ISSN 2651-4451 | e-ISSN 2651-446X

AN EFFECTIVE PARKINSON'S DISEASE PREDICTION USING LOGISTIC DECISION REGRESSION AND MACHINE LEARNING WITH BIG DATA

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ABSTRACT

Background: Medical data is conducive to early identification of diseases, patient treatment, and community service. Parkinson's disease prediction by Machine Learning (ML) in large data and reliable study of biomedical and healthcare community develop big data; medical data is conducive to early detection of diseases, patient care, and community service. The machine learning algorithm is being used to successfully forecast the prevalence of chronic illness populations.

Proposed Methodology: Parkinson's disease is a serious neurodegenerative disease that affects people when they become older (mostly past the age of 50). It is the most serious and harmful of the non-curable neurodegenerative diseases. Parkinson's disease is challenging to diagnose at an early level and the origin of subtle early signs is difficult to identify. Due to the heavy responsibility of the condition on the Parkinson disease patient, a clinical care scheme has been developed. To classify Parkinson's disease and overcome this complicated challenge, the suggested Machine Learning (ML) induced Logistic Decision Regression (LDR) algorithm is used. Early diagnosis of Parkinson's disease will contribute to improved care and disease control, thereby enhancing the quality of life of patients. To create such successful decision support, an automatic prediction system focused on machine learning was developed and presented.

Result and Findings: This data collection would be used to classify possible biomarkers of Parkinson's disease using Machine Learning (ML) and Big Data (BD) technologies. The organization's disease prediction technology, which is focused on machine learning and large data, enhances human wellbeing while further promoting the big data industry of disease prediction. In comparison to other current approaches, the simulation findings indicate a strong reliability.

Keywords: Parkinson’s disease, Machine Leaning (ML), Big Data (BD), Logistic Decision Regression (LDR), Prediction, Classify.

I. INTRODUCTION

Parkinson's disease is a neurodegenerative disorder that affects millions of people around the globe. Muscle fatigue, tremor (upper and lower arms, as well as jaw vibration), voice disturbances, deadpan, slow motion, apathy, postural dysfunction (depression and mood changes), repetitive gestures, dementia (loss of memory), what not to do, sleep disorders, and thinking are also typical symptoms of Parkinson's disease. The batch size, all the properties of velocity, veracity, length, meaning, and variety are all present in Parkinson's disease data, which is referred to as Big Data (BD). These five have been identified in greater depth in the context of Parkinson's data in the following manner. Velocity is provided by the pace of the data contained within, as well as the processing speed of the storage indication, which aids in real-time decision making and modern real-time prediction processing. Veracity is a software company that specialises in data and precision analysis. A key aspect of consistency is issues and knowledge concerning the reliability of data quality. The information on Parkinson's disease is heterogeneous, multi-source, unreliable, contradictory, and scarce. In disorders like Parkinson's disease, medical and biological predictions are extremely significant. Stable people with Parkinson's disease treatment judgments boundary evidence from their alienation and Parkinson's disease for the diagnosis efficacy and computational performance class boundaries mechanisms

Parkinson's disease is a chronic brain condition marked by non-motor symptoms as well as two motor symptoms (motor). The personal introduction shown in the conditions, in addition to all of the typical symptoms, is something that everyone will witness. Stiffness or rigidity may occur in people with Parkinson's disease. People with Parkinson's disease may also become frozen or unable to shift for a brief amount of time. Parkinson's disease is a neurodegenerative disease characterised by the destruction of dopamine-producing cells. Parkinson's syndrome may be isolated from other disorders that have identical clinical manifestations, but accurate testing is difficult to come by. The scientific practise of patient background and analysis is used to make a diagnosis. Movement conditions, commonly involving neurological illnesses such as depression and schizophrenia, are the most common causes, although they may often lead to the progression of other diseases. It's possible that you'll lose your autonomy and be in agony as a result. People with a deteriorating standard of life and major obstacles and challenges were impacted as the disease advanced. There is a chance that family members and caregivers may have an indirect impact.

