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EXPLORING DATA MINING APPROACHES FOR EARLY ALZHEIMER'S DETECTION: A COMPREHENSIVE SURVEY

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Abstract - This literature review addresses the burgeoning global health challenge posed by Alzheimer's disease (AD) and the imperative for early detection. With the gradual onset and the lack of definitive early diagnostic tools, integrating data mining techniques offers a promising avenue for uncovering intricate patterns within diverse datasets. Examining research across neuroimaging, genomics, and clinical records, this survey explores integrated data mining approaches, spanning machine learning, statistical analysis, and artificial intelligence. The review critically evaluates methodologies, emphasizing the potential of collaborative data integration initiatives to develop robust models for early Alzheimer's detection.

Keywords: [Alzheimer's disease, early detection, integrated data mining, statistical analysis, artificial intelligence, biomarkers;]

1. INTRODUCTION

Alzheimer's disease (AD) poses a substantial global health challenge, and its prevalence is anticipated to surge in the coming decades. The gradual onset of AD and the absence of definitive early diagnostic tools present significant challenges for timely intervention. In response, integrating data mining techniques emerges as a promising strategy to uncover intricate patterns within diverse datasets, facilitating the timely detection of Alzheimer's. Traditional diagnostic methods often prove inadequate for accurate early assessments due to the complex nature of the disease. A comprehensive approach, leveraging data mining across various data sources such as neuroimaging, genomics, and clinical records, offers a holistic perspective, unveiling subtle patterns indicative of pre-symptomatic stages of Alzheimer's disease.

This literature review aims to comprehensively examine the current research landscape focused on integrated data mining approaches for early Alzheimer's disease identification. By synthesizing findings from diverse studies spanning machine learning, statistical analysis, and artificial intelligence, this survey explores advancements, challenges, and emerging trends in the field. The objective is not only to provide a holistic overview of methodologies but also to critically evaluate their effectiveness in distinguishing between normal aging and cognitive decline. The investigation into neuroimaging data, genetic markers, and clinical variables using advanced algorithms holds promise for uncovering intricate relationships and discovering novel biomarkers for early Alzheimer's detection. Furthermore, this review underscores the evolving nature of data integration techniques, highlighting the significance of collaborative initiatives in amalgamating diverse datasets for the development of more robust and widely applicable models.

2. Literature Survey

1. N. Tasnim (2019) et.al proposed Identification of Drop out Students Using Educational Data Mining. Education serves as a cornerstone for individual stability, resilience, and national prosperity. However, early-stage student dropout poses a substantial challenge, depleting a nation's intellectual resources. Despite declining dropout rates, timely identification remains a hurdle. This paper introduces an educational data mining approach employing thresholds to identify potential dropouts. Utilizing attribute values and information gain, this method calculates a threshold, eliminating the need for complex classifiers. The proposed approach excels in both original and outlier-containing datasets, fulfilling the crucial role of accurately identifying students at risk. Future work may address dataset imbalances to further enhance method performance.

Merit

The threshold-based strategy improves the accuracy of early intervention by effectively identifying prospective dropout students utilizing attribute values and information gain.

Demerit

Managing dataset imbalances is a possible drawback that needs more research to be resolved for better results.

2. P. Nguyen (2019) et.al proposed early In-trouble Student Identification Based on Temporal Educational Data Clustering. This paper introduces a groundbreaking method, DTM_Kernel, designed for the early detection of

academically struggling students using temporal educational data within an academic credit system. In contrast to existing educational data mining approaches, our method employs temporal clustering through an ensemble technique, merging dynamic topic models and kernel k-means. The dynamically generated temporal clusters enhance the comprehension of student performance over time. DTM_Kernel optimizes the ensemble learning process with S_Dbw for internal validation, enhancing practicality by streamlining parameters in kernel k-means. Experimental results on real datasets spanning three academic years underscore the efficacy of our method, exhibiting superior Recall and F-measure compared to both unsupervised and supervised learning approaches. DTM_Kernel signifies a noteworthy advancement in educational data mining, providing a robust solution for early identification of at-risk students.

Merit
DTM_Kernel improves temporal clustering for precise early identification of students who are struggling by integrating dynamic topic models and kernel k-means.

