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ABNORMALITY FEATURE EXTRACTION IN SPINAL CORD MRI

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Abstract: Research on Medical Image proposes an efficient platform for automatic analysis and detection of any Deformations in a given medical image data set especially in Spinal Cord for an effective and better understanding of diagnosis. The abnormality of the spinal cord may include Tumor, Disc a hernia, Fracture, swelling etc., which has been detected from any given modality of Medical images such as MRI, CT, and fMRI etc. In this work, Automated Decision support system is introduced for fast and accurate analysis which will help to confirm the existence of abnormality of the Spinal Cord MR image. Lower back pain can be caused by many complications with any parts of the body in the lumbar spine. The compilation of a medical diagnosis is crucial to the medical practitioners in order for them to give a convenient treatment for the low back pain.to solve this problem, we like to give a solution by finding the abnormality in Lumbar spine. ABNORMALITY FEATURE EXTRACTION IN SPINAL CORD MRI helps the patients or end users to find the abnormality in the spinal cord which can save the time for the doctors and also the end users.

Keywords: Medical Image like Magnetic Resonance Imaging(MRI), Deep learning, CNN,Tensor flow, Classification, Framework.

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ABNORMALITY FEATURE EXTRACTION IN SPINAL CORD MRI

1. INTRODUCTION

Neuroscientists usually divide the CNS into brain and spinal cord. The human spinal cord, responsible for connecting the brain and peripheral nervous system.The spinal cord is a long, thin, tubular structure made up of nervous tissue, which extends from the medulla oblongata in the brainstem to the lumbar region of the vertebral column.In a human spinal cord there are 31 spinal cord nerve segments:8 cervical segments forming 8 pairs of cervical nerves, 12 thoracic segments forming 12 pairs of thoracic nerves, 5 lumbar segments forming 5 pairs of lumbar nerves, 5 sacral segments forming 5 pairs of sacral nerves, 1 coccygeal segment.Here ,we concentrate on detecting the abnormality in the "**Lumbar Spine"**, which takes of the "Hip and Thigh" of our body.Damage to the lumbar spinal cord subsequently affects the hips and groin area, and may impact the lower abdominal muscles and thigh flexion as well.The lumbar spine MRI Contains the left and right views. The left view is known as Sagittal View and right view is known as Axial view.

Sagittal View: The sagittal view is the optimal view to visualize the spinal cord, cauda equina, CSF and vertebral bones. However, as most disk herniations are posterior lateral (as opposed to straight posterior), the sagittal view may not the optimal view to see a disk herniation.