The physical activity data obtained on the wearable smart terminal is also pre-processed on the computer, after which it is fixed and stored by the wireless relay base station to the online tracking management network, and all data is summarised as decided on the cloud online management platform for web pages and smartphone apps, called visual. Both physical activity details, on the other hand, must be in a particular data format based on Hadoop-bigdata, which implements the format of data files from the online monitoring portal, utilising high data analysis and corresponding data analysis technologies, with high data integration advantages, and highly effective data analysis.

To maintain the integrity of the data files, all of them will be copied at the same time. After that, I'll run the abbreviated research software for the particular diagram in order to do the parallel analysis efficiently and in accordance with the calculation's analysis specifications. Following the completion of the calculation, different analyses are performed, and the calculation's result is output, with many of the resulting files being generated and extracted. Big Data (BD) and Machine Learning (ML). Following that, the company will notify the online administration in compliance with the agreed-upon procedure and apply the site's sports data processing results. Finally, partner members can access related analytics data using the online management tool for spoken smartphone apps.

II. RELATED WORK

An organisation, which is generally described in depth as a structured collection of processes, protocols, and the concept of designing procedures to carry out specific activities or solve specific problems, successfully applies to public health from a variety of mechanisms, including mechanical systems. The data representation framework relevant to continuous surveillance, review, and device control, management, and strategic preparation is referred to as System Health Monitoring and Management (SHMM) [1]. A dynamic engineering system's requirement for brain health and quality pre-sales testing has become critical. The integration of big data, intelligent flight coding, and the introduction of popular classification algorithms, the secret mining of historical data knowledge, and the capacity to achieve quality forecasts of brain health are all dependent on intelligent decision-making [2]. Stuff for measuring brain health content are developed on an internet-based architecture, and classification approaches are used to accomplish real-time data collection and analysis. Obstructive Sleep Apnoea (OSA) is a serious sleep condition that has a strong detrimental effect on one's quality of life. Reduced mood changes are a symptom of depression, and certain OSAs are caused by behavioural and attitude problems [3]. As a result, there is a pressing need for treatment solutions for this disease to be monitored in real time. There are many OSA detection systems available. The pervasive usage of medical / health-related data is the at an exponential pace, thanks to the growth of maturity and the Internet, cloud infrastructure, and technology across the Internet, medical / health information technology. Simultaneously, the usage of mainstream and genomic technologies, as well as the exponential growth of mobile medical technology and mobile medical technology, have resulted in big data programmes in the medical and healthcare fields [4].

Wireless sensor networks for essential applications such as self-organizing autonomous cities, digital medicine, precision farming, and industrial control systems are often developed and equipped with resource-controlled sensing equipment. Many of these instruments are conscious of their surroundings and the data they collect, and they submit it to the data collection flow server. The real-time monitoring and decision-making capabilities of Data Stream Manager (DSM) gathers server data flow (commonly referred to as big data) for these critical applications, which can be exploited during malicious attack traffic or to destroy data [5]. As a consequence, ensuring the reliability of the gathered data such that any reports are reliable is a difficult challenge in these applications.

