International Journal of Information Technology & Computer Engineering

ISSN 2347–3657

Volume 13, Issue 2, 2025

Book Listing And Catalog Management System

Mohd Sofiyan[1], Mohammed Sohail khan[2], Mohammed Abdul Raheem Khan[3], Ms. Naga Lakshmi[4]

[1,2,3]B.E. Student, Department of IT, Lords Institute of Engineering and Technology, Hyderabad

[4] Assistant Professor, Department of IT, Lords Institute of Engineering and Technology, Hyderabad

nagalakshmi@lords.ac.in

ABSTRACT:

The Book Listing and Catalog Management System is a comprehensive software solution designed to efficiently manage and organize books within a library, bookstore, or digital platform. The system allows administrators to add, update, and categorize books based on various attributes, such as title, author, genre, publisher, and ISBN. Users can easily search for books, view detailed information, and track the availability or status of each title. It offers functionalities for inventory control, with features like stock management, ordering, and generating reports.

The system is equipped with a user-friendly interface that supports both backend management and frontend user interactions, ensuring ease of use for both administrators and end-users. With advanced search filters and sorting options, users can quickly locate books based on specific criteria, while administrators can generate analytical reports to assist in decision-making. Furthermore, the system supports the integration of multiple book formats, including physical and e- books, making it a versatile tool for a variety of environments.

By automating the cataloging process and streamlining book management, the Book Listing and Catalog Management System significantly reduces manual effort, improves accuracy, and enhances the overall user experience for both staff and customers.

Keywords— *Real-time Stress Detection, Personalized Stress Monitoring, Physiological Signal Analysis, Machine Learning for Stress Detection, Time-Series Data Classification, Approximate Bayes Classifier, Electrodermal Activity (EDA), Heart Rate Variability (HRV), Virtual Reality (VR) Training, Wearable Sensor-Based Stress Detection, Feature Selection in Physiological Data, Human-Machine Interaction (HMI).*