Demerit
On the other hand, its dependence on internal validation and ensemble approaches may raise computing complexity in large-scale educational datasets.

3. G. Hemanth (2019) et.al proposed Design and Implementing Brain Tumor Detection Using Machine Learning Approach. Detection of brain tumors in healthcare is increasingly vital, given the rapid and uncontrolled cell proliferation resulting in malformed masses. Magnetic Resonance Imaging (MRI) segmentation plays a crucial role in identifying abnormal tumor regions. This research advocates an efficient automatic segmentation method that utilizes Convolutional Neural Networks (CNN) with compact 3 x 3 kernels. The process involves data collection, pre-processing, average filtering, segmentation, feature extraction, and CNN-based classification. By integrating data mining techniques, valuable patterns are extracted, enabling effective brain tumor detection and prevention at early stages. The proposed algorithm, with its precision and leveraging of traditional neural network and CNN approaches, demonstrates high accuracy. Through meticulous processing steps and strategic method selection, the research provides a potent tool for robust brain tumor detection.

Merit
The proposed approach uses CNNs to detect brain tumors with high accuracy, providing accurate and effective segmentation for early diagnosis.

Demerit
Because CNNs are complicated, limited interpretability may be an issue, taking it difficult to comprehend decision-making processes.

4. N. Mathew (2018) et.al proposed A Boosting Approach for Maternal Hypertensive Disorder Detection. Pregnancy, a delicate phase in a woman's life, introduces health changes that may pose risks, particularly with high-risk pregnancies threatening both maternal and fetal well-being. Hypertensive disorders, prevalent culprits in such complications, present a formidable challenge in healthcare, contributing to increased maternal and fetal mortality. This paper addresses this concern by employing a boosted random forest approach for the early prediction of hypertensive disorders in pregnant women. Utilizing advanced data mining techniques, this classification method aids in risk prediction, diagnosis, and potentially reduces maternal and fetal mortality, a critical issue in many developing nations. The significance of early identification is underscored, as even healthy women can encounter pregnancy-related problems, especially hypertension, with potential detrimental outcomes if not effectively controlled. Emphasizing the role of data mining in healthcare, this proposed approach, termed boosted random forest, holds the promise of revolutionizing maternal care by enhancing the accuracy of disorder classification and, consequently, improving overall pregnancy outcomes.

Merit
The boosted random forest approach improves risk assessment and may lower maternal and fetal mortality by improving early prediction of hypertensive diseases in pregnancy.

Demerit
The enhanced random forest model's complexity and interpretability may provide difficulties, reducing the transparency of decision-making for medical professionals.

5. Z. Ghasemi (2020) et.al proposed Automated Chagas Disease Vectors Identification using Data Mining Techniques. Chagas disease (CD), a pervasive vector-borne zoonotic ailment, poses a considerable global public health threat. Carried by triatomine insects, or kissing bugs, CD manifests in acute and chronic phases, emphasizing the critical need for early detection to facilitate effective control and treatment. Despite numerous clinical trials, advancements in automatic identification systems have been sluggish. This study introduces two systems utilizing Principal Component Analysis (PCA) for feature extraction and employing Random Forest (RF) and Support Vector Machine (SVM) for classification. Examining over two thousand kissing bug images, the PCA–RF approach achieves a remarkable 100% accuracy for both Mexican and Brazilian species, outperforming existing methods. Particularly noteworthy is PCA–SVM, exhibiting 87.70% accuracy for Mexican species and 75.30% for Brazilian species, overcoming challenges related to resolution, preprocessing, and accuracy inherent in reference methods. These encouraging outcomes underscore the potential of automated CD vector identification systems in advancing

the understanding and control of this significant public health concern.

Merit
The PCA-RF method outperforms other approaches by achieving an amazing 100% accuracy in detecting species of Brazilian and Mexican kissing bugs.

Demerit
The accuracy of PCA-SVM is significantly lower (87.70% for Mexican species and 75.30% for Brazilian species), suggesting certain performance constraints.