Due to advancements in the area of digital technology, there has been significant development in medical technology in a variety of areas. These emerging advances, on the other hand, also rendered medical data collection and processing not just more complex, but much more difficult. Furthermore, since the data is generated by a multitude of devices within a limited period of time, the data has the characteristic of being stored in various formats and being generated rapidly, which can be called a massive amount of resource problems [6]. The patient-centered healthcare utilities and providers have recommended a web-body framework to pick up and distribute health-CPS, focused on a convenient service and health ecosystem built by cloud and big data processing technologies. Today, a substantial amount of residents are relocating to metropolitan areas. One of the most difficult facets of a flood in the city centre is providing medical and educational care. As a result, communities all over the world are putting significant resources into urban development in order to create a better atmosphere for their people. Through this transformation, millions of mobile devices in households are fitted with analysable builders (smart metres, cameras, and so on), which help granular and indexical huge data for smart city services [7]. Use big data in the smart home as a model for exploring human behaviour habits for learning and health applications. Big data and knowledge are difficult tasks, particularly in health-related services involving the management and cross-linking of various types of data where a clear understanding of the successful display is required. With some templates and strategies for visualising health statistics, a modern graphical method for measuring health data has been developed that can be used to quickly track patients' health condition remotely [8]. The tool is user-friendly, and it helps doctors to easily assess a patient's current diagnosis by looking at the collared circles. Environmental knowledge monitoring is a rapidly developing platform that offers a diverse range of real-time personal health programmes and large data applications. Knowledge is focused on the identification of a framework that allows the Environmental Awareness System to analyse data stored by the cloud storage library based on its behaviour during the large-scale construction and deployment of Ambient Assisted Living (AAL) systems [9]. The proposed model is useful for analysing vast amounts of data in a cloud world. It begins with mining trends and patterns, as well as the probabilities and patterns correlated with individual patient data, and then applies this information to learn the correct waves. It is now simpler than ever to watch the progression of one's personal wellbeing and to keep track of life-related details thanks to a computer that can be worn by people. Because to advancements in fitness technology, a vast variety of patient care companies are already able to conveniently capture safe life records from a wide range of people for data review. While data from safe living records often contains confidential details, this may lead to significant privacy concerns in the processing of personal health information [10]. Evaluation physicians also have the opportunity to analyse such clinical experiments in DBN model multimedia, thanks to the growing number of DBN-based clinical multimedia research tools. Things related to the internet To begin, the hospital can be accessed over the internet via a portal that supports architectural and medical multimedia details, as well as real-world assets. Second, using multimedia data modelling and classification techniques, DBN Medicine performed study and review [11]. Strong confidence network, automated stacking encoder, and convolutional neural network are three network system models that have been implemented and analysed [12]. The quality of clinical multimedia data classification can also be improved with a medical multimedia data classification modelling framework focused on DBN. Wide data of machine learning algorithms, intelligent online control, and remote diagnostic realisation of equipment health status can be used in operating equipment data mining related to the establishment of intelligence platforms, detection rules failure can be used in operating equipment data mining related to the establishment of intelligence platforms, detection rules failure can be used in operating equipment data mining related to the establishment of intelligence platforms, detection rules failure can be used in operating equipment data mining related to the establishment of intelligence platforms, detection rules failure can be used in operating equipment data mining related to the establishment of intelligence platforms, detection rules [13.] One of the hybrid intelligence algorithms implements a hierarchical connection between big data and function error and function error feature identification and operational error clever detection action feature to obtain a system instability error prediction approach and function error feature detection and operational error clever detection action feature to obtain a hierarchical correlation between big data and function error [14]. Diabetes has become more common in the world. To meet this aim, diabetics must be monitored on a regular basis and must be actively engaged with their health care. Mobile Health (MH) is a growing trend in information and telecommunications technology that can help chronic patients in a smart world. It will review the existing status of MH technology in order to overcome its shortcomings [15]. Current study papers are evaluated in terms of validity and degree of applicability by patients and medical care professionals in the MH literature. The Patient will remotely track patients using Internet of Things (IoT) big data processing sensors. The literature, on the other hand, supports experiments that acknowledge the relatively large number of virtual instruments and the common use of a sleep predictor. A simulation-based smart bed load sensor is provided by the Design sluggish motion agent-based simulation platform [16]. The arrangement specifies the sleep predictor identification indicators and enables the outcomes of the dull taken indicator to be compared. The effects of the graph star map, chart evolution, and the final visual output of the bed sensor state are presented in this novel befit dummy, which helps users to discover the results of the graph star chart, chart evolution, and the final visual performance of the bed sensor state. While health networks for Parkinson's disease (PD) exist and have been discussed in the literature, the majority of them lack the capacity to analyse vast volumes of data generated and gathered from medical exams and organised in a pre-defined manner. Centered on the study of massive numbers, proposes a modern model of health network [17]. The planned architecture's key goal is to assist physicians in conducting purposeful assessments of common Parkinson's disease motor issues and improvements. Machine health control devices are commonly used in the modern sector to accomplish proactive maintenance, with applications such as fault monitoring, unemployment reduction, and property safety. Since predicting the appearance of certain faults (up to and including forecasting potential operating conditions and remaining service life [18], data-based health management has produced significant results in the big machine data age. The data source sensor is comprised of numerous effective trapezoids of digital data expression. The conventional approach is labor-intensive since it typically necessitates specialised knowledge and relies on manual labour. Wearable Health Monitoring Systems (WHMS) that are disabled will allow for continuous monitoring of possible patient physiological parameters from either place. Furthermore, utilising multiple biosensors, such a device will be unable to achieve a comprehensive measure of the user's wellbeing. Java-based simulation platform [19] that is multi-sensor supported or equivalent to the petri net model. This work has been extended to accommodate for synchronisation issues as well as time-dependent variables.