I. INTRODUCTION

The Book listing and Catalog Management System is an innovative software solution designed to streamline the management of book inventories for libraries, bookstores, publishers, and online retailers. It simplifies the cataloging process by centralizing book data in a digital platform, eliminating the manual, error-prone tasks of traditional systems[1]. The system stores comprehensive book details such as title, author, genre, ISBN, and price, and offers search and filtering options for easy access. It supports multiple user roles with control over adding, modifying, or deleting book entries and allows users to generate reports on sales trends and inventory. Additionally, it can be integrated with e-commerce or library management systems for a seamless experience across platforms. Highly scalable and customizable, the system meets the needs of both small businesses and large organizations, ensuring efficient operations, accurate data management, and improved customer satisfaction[2]. hazardous operation [3], [4]. Stress detection using machine learning has been challenging for several reasons. First,there are individual differences in the appraisal of, and physiological responses to, stressful situations. Numerous stress detection approaches have attempted to reduce technical complexity by generalizing their models to a broad population, or the ''average'' response [3]. However, the stress response to a unique situation is largely subjective, and personalized stress detection models may be more robust to individual differences [5], [6]. The second challenge is that the time series nature of physiological signals can be problematic. The physiological stress response has temporal and feature correlations. These correlations may violate the machine learning assumption that the data are independently and identically distributed, thereby leading to biased results [7]. An additional challenge is interpreting how well model estimations match the true conditional probabilities of a subject's stress levels. Stress detection models rely on traditional machine learning algorithms that make data- driven approximations to estimate the chance that the individual is experiencing a state of stress given their physiological responses. However, these estimations are often indirect and without a benchmark for comparison. From classical statistics research, the Bayes theorem is theoretically the optimal solution and a classifier given the same parameters as Bayes theorem will have the lowest probability of error [8]. The Bayes theorem usesan empirical density distribution as a true prior probability, which can be used to calculate the conditional probability of each class. The classifier selects the class with the greatest posterior probability of occurrence, also known as maximum a posteriori. Machine-learning algorithms attempt to approximate the density distributions. If the density estimates of the classifier converge to the true densities, then the estimated probability represents the true probability of occurrence and a classifier that approximates Bayes becomes an Optimal Bayes classifier. However, these approximations can have varying accuracy due to assumptions made by the algorithm, such as independence of predictors [9]. Thus, it can be difficult to interpret the model's logic. Physiological systems are known to have a high degree of dependence with regard to a stress response, because they are often initiated by the same neuro endocrine axis [10]. Some researchers have shown that classifiers may account for dependencies using multivariate kernel density estimators [11]. Therefore, it may be beneficial to evaluate supervised machine learning classifiers against a benchmark optimal classifier that approximates Bayes using a density distribution estimated through multivariate kernel density estimation for stress detection. To achieve real-time and continuous monitoring of stress levels, new approaches are needed to analyze time series for physiologically-based stress detection [12]. Real- time stress detection can enable closed-loop automation to either modify the training environments to better match the trainee's responses or better assess individual stress during staged or real operations [13]. In datasets with repeated measurements at multiple times that present uncertainty from randomnessor incompleteness, such as multiple measures of physiological data, multivariate kernel density estimators may help increase detection accuracy [11].To address these challenges, the goal of this research is to assess the objectivity, reliability, and validity of a personalized model methodology. The first research question focuses on objectivity, and whether the stressor levels can show distinct levels in personalized features used for the classification model while accounting for individual differences in physiology. This will provideconfidence that the model is designed for the appropriate context and that the training data reflect distinct ground truth levels. The second research question focuses on the system's reliability by evaluating the performance of the time-series interval approach using a post- hoc model comparing between a standard laboratory cognitive task and a complex job-specific task, window sizes, classifier validation techniques, and features selected for each individual. The third research questionfocuses on the validity of the system by seeking to understand whether indirect approximations influence traditional supervised machine learning classifiers compared to a Bayes classifier, knownas Approximate Bayes (A Bayes), which uses direct approximations of optimal stress classes throughmultivariate kernel density estimation. This research is part of a larger development effort to design VR training scenariosthat can dynamically adapt a virtual environment using real-time stress detection [14], [15], [16]. Toanswer these research questions within the constraints of the larger system, the experiment will assess a time-series interval approach to stress detection for a post-hoc model of physiological response data, its accuracy in detecting participant stress using a collected during stressful tasks, andprovide the architecture for a real-time stress detection system that uses this classification methodology. Validating a machine learning pipeline post- hoc allows for translation to real-time stress detection and applications for stress monitoring.

II.RELATED WORK

A. Existing Research and Solutions

Stress detection in drivers is crucial for Book listing, with AI, machine learning, and wearable sensors playing a vital role in real-time monitoring. Multi-task neural networks (MT- NNs) using physiological signals like heart rate and skin conductance enhance personalized stress detection by incorporating subject-specific layers, outperforming traditional classifiers.

The integration of biometric sensors, AI, and virtual reality (VR) further improves stress classification. PPG sensors in wristwatches capture heart rate while VR-based driving simulations provide controlled environments for consistent data collection, enabling real-time detection and intervention. Real-time stress prediction using ECG and electrodermal activity (EDA) has shown that personalized models outperform generalized ones. Multi-modal approaches combining physiological and sociometric signals enhance classification accuracy, beneficial for high-stress environments. EDA sensors effectively distinguish between calm and distress states, offering a non-invasive means of real-time monitoring for applications in healthcare and well- being. Future research should refine sensor sensitivity, expand physiological metrics, and integrate deep learning for improved stress management interventions.

B. Problem Statement

Accurately detecting stress in real-time during hazardous operations is critical for optimizing task performance and ensuring safety. However, generalized stress detection models struggle with individual physiological differences and the time-series nature of physiological signals, leading to reduced accuracy and reliability. Traditional classifiers often rely on indirect approximations, introducing errors that hinder both post-hoc stress assessment and real-time monitoring. There is a need for a personalized stress detection system that dynamically selects optimal features and adapts to individual variations, improving classification accuracy across different tasks and stress levels. This study aims to address these challenges by evaluating a personalized machine-learning model for stress detection, comparing its performance against traditional classifiers and benchmark probabilistic models.