6. M. N. Elagamy (2018) et.al proposed liver disease random forest-text mining system mining critical indicators of stock market movements. The disease is a pivotal element in a free market economy, significantly influencing commerce and industry growth. To better understand SM movements and detect early warning signs of potential crises, this paper introduces a novel method, merging text mining with the Random Forest algorithm. In contrast to past reliance on data mining alone, the study expands critical indicator classification from three to eight classes. Results indicate that Random Forest surpasses other classifiers, achieving notable accuracy in classifying relevant news articles. While addressing the challenge of stock market behavior randomness, the study underscores the importance of efficiently analyzing and visualizing stock market data through the integration of text mining and computational theories. However, reliance on computational tools may introduce complexity, and interpreting unstructured data presents potential challenges.

Merits
A novel method that expands crucial indicator classification and achieves high accuracy in news article classification combines text mining and Random Forest.

Demerits
Dependence on computer ideas and tools could make things more complicated, and interpreting unstructured data could be difficult.

7. R. G. Franklin (2020) et.al proposed Survey of Heart Disease Prediction and Identification using Machine Learning Approaches. Detecting heart disease poses challenges due to limited medical practitioner knowledge, resulting in intricate diagnoses. This research delves into leveraging extensive healthcare data and optimal data mining techniques to facilitate early detection and prevention. Emphasizing risk parameters in heart disease investigation, the study aims to identify effective prediction techniques while assessing existing drawbacks. Within the medical domain, Machine Learning and Data Mining play pivotal roles. The proposed combination of Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM) model surpasses existing methods, employing encrypted data transfer for secure symptom collection. The approach involves dataset collection, training/testing, symptom gathering, secure data transfer utilizing Advanced Encryption Standard (AES), and generating PDF results. Comparative analysis demonstrates superior heart disease prediction performance compared to other Machine Learning approaches. This Data Mining-based Heart Disease Prediction System enhances security and efficiency, automating predictions through online software. The suggested LSTM and CNN technique elevates encryption complexity, enabling automatic diagnosis, reducing retrieval time, enhancing service quality, and minimizing costs associated with life-saving efforts.

Merit
The proposed CNN and LSTM model outperforms other models in heart disease prediction, improving precision and dependability.

Demerit
There may be an increase in computational overhead and resource consumption as a result of the complexity of encrypted data transfer utilizing AES.

8. S. Andleeb (2019) et.al proposed Identification and Classification of Cybercrimes using Text Mining Technique. This research addresses the intricate challenges of detecting cyberbullying, grappling with issues such as sparse datasets, anonymous actors, and the imperative to safeguard victim privacy. It introduces a proactive methodology that employs text mining and machine learning, utilizing datasets from myspace.com and Preverted-Justice.com. In contrast to prior studies focusing solely on textual aspects, this approach extracts three types of features—textual, behavioral, and demographic. Textual features encompass bullying-indicative words, behavioral features include persistent personality traits, and demographic features involve age, gender, and location. Evaluation, using Support Vector Machine and Bernoulli NB classifiers, highlights the superior performance of the former, achieving an overall classification accuracy of 87.14%. This comprehensive framework yields promising outcomes in identifying cyberbullying, utilizing a multi-feature approach and data mining techniques for chat conversation data classification. Various dataset division strategies contribute valuable insights into assessing the model's performance.

Merit
The study's incorporation of multiple feature types enhances cyber bullying detection accuracy and provides a more nuanced understanding.

Demerit
Limited generalizability may result from the specific dataset sources (myspace.com and Preverted-Justice.com), potentially affecting broader applicability.

9. P. B. Chanda (2020) et.al proposed Cardiac MR Images Segmentation for Identification of Cardiac Diseases Using Fuzzy Based Approach. The proposed research centers on the segmentation of cardiac MRI images, specifically focusing on the critical task of delineating the left ventricle. Employing a combination of data mining and machine learning techniques, the study integrates morphological segmentation, threshold-based methods, and fuzzy-based edge detection. Given the increasing prevalence of cardiac diseases, early detection is vital for prompt intervention. The objective is to classify cardiac arrhythmias, abnormal cardiac conditions, and left ventricular issues. Demonstrating a commendable accuracy exceeding 90%, the approach utilizes statistical parameters such as MSE, PSNR, and MAE, showcasing superior performance in fuzzy-based image quality evaluation. The primary goal is to swiftly and accurately identify diseases within the left ventricle from cardiac MRI images, facilitating prompt clinical diagnosis and treatment decisions. Experimental studies highlight precise segmentation, enabling the early detection of abnormalities with heightened efficiency. The methodology, incorporating fuzzy-based, threshold, and morphological techniques, proves highly effective in identifying and categorizing diseases within the left ventricle, ensuring rapid and accurate segmentation outcomes.

