Attachment: Project Summary Template

**Project Summary**

Project Title:

Localized End-to-End AI System in Fracture Diagnose based on CT Scan

Abstract:

To predict the overall fracture possibility of a patient, we involved a CT-scan dataset which consists of 7 cervical spines and labels of corresponding bone fractures. However, it requires segmentation, objection, and prediction knowledge. Specifically for our solution, we first input the dataset into a segmentation-based vertebrae detection network. The trained data generated is then inserted into Detection Localized Classifier (DLC) that can determine the spine fractures. Finally, the output consists of annotation of different bones, the location of fractures, and the probability of fracture.

To verify the robustness and stability of our approach, we compared DLC with other fantastic solutions, such as Vanila EfficientNetV2 and RFS EfficientNetV2. The experimental results show that utilizing the DLC model can further improve the model's performance. To be specific, the accuracy of DLC (0.51) is higher than Vanilla EfficientNetV2(0.44) and RFS EfficientNetV2(0.47), respectively. In conclusion, better performance should be because the DLC equips convolutional classifiers instead of single classifiers or RFS results enhanced classifier. Beyond the task, the experiment proved that such fusion of neural networks with multiple purposes would improve general-purpose aimed models in terms of prediction precision and lead to more accessible interpretations of medical deep learning models.

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Research-led learning component that is reflected in the project:

INT104 Introduction to Artificial Intelligence (AI), one of the XJTLU curricula, has stimulated us to investigate the field. Subsequently, we have done some research-based learning. We together joined a SURF team to study AI applications in the medical field, designed an AI model to solve the cell detection problem, and became the SAT SURFF22 winner. With further study, we found that using artificial intelligence in the medical field could solve many real-world problems, like the prediction of the possibility of fracture. With the trend of fighting, we decided to work together again to tackle this prediction problem.

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