



SUMMARY +

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## FPGA Acceleration of Convolutional Neural Networks

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### Overview

As a class of artificial neural networks (ANNs), convolutional neural networks (CNNs) are one of the most commonly used algorithms for visual image analysis. Face segmentation is a bio-metric community research that has received more and more attention in the last two decades with their application in different fields. Based on the interest of the usage of CNN to solve image segmentation problems, facial segmentation has been chosen as the task for this project. However, the traditional general processing unit such as CPU or GPU both cannot provide ideal running rate for CNN. Thus, in this project, FPGA will be chosen as the processor. As a no instruction and no shared memory architecture device, FPGA is a ideal accelerator for the CNN-based network. To be more specific, the CNN-based network will be designed, pre-trained and accelerated on a FPGA device. Then it will be used for face segmentation of the image captured by a camera and shown the segmentation results on the monitor.

### Design

Our model is modified from U-net, which is an effective CNN model for face segmentation due to the encoder-decoder architecture. Below is the structure of our model.