Merit
Achieves over 90% accuracy in disease identification, enhancing early diagnosis and treatment decisions for cardiac conditions.

Demerit
Complexity of fuzzy-based approach may require computational resources, potentially limiting scalability in large-scale applications.

10. S. De Silva (2019) et.al proposed A Rule-Based System for ADHD Identification using Eye Movement Data. Addressing the prevalent and impactful psychiatric disorder, Attention Deficit Hyperactivity Disorder (ADHD) this study centers on early identification through a rule-based approach. Utilizing eye movement data, encompassing fixations, saccades, gaze positions, and pupil diameters, decision tree classifiers exhibited a peak accuracy of 84%, with classification rule algorithms closely following at 82%. These results underscore the effectiveness of rule-based components in detecting ADHD. Affecting approximately 7% of the global population, with 6.4% of 7 to 14-year-olds diagnosed in the United States and 7.1% in Sri Lanka, ADHD is a genetically linked disorder necessitating early detection due to its potential long-term impacts. The study underscores that both decision tree and classification ruling algorithms present viable options for constructing effective rule-based systems in early ADHD identification using eye movement data.

Merit
Decision tree algorithms achieve an impressive 84% accuracy, showcasing their effectiveness in early ADHD identification using eye movement data.

Demerit
The classification rule algorithms, while still accurate at 82%, exhibit a slightly lower accuracy compared to decision tree algorithms.

11. F. Pacheco (2018) et.al proposed a novel statistical based feature extraction approach for the inner-class feature estimation using linear regression. This research introduces an innovative statistical-based feature extraction method using linear regression (LR) models, with a specific focus on mean computation. The approach involves creating an ensemble of LR models for each class to enhance the likelihood of inner-class identification. Tested in a real-world scenario for traffic network classification, the proposed method demonstrated superior performance compared to classical methods, particularly when dealing with limited raw sample lengths. This study serves as an initial exploration, with plans to refine LR model selection, optimize procedures, and incorporate error penalization principles. Future endeavors aim to broaden the application of this approach to diverse databases, including satellite communications, highlighting its potential for early detection and enhancing quality of service.

Merit
The proposed ensemble of LR models enhances inner-class identification in statistical feature extraction, improving classification accuracy.

Demerit
The method's dependence on assumptions may limit generalizability to datasets with different distribution characteristics.

12. A. Teske (2018) et.al proposed Automatic Identification of Maritime Incidents from Unstructured Articles. This paper presents two Natural Language Processing (NLP) methodologies designed to detect maritime incidents within unstructured articles. The first technique employs a document classification scheme utilizing binary and frequency bags-of-words, incorporating two feature selection methods. Notable classifiers such as Logistic Regression (98.5%), AdaBoostM1 (Bayes Net) (98.33%), and Random Forest (97.56%) exhibit high accuracy. The second technique emphasizes information extraction, employing regular expressions, Named Entity Recognition (NER), and contextual cues to ascertain maritime incident locations, achieving an accuracy of 87.9% in testing. Together, these techniques form a cohesive pipeline, where positive examples from document classification inform the information extraction algorithm. Addressing challenges in maritime risk assessment, the paper contributes a robust document classification scheme and an effective

information extraction technique, demonstrating promising results in accurately identifying and locating maritime incidents within unstructured articles.

Merit
The document classification technique proved successful in recognizing maritime incidents in unstructured papers, with a high accuracy rate of 98.5%.

Demerit
The accuracy of information extraction (87.9%) is marginally lower, indicating potential for improvement in precisely locating incident facts.

