**Smart Mobile Platform (Fall 2019)**

**Midterm Exam**

* Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Note)

* Submit the answer sheet by November 3rd 11:59pm (hard deadline).
* For each question, please list up your collaborators.
* For Korean students, you have to submit your answers in Korean and English, both.

**Q1 [20 points])** One of the most promising modern deep learning research topics is “neural network quantization and model compression”. Please follow up what it is and the summary current literatures. For example, you have to summarize the motivation, problem definition, why it is required, and proposed algorithms in “neural network quantization and model compression”.

**Q2 [40 points])** If we are using 3 hidden layers in a neural network, changing the number of hidden layers is not possible during run-time/real-time operations. In following paper, the adaptation of the number of hidden layers is discussed. Please read the paper and then discuss how it can be possible.

D. Kim, J. Kim, J. Kwon, and T.-H. Kim, “Depth-Controllable Very Deep Super-Resolution Network,” in *Proceedings of the IEEE International Joint Conference on Neural Networks (IJCNN)*, Budapest, Hungary, July 2019.

**Q3 [40 points])** Suppose that you are a deep learning engineer who is working at hospitals and medial industries. Then, you have to handle patients’ data in multiple hospitals. Note that the hospitals are geo-distributed. In this case, gathering all the patients’ data in a single storage is not realistic because it is harmful in terms of patents privacy protection. Then, it is not possible to conduct deep neural network training (because entire data are not in a single storage). Furthermore, it will introduce overfitting in each hospital if each hospital trains its own deep learning model with its own small number of patients’ data. Can you propose any idea which can overcome this problem? If you can propose more and more ideas, it will guarantee bonus scores.