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Prediction of Orthopedic Disease

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ABSTRACT: Now-a-days number of orthopedic disease are increasing and it has lead people to suffer in an early age and it can be prevented through an early diagnosis. The main goal of our project is to build web page which is able to predict the disease . Dataset is used for training and testing to machine learning models ,based on the best accuracy algorithm the web page is designed . By using the web page user will able to give the inputs to get the name of the disease.

KEYWORDS: Orthopedic, diagnosis, disease, prediction, machine learning.

I. INTRODUCTION

The application of machine learning in the medical field is the trending approach for early prediction and remedy of diseases. Among orthopedic diseases, hernia and spondylolisthesis are the most common ones that affect people of all ages. A hernia happens when an organ or greasy tissue presses through a feeble spot in an encompassing muscle or connective tissue. It injures the lower part of the human body and causes severe pain for several days. Hernia occurs due to the pressure of unwanted organ into an open or weak part of muscle or tissue. Additionally, lack of nutrition is one of the causes for hernia. In case of spondylolisthesis, the spinal bones are affected, causing extreme pain while movement in severe cases. Spondylolisthesis is seen more in elder people and also gained through heredity and daily lifestyle choices.

Although mild spondylolisthesis can be cured relatively well, severe case requires surgical treatments with utmost care. Orthopedic disease has been classified into normal, hernia and spondylolisthesis based on six features describing the state of pelvic and lumber of 310 patients. The six features contain pelvic incidence, pelvic tilt numeric, lumber lordosis angle, sacral slope, pelvic radius and degree spondylolisthesis. The results are then tested and trained using three machine learning algorithms and is evaluated through the accuracy gained from the prediction models. The main goal of this study is to provide the best algorithm that can correctly classify and predict the diseases in order to aid the medical specialists for an early diagnosis and prevention.

II. LITERATURE REVIEW

[1]P. Srimani and M. koti said**,** in the present study, the experiments are conducted on five medical datasets and the results justify that there is a drastic enhancement in the performance of the base classifiers, and this certainly would facilitate effective medical diagnosis, which in turn would contribute to the health index of the patients. Further, it is concluded that only selected classifiers are to be used for each data set, and for some specified cases, ensemble classifiers need not be proposed. A proper selection of the classifier is recommended in order to achieve optimal accuracy with regard to a specific medical data set.

[2] Nearest neighbor (KNN) is very simple, most popular, highly efficient and effective algorithm for pattern recognition.KNN is a straight forward classifier, where samples are classified based on the class of their nearest neighbor. Medical data bases are high volume in nature. If the data set contains redundant and irrelevant attributes, classification may produce less accurate result. Heart disease is the leading cause of death in INDIA.

In Andhra Pradesh heart disease was the leading cause of mortality accounting 32%of all deaths, a rate as high as Canada (35%) and USA. Hence there is a need to define a decision support system that helps clinicians decided to

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take precautionary steps. [3] An ANN model and a logistic regression (LR) model were used to predict outcomes outcomes. The age, gender, duration of symptoms, smoking status, surgical level, visual analog scale (VAS) of leg/ back pain, the Zung Depression Scale (ZDS), and the Japanese Orthopaedic Association (JOA) Score, were determined as the input variables for the established ANN model. The Macnab classification was used for outcome assessment. ANNs on data from LDH. patients, who had surgery, were trained to predict 2-year successful discectomy using several input variables. Sensitivity analysis to the established ANN model was used to identify the relevant variables. [4]Defined ML as a powerful set of computational tools, as this is the most common meaning of this expression within the medical community.

Additionally, we pushed that the evaluation of these instruments should be rigorously identified with the principle focus on which analysts create and apply them to clinical fields, that is, to help doctors in their primary errands, whose embodiment is the need to decide "without certitude" and make an interpretation of these choices into decisions of care for the advancement of patients. This point of view is a realistic one and it can add to flattening the current way of talking in regards to the transitioning of "man-made brainpower" in medication, of which ML "rides on the pinnacle of Inflated assumptions". [5]The pelvic vertebra has assumed a significant part in this change by going through reformist enlarging and retroversion [1].