III. MATERIALS AND METHODS

Parkinson's disease is caused by the death of dopamine-producing neurons in the brain. Early signs of infections may be tough to detect since they are mild at first. Owing to the high pressure placed on patients, there is a health-care system that delays detection. The diagnosis of Parkinson's disease using Machine Learning (ML) and Big Data (BD) methods leads to a greater explanation of the disease decade.

Figure 1 shows the pre-processing of a Parkinson's disease dataset, which eliminates noise and unnecessary data while using feature selection to find the right attributes and eventually classifying the Parkinson's disease prediction result.

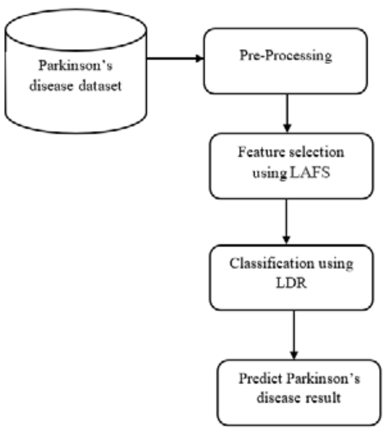

Figure 1: Block diagram

3.1 Pre-processing

It is a typical data pre-processing approach that is defined by the use of a data processor. Filtering, normalisation, and target recognition are also part of the pre-processing procedure. The performance at this stage is a set of important parts and components. Light varies often, and there is less comparison, according to the data. As a result, the platform must process the data immediately. To protect random lighting and noise medical records, improvements are needed. It's a technique for filtering out unnecessary information from the background noise. Clinical evidence were often altered prior to improvement. This is a phase in the data pre-processing method that will increase performance.

3.2 Feature selection using Least Absolute Shrinkage and Feature Selection (LAFS) algorithm

In machine learning, feature selection refers to the process of choosing the most appropriate features for the model disease results. There is a propensity to increase the tempo, precision, or both training by limiting the number of features you want to use (not only the data that hasn't modified the model supplied), but there is also a tendency to improve the speed, accuracy, or both training by limiting the number of features you want to use (not just the data that hasn't changed the model supplied). Using the LAFS algorithm, it picks shivering, voice problems, postural instability, and movement problems.

Algorithm Steps

Input: Parkinson’s disease dataset

Output: Feature selection disease Dataset

Start
Step 1: Initialize the disease dataset
Step 2. Read the dataset
Step 3. Split the Dataset
Step 4. For (Calculate each intensity data)
Feature selection disease dataset
End of
Step 5. Select best features (shivering, speech problem, Movements)
Exit

Any Parkinson's disease data is gathered during the phases of this algorithm, making the data a very delicate operation. The LAFS algorithm is used to select the Parkinson's disease functions.

3.3 Classification using Logistic Decision Regression

The large-scale estimation issue of Parkinson's disease is found in the general public health. Machine learning-based approaches were used to differentiate between stable individuals and those with Parkinson's disease. Via a network of space exploration lectures, LDR is able to achieve its goals. It is reliant on a number of inputs, which are usually used to estimate the estimated function.