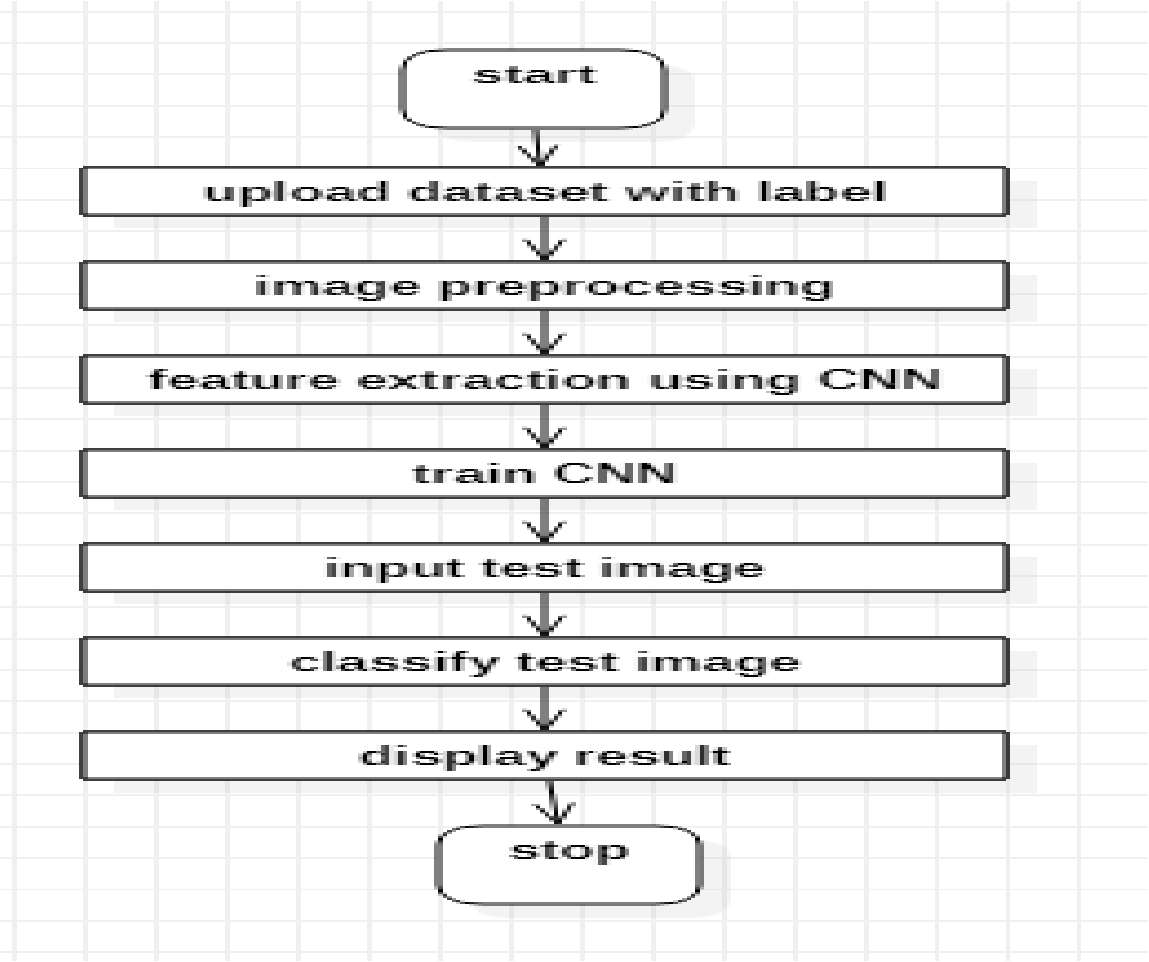
Axial View: The axial view also nicely visualizes the neural foramina, posterior bony elements and paraspinal muscles. The axial view is the optimal view to visualize the disk herniations which are typically posterior lateral (as opposed to straight posterior) and any neural foraminal stenosis.

2.DESIGN

Existing System:The existing system is based on the K-Mean Clustering algorithm and is developed in the domain Machine Learning. This system is a two-stage process.In the beginning Spinal MR medical images are taken as input and then pre-processing of the images done in order to improve the flexibility of the images for further processing. To automate the decision support system First Given data primarily checks for the existence of anomaly features by using Image Enhancement technique histogram. Inage with no issues are need not to process. If data has anomaly goes to the Second Process and apply kmeans algorithm to the clustering to attain the Feature extraction.Disadvantages of the existing system are difficult mathematical calculations which makes the system complex and accuracy is too less as we are using image classification technique using the only one image.

Proposed System: The recent advancement of deep learning makes it possible to perform automatic high-level feature extraction thus achieves promising performance in many areas.Here we came up with deep learning model. Deep learning methods have been demonstrated successfully on detection problems given their ability to automatically learn higher-order features also it handles large data sets. In past years, various traditional machine learning algorithms have been used to detect this. Recently, several researchers have studied about abnormality detection in spinal cord and classification with neural network algorithms and image processing. Also, the research studies showed that convolutional neural network have been used majorly for abnormalities in the lumbar spine and showed good results. The main motive of ABNORMALITY FEATURE EXTRACTION IN SPINAL CORD MRI is to predict whether the lumbar spine is Normal or Abnormal.

Figure



Here the result will be either Normal or Abnormal.

3. FEASIBILITY ANALYSIS

n important outcome of preliminary investigation is the determination that the system request is feasible. This is possible only if it is feasible within limited resource and time. The different feasibilities that have to be analyzed are

OPERATIONAL FEASIBILITY

Operational Feasibility deals with the study of prospects of the system to be developed. This system operationally eliminates the manpower and effectively tracking the project progress. This kind of automation will surely reduce the time and energy, which previously consumed in manual work. Based on the study, the system is proved to be operationally feasible.