Support of an upstanding stance requires the body's focal point of gravity to fall over a thin region between the feet while keeping a level look with negligible energy use. In 1992, Duval-Beaupere et al. examined the pelvic shape and sagittal profile of solid volunteers utilizing a Barycentermeter [3]. They depicted a morphological boundary called the "Pelvic Incidence" to empower reproducible examination of the anatomical qualities of the pelvis in the sagittal plane. [6] This investigation presents the grouping of cervical plate herniation patient and sound people by utilizing muscle weakness data. Cervical plate herniation patients experience the ill effects of neck torment and muscle weariness in the neck expands these throbs. Neck torment is the most well-known agony type experienced after back torment. The distresses that happen in the neck district influence the everyday personal satisfaction, so the quantity of investigates done in this space is expanding.

III. PROPOSED WORK

The existing system for prediction of orthopedic disease is not evaluated clearly. But people with orthopedic usually needs physical accommodations or assistive technology in school, the workplace, and at home. They have legal rights to this support under the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. In the existing system all the persons should be aware of the impact of Orthopaedic disability. For example seating arrangements problems, they have to learn about that assistive technology like how to use it.

In this proposed system, orthopedic disease has been classified into normal, hernia and spondylolisthesis based on six features describing the state of pelvicand lumber of 310 patients. The six features contain pelvic incidence, pelvic tiltnumeric, lumber lordisis angle, sacral slope, pelvic radius and degree spondylolisthesis. The outcomes are then tried and prepared utilizing three AI calculations and is assessed through the exactness acquired from the forecast models. The fundamental objective of this investigation is to give the best calculation that can accurately arrange and anticipate the infections to help the clinical experts for an early analysis and avoidance.

Muscular sicknesses render the everyday lives of individuals by making them unfit to deal with day by day exercises as a typical individual would. Early diagnosis and treatment may prevent the extremity of the orthopedic disease and give better cure to the patients. By using machine learning approaches, it is possible to do so and researchers are continuously trying to better their results.

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IV. SYSTEM ARCHITECTURE

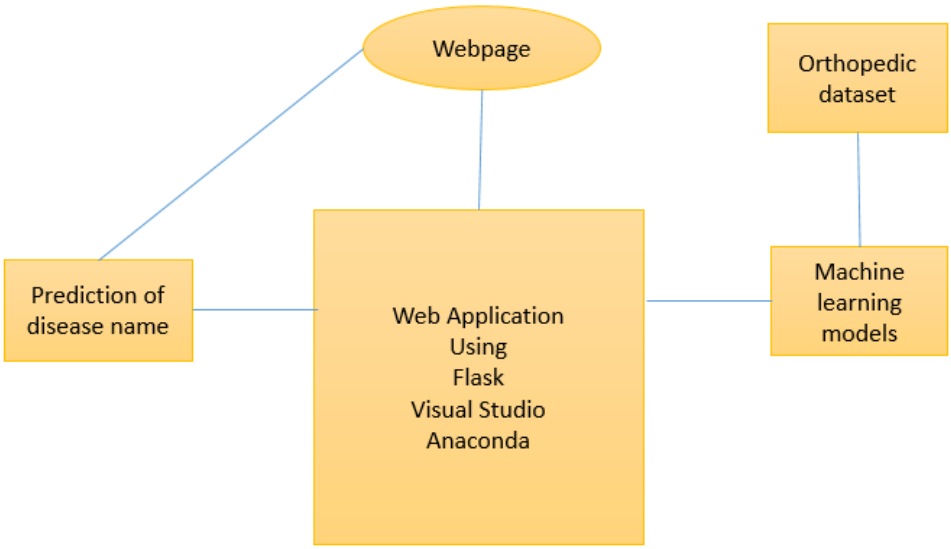

Fig 1: System Architecture

ALGORITHM:

Step1: Start
Step2:Open the web page
Step 3: Enter all the fields
Step4:Select the predict button
Step 5: Then it gives the disease name
Step6: Stop

DATA FLOW DIAGRAM:

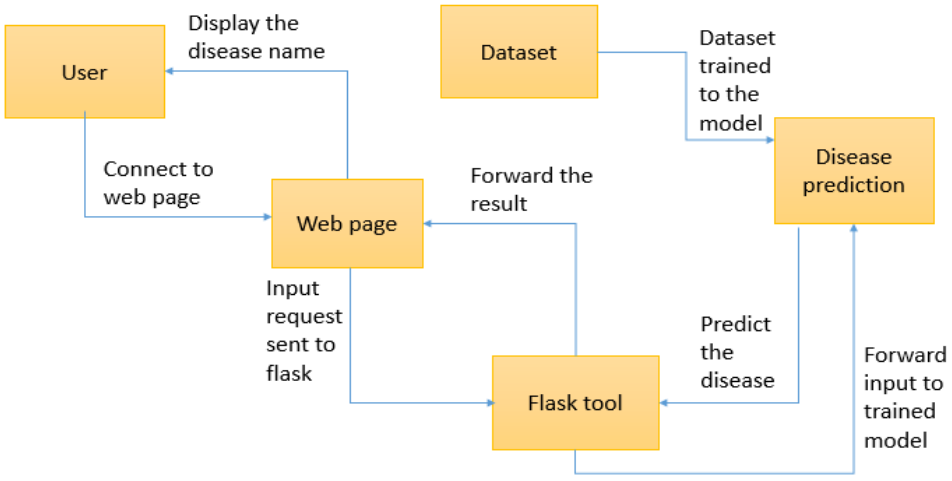

Fig 2: Data flow diagram

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OUTPUT SCREENS:

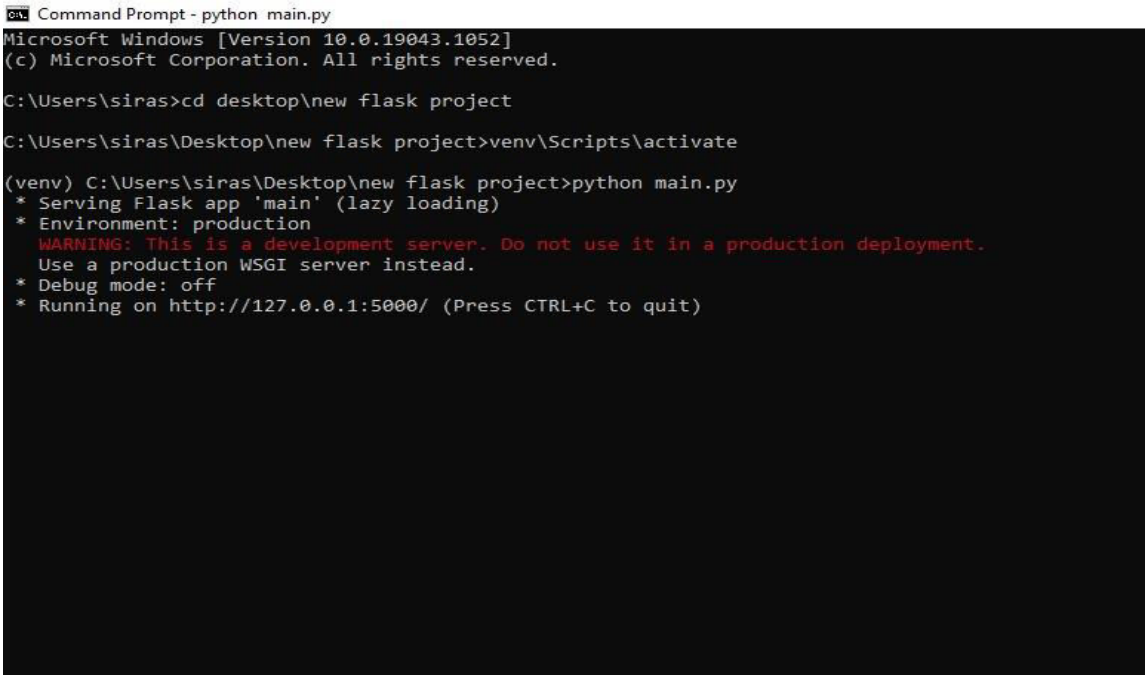
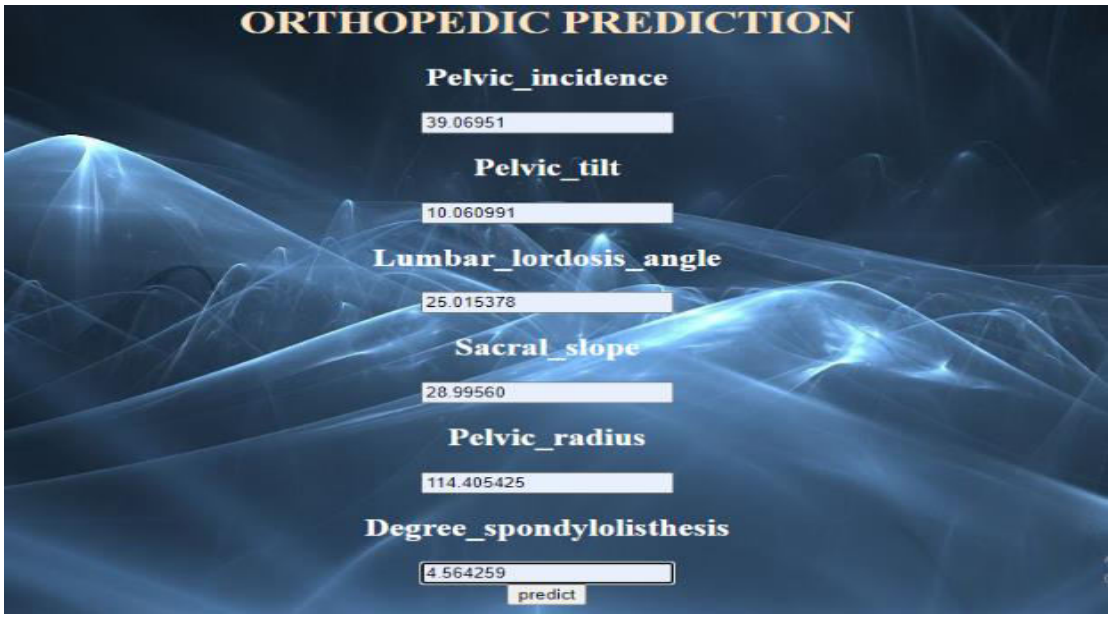