Algorithm steps

Input: Feature selection disease dataset

Output: Classification of Parkinson’s disease

Start
Step 1: Import the feature selection disease dataset
Step 2: Read the feature selection disease dataset
Step 3: Remove unnecessary data
Step 3: Calculate the classification using LDR
Stop

IV. RESULT AND DISCUSSION

The outcomes and consequences of the new development process would be evaluated using the Anaconda tool and a medical dataset for Parkinson's disease. The results evaluation During the re-run process of test data, sensitivity, accuracy, and classification efficiency are determined. Support Vector Machine (SVM) and Convolutional Neural Network (CNN) are two known approaches that are compared to the proposed Logistic Decision Regression (LDR) algorithm (CNN).

Table 1: Simulation parameters

Parameters	Values used
Tool	Anaconda
Language	Python
Input data	Parkinson's disease data set
Training dataset	120
Testing dataset	30

Table 1 shows the simulation parameters for proposed implementation process using python language.

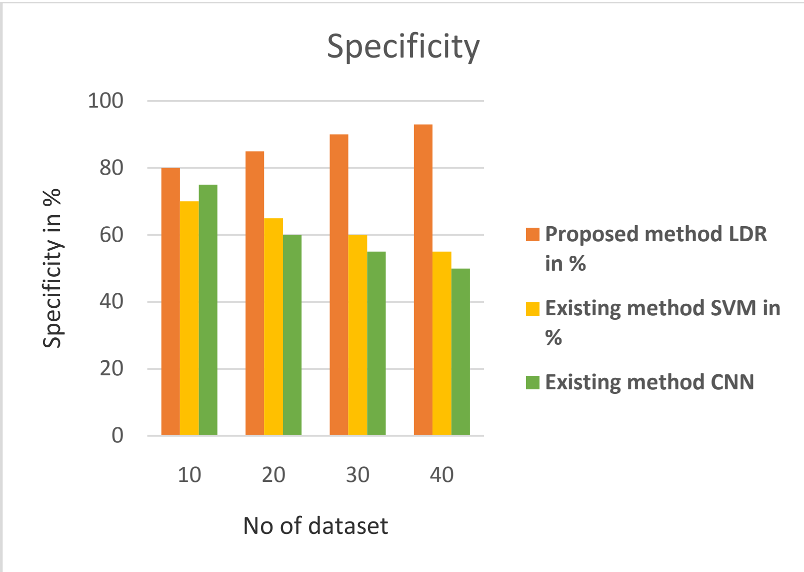

Figure 2: Analysis of specificity

The study of accuracy in percentages is depicted in Figure 2. The sensitivity to Parkinson's disease tests refers to the number of times they are correctly identified. The suggested sensitivity result from Logistic Decision Regression (LDR) is 93 percent. The results of the current approaches are 55 percent for the Support Vector Machine (SVM) and 50 percent for the Convolutional Neural Network (CNN).

