



Department of
Biomedical Informatics

BMI 500:

Introduction to Biomedical Informatics

**Lecture 2. Coding, documentation, security
& data management basics**

Homework- Week 2

**Report Running Code of
CNN-based LCD Transcription of Blood
Pressure from a Mobile Phone Camera**

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The codes are related to transcribing the numbers from the images of the LCD screen of the blood pressure measurement device that report values of DBP and SBP using the Oscillometric method and are measured automatically based on the cuff. By reading the description of the codes in the folder, we can conclude that when the main function (`gen_trained_model`) is run, the test data and the model that has been trained in advance are recalled. In order to input the data into the model, a series of pre-processing algorithms on the images need to be performed.

In the pre-processing step, the images have different qualities based on how they were photographed. For this reason, it is necessary to use different algorithms to enhance the images and remove their noise. For example, binary operations are trying to identify the LCD frame. Also, because of the difference in the size and location of the LCD frames, LCD frame localization is required to distinguish the frame among the different contours with high accuracy. On the other hand, because of the different sizes of the numbers, the preprocessing process should also include LCD frame normalization.

Finally, after creating the input data, they input the pre-trained model (`gen_trained_model`). The code for the model shows that the input vector is 80×180 to a three-layer CNN with 32, 64, and 128 filters with dimensions of 5×5 . Also, each layer is followed by normalization, ReLU activation and max-pooling layer. Similarly, since each digit variable can take a limited number of possible values (0 to 9), a classifier is used to get each digit. For this reason, using the back propagation learning rule, the digit classifier would then generate the digits. As a result, the output feature vector of this CNN is also a classifier with three output channels to predict three probable digital numbers.