**Minh**: Good morning ladies and gentlemen, we are students from Vietnam National University. First of all, we would like to send our warmest welcome to all of you. It is our pleasure for us to be here to present to you our invention which is named Smart garbage classification system. Don’t waste your time, we will talk about the main features of our invention now.

As we all know, the world population is increasing dramatically and until now, our planet has approximately 7.8 billion people. This is a big challenge to the environment as more people will lead to more garbage being produced. This reality has lead to the downfall of human health, leading to serious illness; it also damages the road scenery, and so on.

Smart garbage classification system is vital for classifying garbage as well as protecting human health, who work in garbage industrial. By using machine learning with an appropriate pre-trained model, we were able to detect the type of garbage with an accuracy of up to 99%. In addition, a robotic arm is added for moving garbages into the pre-defined bins. Next Mr. Bao will explain how our system work.

**Bao**: Thank you Mr. Minh, and now, let me show you how our system work.

To detect objects such as garbages, we use machine learning technique with deep learning and convolutional neural network. With A.I, there are a lot of training models obtain as a fast, high classification, But in particular, in our prototype we use Raspberry Pi board, so the SSD\_lite-MobileNetv2 model architecture will be used. This model improve the state of art performance of mobile models on multiple tasks on recognition as well as various object sizes.

To prepare dataset collection, we take 500 training images and 100 testing images for 3 common types of garbage: bottle, nylon and scrap paper. Then, we label with labelImgage program. The data will be training by using GPU Nvidia GTX 1050 with TensorFlow environment. The inference graph with garbage feature will be exported when the classification loss function reaches threshold value. In addition our project intergrated with 4 dof robot arm to distribute garbage to pre-define bin. In the next presentation, Mr. Minh will operate the system as a demonstration.

**Minh**: Thank you Mr. Bao, and next, I will operate our system.

In our project, we divide garbage into 3 types: scrap paper is labeled in the gray bin, bottle in the red and nylon in the green. Once the garbage drop into the recognition area, the garbage image is taken and transferred to the server for classification, and the robot arm will be controlled to pick and drop the garbage into the correct bin.

Last but not least, for convinent to collect trash in the easiest way, the system intergrated an open and close all the recycle bin function. And all of them are connected via wireless network system.

**Bao**: Now that brings the end to our presentation. If you have any question, please don’t hesitate to ask us for explanation and thank you for your attention. We also prepare a summary of our project, please feel free to take one and have a look. Oh, just a minute, as you know, we come from Vietnam, it is a very beautiful country. Today we prepare a traditional gift for you and we would be very glad if you take it for us. If you have a chance, please visit Vietnam. Thank you very much.