13. A. Aldallal (2018) et.al proposed Using Data Mining Techniques to Predict Diabetes and Heart Diseases. This research addresses the rising incidence of non-communicable diseases (NCDs), particularly heart diseases and diabetes, linked to modernized lifestyles. The focus is on creating predictive software for medical professionals using a data-mining model. Utilizing patient records from Bahrain Defense Force Hospital, the study demonstrates the software's effectiveness in forecasting NCDs. Given that NCDs account for 68% of global deaths, as reported by the World Health Organization, there is a crucial need for proactive measures. The developed application facilitates rapid and informed decision-making for physicians, with potential widespread adoption in healthcare centers. The study emphasizes the importance of ongoing testing, code refinement, and future considerations for mobile applications, enabling patients to actively monitor their well-being.

Merits
Based on patient information, the research develops predictive software to support proactive NCD prevention, addressing a critical health concern.

Demerits
Future considerations for mobile applications may need to address accessibility difficulties, necessitating ongoing testing and coding improvement.

14. X. Zhai (2018) et.al proposed Research on the Biological Basis of Treating Different Diseases with Same Method Based on Big Data Mining and Complex Network. In the realm of big data, Chinese medicine researchers seize the dual prospects and challenges by integrating traditional practices into a vast landscape. This study focuses on the clinically intricate conditions of coronary heart disease and apoplexy, proposing a big data mining model. Employing a "macro to micro" and "micro to macro" approach, the research constructs intricate networks, blending traditional Chinese medicine syndromes with big data mining and complex network analysis. Emphasizing the "treating different diseases with the same method" principle, the study explores common biological mechanisms, such as Qi deficiency and blood stasis syndromes. Through gene big data and network analysis, the research unveils shared biological indicators, providing insights into the scientific essence of unified treatment across diverse diseases in the expansive realm of extensive data.

Merits
The integration of big data facilitates tailored therapy for apoplexy and coronary heart disease by improving understanding of shared biological pathways.

Demerit
Traditional Chinese medicine research has problems due to complexity and potential data bias, necessitating rigorous interpretation and validation.

15. S. K. K. L, N. K. G (2020) et.al proposed Coronary Artery Disease Prediction using Data Mining Techniques. This study delves into leveraging artificial intelligence, particularly machine learning algorithms such as Support Vector Machine (SVM), Naïve Bayes, and Random Forest, to predict coronary disease by tapping into extensive datasets within the health industry. With the global increase in coronary illness, early detection is paramount for timely intervention. The research explores diverse data mining techniques to enhance prediction accuracy, revealing through comparative analysis that Random Forest stands out as the most effective algorithm. In the modern era marked by stress and unhealthy lifestyles, employing advanced statistical mining techniques becomes imperative. By scrutinizing medical data, this research aims to contribute to the early identification of coronary diseases, laying the groundwork for proactive medical interventions. In summary, amidst various data mining methods, Random Forest proves to be the optimal choice for accurate coronary disease prediction, presenting promising implications for the healthcare sector.

Merits
Random Forest uses a variety of decision trees to provide robust outcomes, using ensemble learning to produce high prediction accuracy.

Demerits
Interpretability may be hampered by Random Forest complexity, making it difficult to comprehend the reasoning behind particular forecasts.

CONCLUSION

This literature survey highlights the significance of integrated data mining approaches for early Alzheimer's disease identification. The review underscores the limitations of traditional diagnostic methods and emphasizes the promise of comprehensive approaches leveraging diverse datasets. The investigation into neuroimaging data, genetic markers, and clinical variables using advanced algorithms holds potential for revealing intricate relationships and identifying novel biomarkers. As data integration techniques evolve, collaborative initiatives

become increasingly crucial for developing robust models that transcend individual datasets, contributing to advancements in early Alzheimer's detection methodologies.

REFERENCES

[1]. N. Tasnim, M. K. Paul and A. H. M. S. Sattar, "Identification of Drop Out Students Using Educational Data Mining," 2019 International Conference on Electrical, Computer and Communication Engineering (ECCE), Cox'sBazar, Bangladesh, 2019, pp. 1-5, doi: 10.1109/ECACE.2019.8679385.

[2]. P. Nguyen and C. Vo, "Early In-trouble Student Identification Based on Temporal Educational Data Clustering," 2019 International Conference on Information Technology (ICIT), Bhubaneswar, India, 2019, pp. 313-318, doi: 10.1109/ICIT48102.2019.00062.

