Bone fracture detection

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ABSTRACT

The image processing technique is extremely helpful for several applications like biomedical, security, satellite imaging, personal image, medicine, etc. The research design involves data collection, preprocessing, segmentation, feature extraction, classification and evaluation of the proposed method. The sample dataset were x-ray images collected In this we are using CNN (Convolution neural networks) to find the fracture. The proposed method can find suitable use in categorization of fracture types on different bone images based on the results obtained from the experiment.

INTRODUCTION

Bone fracture is a common problem in every developed countries and the number of fractures also increasing day by day very rapidly. A bone fracture may occur due to simple accidents or different types of diseases. So, for that quick and accurate diagnosis crucial to the success of any prescribed treatment. Depending upon the human experts alone for such a critical matter have cause intolerance errors. Hence the thought of automatic identification procedure has perpetually been associate degree appealing one. The main goal of the paper is to detect the bone fracture from X-ray images using online kaggle notebook software. Although CT and magnetic resonance imaging pictures provide higher quality pictures for body organs than X-ray pictures, the latter is faster cheaper, enjoy wider availability and are easier to use few limitations. Moreover, the level of quality of X-ray images is enough for bone fracture detection.

The motivations of this system are:

1. Saving time for patients to lower the workload of doctors by screening out the easy case.

2. To cut back human errors as a result of doctors in hospitals manually examine an outsized variety of X-ray pictures for fracture.

LITERATURE SURVEY

Medical imaging systems have been used in various medical application domains like trauma center orthopedic, pain management and vascular and non-vascular. One of the oldest and frequently used devices to capture human bones is X-ray. Computer aided bone fracture detection technique is mainly implemented to assist doctors to provide better diagnosis report. Bone fracture can occur in any part of human body such as the leg (tibia and fibula), hand(radius and ulna) and foot etc. The usage of medical images has been increasing tremendously due to a collection of thousands of medical images every day in medical institutions. Due to the increase in medical images there is arising need of managing the data properly and accessing it accurately. Finding the correct boundary in noisy images is still a difficult

task. It introduces a new edge following technique for boundary detection in noisy images. Use of the proposed technique demonstrates its application to diverse cases of medical images. The proposed technique can detect the boundaries of objects in noisy images using the information the fracture detection on the xray images is founded. This paper mainly discusses the computer aided diagnosis of fracture detection in human hand bone X-ray images. The proposed system has three steps. Namely, preprocessing, segmentation, and fracture detection.

METHODOLOGY

Steps involved in this Bone fracture detection is:

- Input Image
- Image Enhancement
- Image Segmentation
- Feature Extraction
- CNN classification
- Output Image

SOFTWARE USED

In this we have used Kaggle online notebook. Kaggle is completely free on the actual Kaggle platform. You can however gain access to Kaggle notebooks on the paid version of Google Cloud Project, and this is how a Kaggle user can access more customizable environments with different GPUs, docker containers to use, etc.

PROPOSED SYSTEM

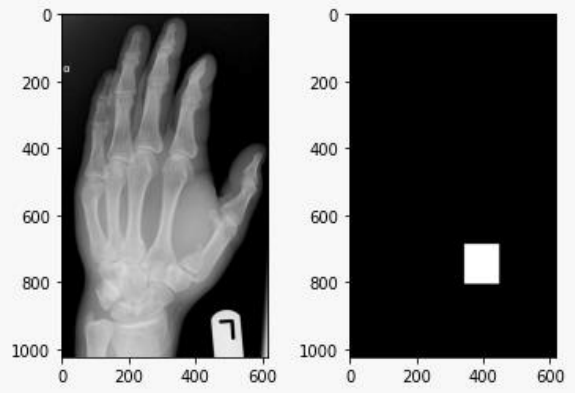
X-ray images were used from the database of hospitals which is comprised of images of both fractured and normal bones. The initial step was to apply pre-processing methods like conversion of RGB to Grayscale and improving them through filtering algorithms for removing image noise. Then, detect its edges in an image using edge detection and segment it further. Post segmentation, every image is converted into a series of functions by making use of a feature extraction technique. So, a classification algorithm was formed depending on the extracted characteristics. The method was then checked for its accuracy.

DATASET

In this we have 237 training files, 237 training annotation files, 40 Validations, 40 Validation annotation files

RESULT

In our proposed model, the task of hand fracture detection is posed as a simultaneous binary classification and object detection problem, meaning that one of the outputs is a single probability value for “trouble” or “non-trouble” and another output is the bounding box prediction,We randomly choose two examples of test results and compare with the help of CNN covolution neural network



CONCLUSION

The ability of an object detection CNN to detect and localize radius and ulna fractures on wrist radiographs with high sensitivity and specificity was demonstrated. An in-depth analysis of the methods' output has shown that heat maps can be blurry while bounding boxes are more precise in providing the correct fracture region. Hence, it might be interesting to fuse the two models as a model assembly outputting a bounding box around the fracture as well as the fracture's heat map. That way, we would obtain the best of both worlds: the correct number of fractures from bounding boxes and pixel-wise fracture detection inside the bounding box.

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