ECONOMIC FEASIBILITY

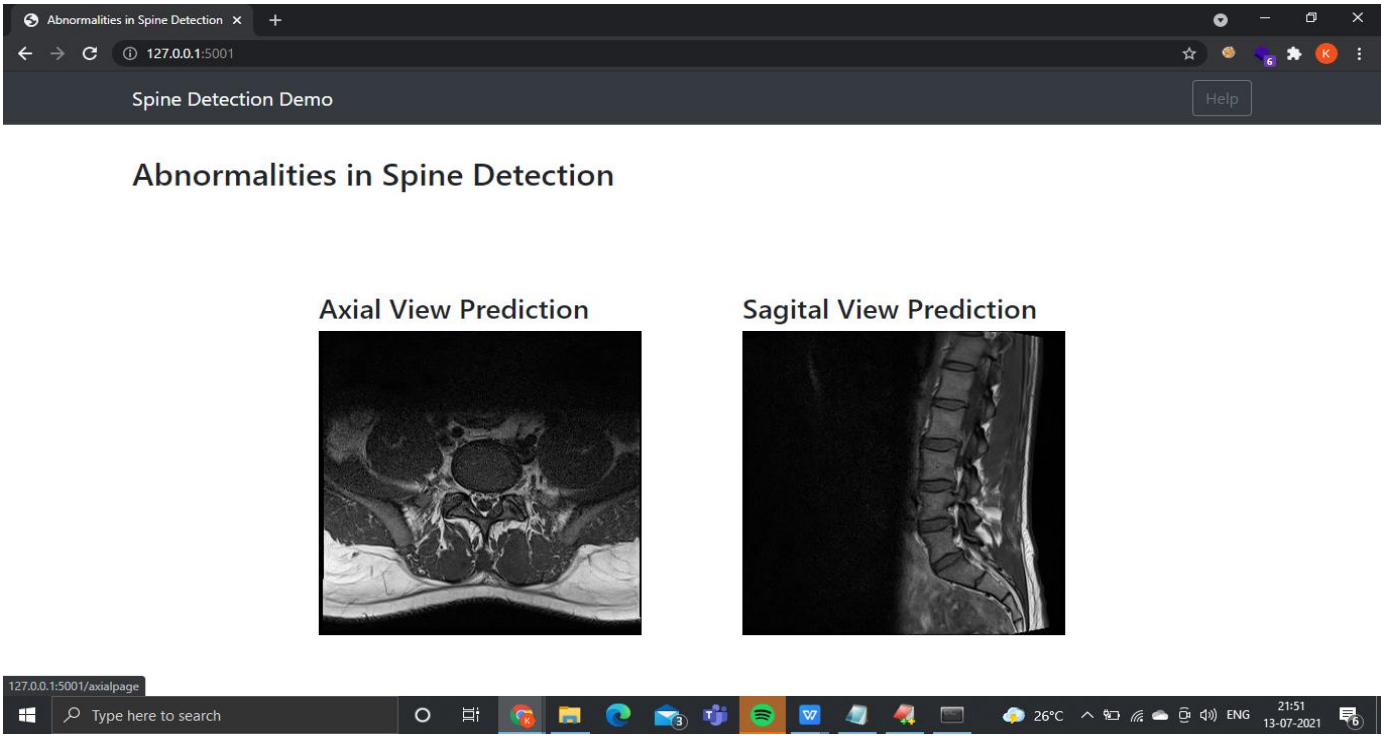
Economic Feasibility or Cost-benefit is an assessment of the economic justification for a computer based project. As hardware was installed from the beginning & for lots of purposes thus the cost on project of hardware is low. Since the system is an ML based. so the project is economically feasible.

