**1.INTRODUCTION**

Nowadays, people are paying more attention to their health, but there are still a lot of dangerous behaviors that may get people injured. They are extremely threatening in some specific situations. For example, talking on the phone while driving distracts people's attention, which may result in traffic accidents. Also, smoking is prohibited in places such as gas stations and department stores, since they may cause fires or even explosions. Avoiding some bad behaviors may save many people's lives and therefore governments have already implemented lots of regulation on people's behavior improperly and they need to be detected in time. However, it is impossible to detect all these behaviors simply by human beings. Fortunately, Machine learning and Computer vision is becoming more prevailing and can be used by humans. By studying the relationship between data, computers can develop the ability to classify the photos by itself. So, if some smoking and calling images can be put into computers for learning, they can be used to help detect improper behaviors.

Machine learning developed significantly in different fields in recent years. In the previous studies, there are some studies that have already tried to apply machine learning into the field of computer vision about humans. By designing a convolutional neural network, the computer managed to distinguish different human's behaviors. What's more, Zhu et al. also gave out an algorithm based on deep learning to monitor students' behaviors during the test. In terms of smoking behavior detection, Zhang et al. have developed a machine learning algorithm in the method of decision tree [6]. Their model achieved 84.11% accuracy with the best performance.

However, there are still few studies about the prediction of calling behaviors, especially applying algorithms based on Machine Learning methods. For instance, smoking, talking on the phone is hard to detect even with our naked eyes. The phone may be too small to be blocked by people's hands, thus making the problem more complicated. In [7], Zheng used Machine Learning algorithms based on Support Vector Machine (SVM) as well as Convolutional Neural Network (CNN) to predict people's walking upstairs and downstairs behavior, which achieved 93.5% as the highest accuracy. However, this paper would like to compare the mainstream machine learning algorithms in detecting the smoking and calling behaviors and figure out which one is the best solution to the problem.