III. PROPOSED SYSTEM

An online library management system is a practical solution for the existing issues of the traditional library system. It is basically a windows application that is built mainly on

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 13, Issue 2, 2025

Java technology and relational database (sql). The similar application can also be built using the web technologies like HTML, CSS and JavaScript and a corresponding database, that can be a relational database like sql, oracle or no-sql database like mongodb.

Using this application software, the librarian can search any book by using the issued book id of that particular book in just a second. He can also add new students, new books to the library database, can issue books, return books by making the necessary changes to the database part from the application user-interface. The whole application is divided into different section depending upon its usage. The different sections are explained in the architecture part of this paper.

A. Advantage over Traditional System

As we know that the manual process of maintaining the data of a library in files or excel sheets is very hard. An online library management system provides a number of benefits and alternatives to the traditional library workflow.

Following are the advantages of an automated library management system:

1. Reduces the library management cost.
2. Enhancing monitoring and reporting process.
3. Eliminate the paper work and makes the library data more secure.
4. Removes the need for manual book distribution and simplifies the procedure to save time and effort. It also makes it simple for librarians to catalogue books and maintain track of those that have been issued, reissued, and not returned.
5. It's simple to create a customised report for library items, inventories, and fines.
6. Human involvement is still required in this automated system (library management system), but the number of decisions or processes that a human must perform is reduced.

B. Requirements for the Application

The minimum acceptable hardware requirement that are required for the proper functioning of the application are given below:

a. Operating System: Windows

b. Hard disk and RAM: 40GB and 4GB are required respectively

c. Processor: Dual-Core CPU

In our application, various supporting software's, libraries and tools are required which will help to develop this application. These software and libraries can be easily downloaded through the internet and then can be integrated with the application. The required software's requirement is listed below:

a. Windows Web Development Environment: The Windows Web Development that we are using in our project is WAMP server. This WAMP server is responsible for connecting the database to our LMS application. Various databases that are supported in the WAMP server are MySQL, Oracle and Php.

b. Drivers and Libraries: JDBC drivers which stands for "Java Database Connectivity" are also required. It basically helps to connect our java application with our SQL database. A sql library, often known as a sql connector library, is also required in our application. The sql library comes in a file with a (.jar) extension.

c. C++ Redistributable Packages: The Visual C++ Redistributable is a DLL (Dynamic Link Library) file required by many applications or programs to function correctly. The majority of these Visual C++ redistributable files and runtime packages are installed for standard libraries that are used by many software applications. So, if your program relies on such libraries and runtime packages, you must first install them before proceeding further. Otherwise, you will face difficulties during runtime and execution.

d. Java Packages: The main packages that we are using in our project are SWING and AWT (Abstract Window Toolkit). Swing makes it possible to create input methods through its interface that work in any java

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 13, Issue 2, 2025

runtime environment. It provides a set of lightweight components that work across all platforms to the greatest extent possible and the Java AWT is an API that contains large number of classes and methods to create and manage graphical user interface (GUI) applications.