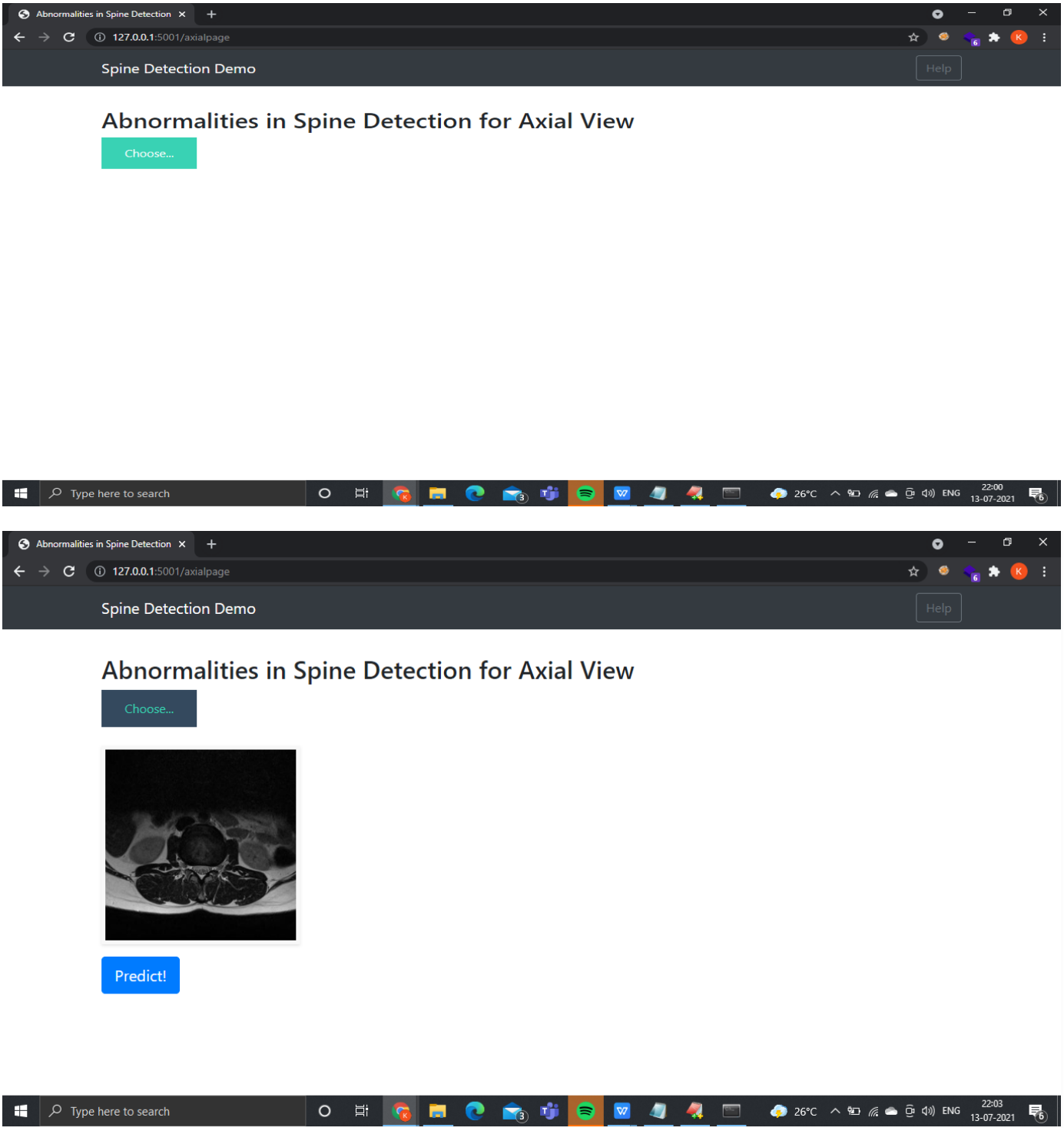
TECHNICAL FEASIBILITY

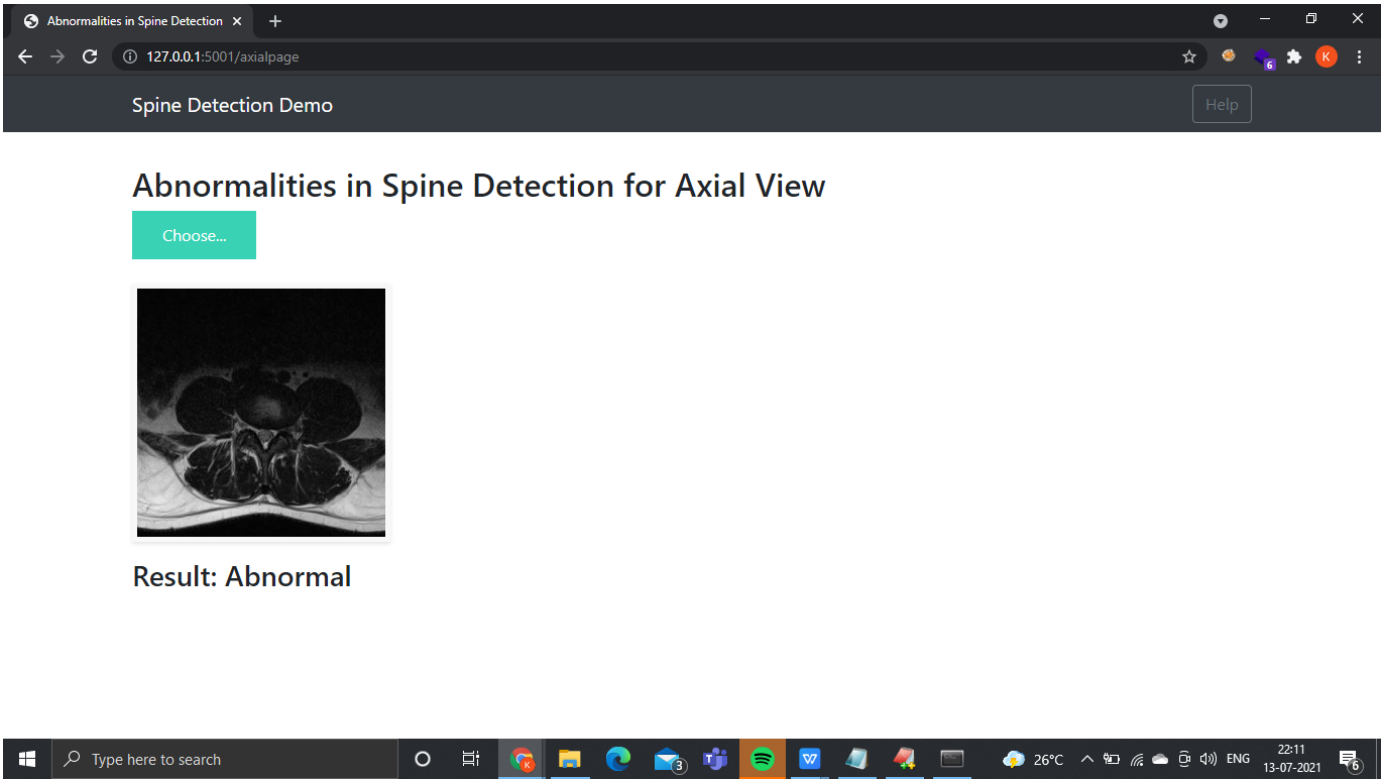
Technical Feasibility is the assessment of the technical resources of the organization. The organization needs MIT App inventor online tool which consist languages of blocks code. The technical feasibility has been carried out. The system is technically feasible for development and can be developed with the existing facility.

4. RESULTS

Here we can see the two pictures of Sagittal View Prediction and Axial View Prediction.The user needs to select any one view prediction and user needs to upload the MRI Scan image of that particular view and click on the predict button by which user gets a result which says that user's Lumbar Spine is Normal or Abnormal.




Abnormalities in Spine Detection
127.0.0.1:5001/axialpage
Spine Detection Demo
Help
Abnormalities in Spine Detection for Axial View
Choose...
Type here to search
26°C
ENG
22:00
13-07-2021
Abnormalities in Spine Detection
127.0.0.1:5001/axialpage
Spine Detection Demo
Help
Abnormalities in Spine Detection for Axial View
Choose...
Predict!
Type here to search
26°C
ENG
22:03
13-07-2021



5. CONCLUSIONS