Fig 3: Shows to run main page



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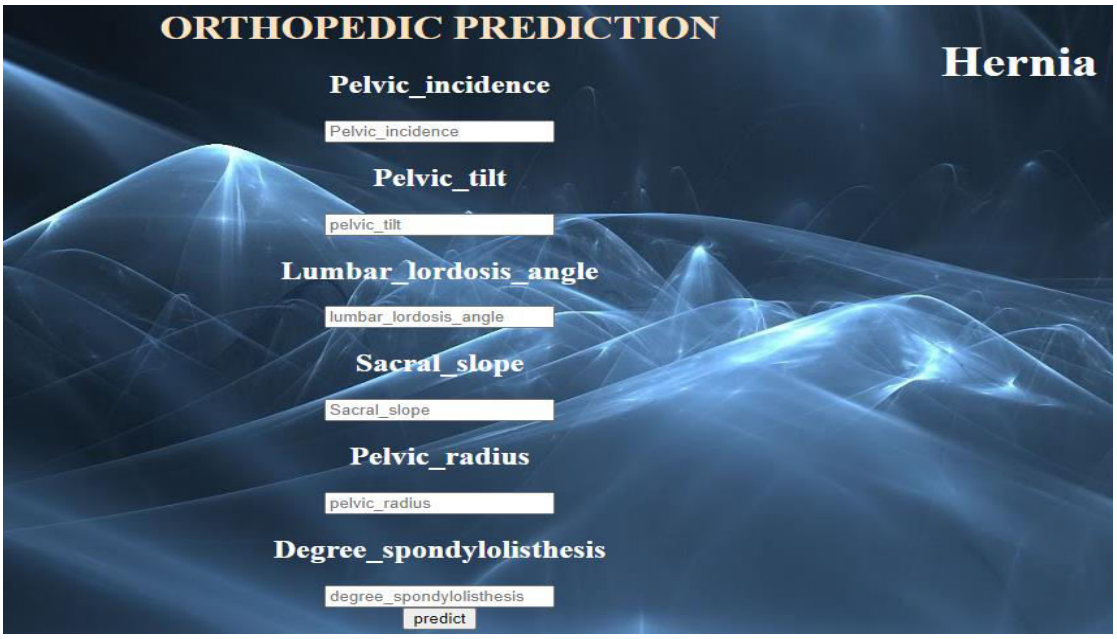

V. CONCLUSION AND FUTURE WORK.

Orthopedic diseases render the daily lives of the people by making them unable to process daily activities as a normal person would. Early diagnosis and treatment may prevent the extremity of the orthopedic disease and give better cure to the patients. By using machine learning approaches, it is possible to do so and researchers are continuously trying to better their results. This exploration expects to give more experiences on the matter and gives that among Random Forest, Logistic relapse and K-Nearest Neighbor, Comparison of these three models obviously express that K-Nearest Neighbor provides the best accuracy of 89 and can be used for the medical fields in the form of web page. With the system we proposed, we are trying to extend this to the maximum. The scope of the project can further be improved in many ways. The first step we are planning to create mobile application to monitor the patient condition based on the theoretic values of orthopedic and provide appropriate health measures to cure the disease.

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