5. Supplementary

5.1. The Effect of Basic Network Depth

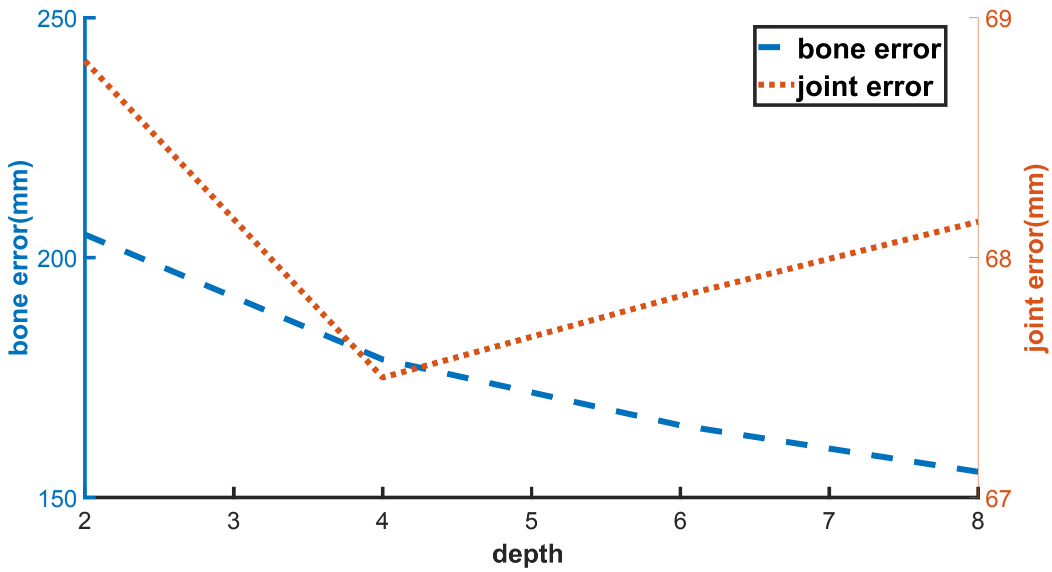

Figure 8: **Effect of our basic network depth on both the bone errors and the joint errors.** The joint errors decrease at first and increase later with the depth growing, while the bone errors keep decreasing.

Although deeper network typically learns more advanced features for joints, it is prone to overfitting when handling non-hard joints. This is verified by Fig.8, while increasing the network depth, the bone length errors decrease while the joint errors increase. This prove that simply deepening the network for 3D human pose estimation could not reduce the joint errors. Existing approaches generally estimate the 3D human pose by holistic prediction, which suffer from poor performance for locating challenging joints. Differently, our proposed model lifts 2D joints locations to their 3D locations in a coarse to fine module. We propose to first estimate the joint 3D coordinate candidates and then refine the locations of hard joints. To exploit the structural information of human, we cascade the basic model with two individual fully connected networks to refine the coordinates of hard joints.

5.2. The Effect of Dropout

Fig.9 demonstrates the performance changes of the proposed network without REM while varying dropout rate {0.5, 0.6, ..., 1.0}. Increasing the dropout rate, i.e., activating more neurons, leads to an overall increased joint error. While keeping more neurons activated seems benefit the drop of the bone error (results between 0.5-0.7 and 0.8-1.0). When the dropout rate is larger than 0.8, both the joint and bone errors increase with the increase of dropout rate. In other words, small dropout rates provide good performance for joints, and large dropout rates provide a generally good performance for bone lengths. In network

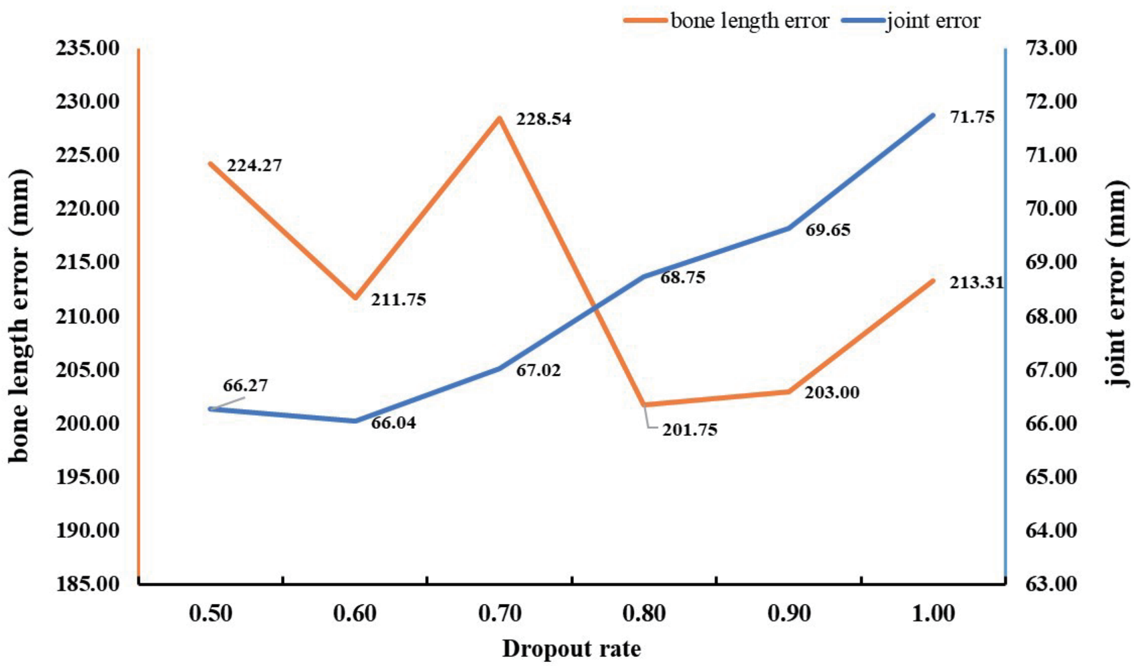

Figure 9: **Effects of different dropout rates for the proposed network without REM on both the bone and joint errors.**

training, adopting dropout could probably prevent the overfitting of model. In our work, we set the dropout rate as 0.5. This, as a result, leads to a random loss of joint information, which however affects the bone length computation (the bone length is computed based on the locations of its relevant joints.). To address this problem, we propose to introduce a REM to replenish the joint information for bone length computation without parameter increasing, which may reduce the impact of joint constraint vanish caused by dropout.