[3]. G. Hemanth, M. Janardhan and L. Sujihelen, "Design and Implementing Brain Tumor Detection Using Machine Learning Approach," 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI), Tirunelveli, India, 2019, pp. 1289-1294, doi: 10.1109/ICOEI.2019.8862553.

[4]. N. Mathew, "A Boosting Approach for Maternal Hypertensive Disorder Detection," 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT), Coimbatore, India, 2018, pp. 1474-1477, doi: 10.1109/ICICCT.2018.8473236.

[5]. Z. Ghasemi, S. Banitaan and G. Al-Refai, "Automated Chagas Disease Vectors Identification using Data Mining Techniques," 2020 IEEE International Conference on Electro Information Technology (EIT), Chicago, IL, USA, 2020, pp. 540-545, doi: 10.1109/EIT48999.2020.9208261.

[6]. M. N. Elagamy, C. Stanier and B. Sharp, "Stock market random forest-text mining system mining critical indicators of stock market movements," 2018 2nd International Conference on Natural Language and Speech Processing (ICNLSP), Algiers, Algeria, 2018, pp. 1-8, doi: 10.1109/ICNLSP.2018.8374370.

[7]. R. G. Franklin and B. Muthukumar, "Survey of Heart Disease Prediction and Identification using Machine Learning Approaches," 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS), Thoothukudi, India, 2020, pp. 553-557, doi: 10.1109/ICISS49785.2020.9316119.

[8]. S. Andleeb, R. Ahmed, Z. Ahmed and M. Kanwal, "Identification and Classification of Cybercrimes using Text Mining Technique," 2019 International Conference on Frontiers of Information Technology (FIT), Islamabad, Pakistan, 2019, pp. 227-2275, doi: 10.1109/FIT47737.2019.00050.

[9]. P. B. Chanda and S. K. Sarkar, "Cardiac MR Images Segmentation For Identification Of Cardiac Diseases Using Fuzzy Based Approach," 2020 Third International Conference on Smart Systems and Inventive Technology (ICSSIT), Tirunelveli, India, 2020, pp. 1238-1246, doi: 10.1109/ICSSIT48917.2020.9214080.

[10]. S. De Silva et al., "A Rule-Based System for ADHD Identification using Eye Movement Data," 2019 Moratuwa Engineering Research Conference (MERCon), Moratuwa, Sri Lanka, 2019, pp. 538-543, doi: 10.1109/MERCon.2019.8818865.

[11]. F. Pacheco, E. Exposito, J. Aguilar, M. Gineste and C. Baudoin, "A novel statistical based feature extraction approach for the inner-class feature estimation using linear regression," 2018 International Joint Conference on Neural Networks (IJCNN), Rio de Janeiro, Brazil, 2018, pp. 1-8, doi: 10.1109/IJCNN.2018.8488992.

[12]. Teske, R. Falcon, R. Abielmona and E. Petriu, "Automatic Identification of Maritime Incidents from Unstructured Articles," 2018 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA), Boston, MA, USA, 2018, pp. 42-48, doi: 10.1109/COGSIMA.2018.8423975.

[13]. Aldallal and A. A. A. Al-Moosa, "Using Data Mining Techniques to Predict Diabetes and Heart Diseases," 2018 4th International Conference on Frontiers of Signal Processing (ICFSP), Poitiers, France, 2018, pp. 150-154, doi: 10.1109/ICFSP.2018.8552051.

[14]. X. Zhai et al., "Research on the Biological Basis of Treating Different Diseases with Same Method Based on Big Data Mining and Complex Network," 2018 IEEE 4th International Conference on Big Data Security on Cloud (BigDataSecurity), IEEE International Conference on High Performance and Smart Computing, (HPSC) and IEEE International Conference on Intelligent Data and Security (IDS), Omaha, NE, USA, 2018, pp. 264-269, doi: 10.1109/BDS/HPSC/IDS18.2018.00063.

[15]. S. K. K. L, N. K. G and M. J. A, "Coronary Artery Disease Prediction using Data Mining Techniques," 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS), Thoothukudi, India, 2020, pp. 693-697, doi: 10.1109/ICISS49785.2020.9316014.