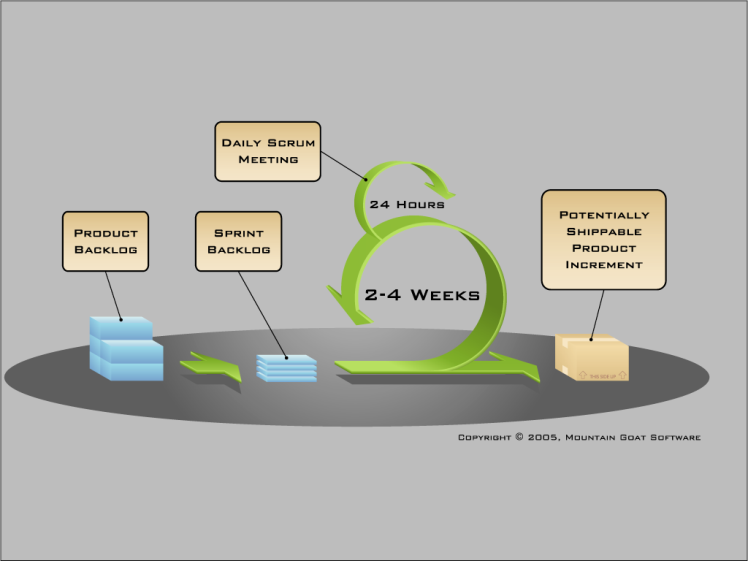


Figure 1: Scrum Development Model

For more information: <http://www.mountaingoatsoftware.com/agile/scrum>

### Roles and responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Full name** | **Role in Group** | **Responsibilities** |
| **1** | Đỗ Đức Minh Quân | Scrum Master/Product Owner | * Specify user requirement * Control the development process * Give out technique and business analysis support |
| **2** | Nguyễn Hữu Kỳ Long | Team Leader, BA, DEV, Tester | * Managing process * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |
| **3** | Nguyễn Xuân Ý | Team Member, BA, DEV, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |
| **4** | Lê Phương Bình | Team Member, BA, DEV, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding   Testing |

Table 3: Roles and Responsibilities Details

### Tools and Techniques

- Front-end technology: Linux GUI.

- Back-end technologies:

* C++ application
* OPENCV library
* LIBSVM library

- Front-end and back-end IDE: QT Creator

## Project Management Plan

### Product Backlog

### Sprint Backlog

### All Meeting Minutes

## Coding Convention

Use GCC C++ coding convention to develop website, web service and mobile app.

Summary:

* Naming Convention.
  + Use camel case for both variable and function name.
  + Use Pascal case for class name.
* Indentation.
  + Avoid lines longer than 80 characters, since they are not handled well by many terminals and tools.
* Declaration.
  + One declaration per line is recommended since it encourages commenting.
  + In absolutely no case should variables and functions be declared on the same line.
  + Do not put different types on the same line.
* Code Examples https://gcc.gnu.org/wiki/CppConventions