Automatic identification of specific osseous landmarks on the spinal radiograph can be used to automate calculations for diagnosing ligament instability and injury, which affect 75% of patients injured in motor vehicle accidents. In this work, we propose to use deep learning based object detection method, Faster RCNN, as the first step towards identifying landmark points in lateral lumbar X-ray images. We show that, by using only 81 lateral lumbar X-Ray training images, one can achieve much better performance compared to traditional sliding window detection method on hand-crafted features. Furthermore, we fine-tuned the network using 974 training images and tested on 108 images, which achieved average precision of 0.905 with average computation time of 3 second per image, which greatly outperformed traditional methods in terms of accuracy and efficiency. We also proposed different fine-tuning techniques and compared and discussed the performance through extensive experiments.  

We experimented on two different datasets to fully compare the performances and different tuning techniques. Base architecture is ZF net. Dataset 1 used 92 images and dataset 2 used 974 images. Fig. 2 and 3 shows the fine-tuning techniques performance.