Origin of Each Chapter of the Dissertation

- Chapter 1 is written solely for this dissertation.

- Chapter 2 is written solely for this dissertation.

- Chapter 3 is adapted from a previously published journal paper noted below.

  Xi Yin (author), Xiaoming Liu (advisor). "Multi-task convolutional neural network for pose-invariant face recognition", *IEEE Transactions on Image Processing*, Vol. 27, No. 2, Feb. 2018.

  Xi Yin is the main contributor for the ideas, implementation, and writing of this paper.

- Chapter 4 is adapted from a previously published conference paper noted below.

  Xi Yin (author), Xiang Yu, Kihyuk Sohn, Xiaoming Liu(advisor), Manmohan Chandraker. "Towards large-pose face frontalization in the wild", *IEEE International Conference on Computer Vision (ICCV)*, Italy, Oct. 2017.

  Xi Yin is the only student author who contribute to the major experiments and paper writing. This work is in collaboration with NEC Labs.

- Chapter 5 is adapted from a paper in submission.

  Xi Yin (author), Xiang Yu, Kihyuk Sohn, Xiaoming Liu(advisor), Manmohan Chandraker. "Feature Transfer Learning for Deep Face Recognition with Long-Tail Data", 2018.

  Xi Yin is the only student author who contribute to the major experiments and paper writing. This work is done when Xi Yin was doing an internship at NEC Labs in the summer of 2017.

- Chapter 6 is written solely for this dissertation.