In recent years automated diagnostic tools have reached a substantial level of development and this progress is expected to continue. In this project we trained and tested a CNN model to detect abnormality in lumabar spine MRI scans. We achieved a better accuracy of 88% on a heterogenous group of patients. We demonstrated the feasibility of training an existing CNN for a novel medical imaging classification task. In conclusion, A practitioner can use the model- driven architecture and quickly build the deep learning models to predict abnormality in spinal cord MRI.

To reduce the Spinal cord injuries in population people must take some preventions like

1. Drive Safely
2. Check Water depth before driving
3. Prevent falls
4. Take precautions when playing sports
5. Don’t drink and drive.

Usually, We can classify any any part of the spinal cord by training the data and can predict whether the Spinal cord is normal or abnormal. But In this project we are mainly concentrating on the Lumbar Spine.

6.REFERENCES

1.Razzak MI, Naz S, Zaib A. *Deep Learning for Medical Image Processing: Overview, Challenges and Future*.

2.Weber, K. A. *et al.* deep learning convolutional neural networks for the automatic quantification of muscle fat infiltration following whiplash injury. *Sci. Rep.* **9**(1), 1– https://doi.org/10.1038/s41598-019-44416-8 (2019).

3.GitHub - raghakot/keras-vis: Neural network visualization toolkit for keras. Accessed September 19, 2020. https://github.com/raghakot/keras-vis.