ISSN 2651-4451 | **e-ISSN** 2651-446X

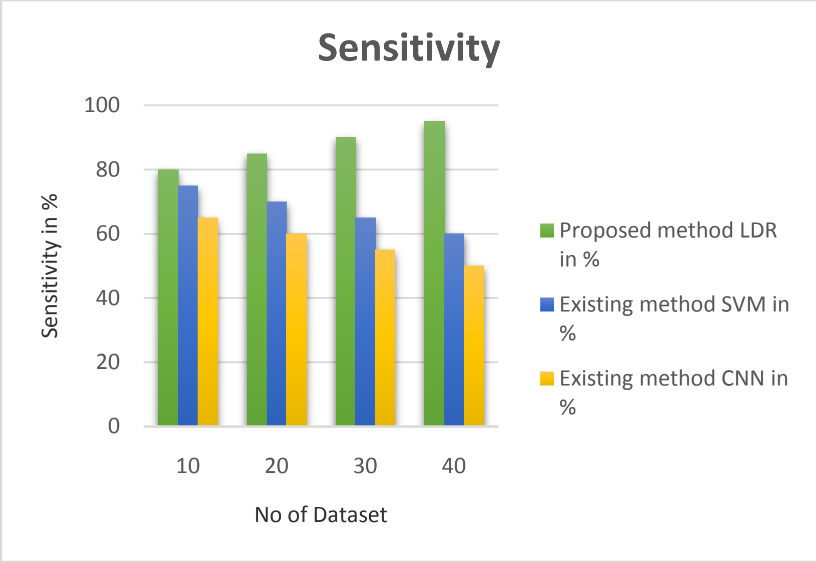

Figure 3: Analysis of sensitivity

The sensitivity study in percentage as seen in Figure 3. As a proportion of correctly negative for Parkinson's disease, specificity tests have been established. The specificity result of the suggested Logistic Decision Regression (LDR) is 95%. Support Vector Machine (SVM) results are 60% and Convolutional Neural Network (CNN) results are 50%, respectively, with the latest processes.

Table 2: Analysis of classification performance

No of dataset	LDR in %	SVM in %	CNN in %
14	81	76	72
25	87	61	66
33	92	66	64
42	98	58	49

Table 2 shows the analysis of classification performance the proposed algorithm classify the Parkinson disease and it provide high performance compared to other methods.

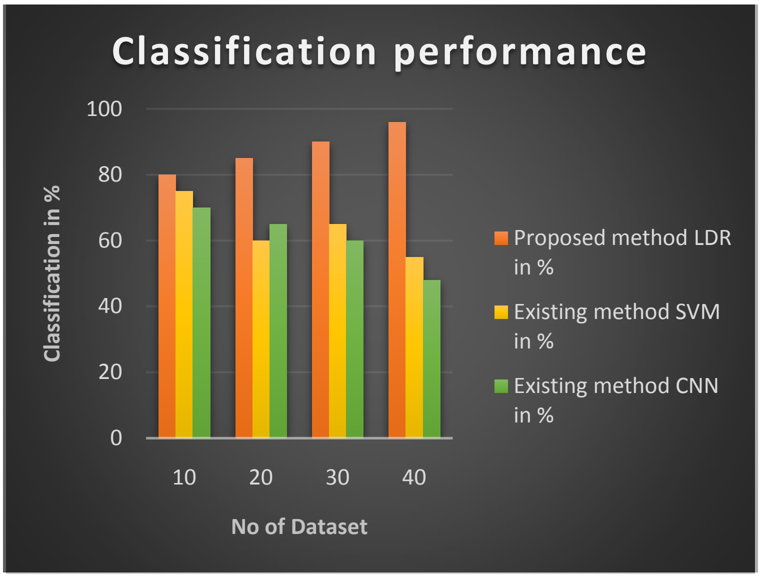

Figure 4: Classification performance

Figure 4 depicts the classification success rate as a percentage. The suggested specificity result for Logistic Decision Regression (LDR) is 96 percent. The results of the latest approaches are 55 percent for Support Vector Machines (SVM) and 48 percent for Convolutional Neural Networks (CNN).

V. CONCLUSION

People may not have a clear way of determining whether or not they are suffering from Parkinson's disease through a particular examination, such as a blood test or an ECG. Diagnosis of Parkinson's disease requires a specific test, such as a blood test or an ECG. To classify Parkinson's disease and overcome this complicated challenge, the suggested Machine Learning (ML) induced Logistic Decision Regression (LDR) algorithm is used. Early diagnosis of Parkinson's disease will contribute to improved care and disease control, thereby enhancing the quality of life of patients. The organization's disease prediction technology, which is focused on machine learning and large data, enhances human wellbeing while further promoting the big data industry of disease prediction. The proposed LDR algorithm has a sensitivity of 95 percent, a precision of 93 percent, and a classification efficiency of 97 percent.

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