IV. METHODOLOGY

This paper describes the development of a personalized physiological-based stress detection system to classify acute stress using feature selection on intervals of the time-series data. To train the machine learning model, participant physiological signals were collected for three stressor levels during either a spaceflight emergency fire procedure on a VR International Space Station (VR-ISS) or a well-validated and less-complex N-back mental workload task. Several previous studies have detected stress induced by N-back tasks via machine learningmethods, both alone [17], [18] and with another job-specific task. Therefore, comparing a jobs pecific VR-ISS task to the N-back using the same personalized approach is a way to assess the system's reliability can work for multiple stress detection tasks. Each participant had featuresselected at different interval window sizes, then those personalized features trained the classifier model, and subsequently tested the classifier's predictive accuracy. Since the stress response is complex and often unique, the analysis will explore which features are selected most for individuals depending on window size, and how this changes classification performance. Classifier performance was assessed using both holdout and cross-validation validation techniques to simulate how the model may perform on unseen data as an analog for deployment in real-time. The novelty and contribution of this research is to show that stress detection may benefit from using personalized time series approaches to quantify temporal patterns in physiological signals, to assess whether traditional classifiers are limited in approximatingthe optimal Bayes solution, that certain features may be better at different windows sizes,and that this approach has a suitable performance for detecting stress for a VR spaceflight emergency training procedure. The system design includes the input, processing, output and key features. The physiological data such as books listings, catalog system activity, and respiration from participants during stress including tasks. The data is analysed using machine learning models, with feature selection applied on data. The accurate stress level classification for real-time monitoring and training applications. The personalized model improves accuracy by accounting for individual differences and task-specific responses. Physiological signals, including heart rate, blood pressure, electrodermal activity (EDA), and respiration, were continuously recorded during task execution. The collected data underwent preprocessing, including signal filtering and artifact removal, to ensure high-quality input for model training. A personalized feature selection approach was employed, where an optimal subset of features was identified for each participant, allowing the model to account for individual physiological variations. Additionally, different time-series window sizes were examined to determine their impact on classification performance.[19] The classification models evaluated in this study include traditional machine learning classifiers—Support Vector Machine (SVM), Decision Tree, and Random Forest— alongside an optimal probability classifier, Approximate Bayes (ABayes), which served as a benchmark. The classifiers were trained using both personalized and generalized feature sets, and their performance was assessed using cross-validation and holdout testing. Classification accuracy, as well as variations in selected features across window sizes and tasks, were analyzed. Notably, blood pressure emerged as a prominent physiological marker for stress detection.

ISSN 2347–3657

Volume 13, Issue 2, 2025

The evaluation focused on comparing the classification accuracy of personalized models against generalized models and assessing the degree of error introduced by indirect approximations in traditional classifiers. The results provide insights into the feasibility of deploying personalized stress detection models in real-time applications. The ability to dynamically adapt to individual physiological responses suggests that personalized models hold significant promise for enhancing stress monitoring systems in book listing and catalog operational environments.

Fig.1. Login system

Fig.2 Book catalog system

Fig.3. Book list

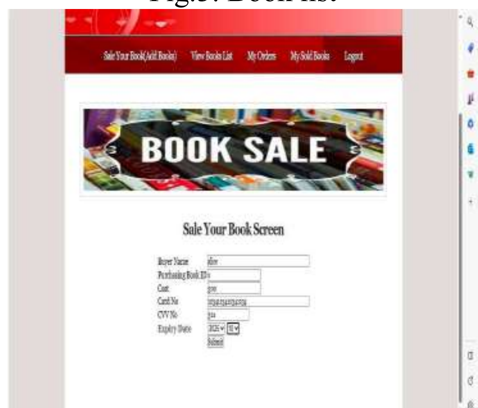

Fig.4 Order details

Fig.5. Order Confirm

V.RESULTS & DISCUSSION

To address the challenges of vast differences between individual listings and response, the time-series nature of physiological signals, this research evaluated the objectivity, reliability, and validity of a real-time stress detection system using a personalized time-seriesinterval approach. The simple and complex tasks were able to achieve distinct levelsof stress enabling their use as machine learning ground truth. Analysis of the window sizes provided insight into which sensors/features were useful for varying time- intervals. The personalized model was found to have better performance than a generalized model. Furthermore, it evaluated the effect of indirect approximations by supervised machine learning classifiers evaluated against a benchmark optimal classifier, A Bayes. It was found that indirect approximations can have a minor-to moderate effect on classifier performance (-11% to +14% of A Bayes). The current findings suggest that a personalizedsystem provides promising performance when compared to past research on multi-class stress detection. Researchers should be careful about the selection of HMIs, sensors, and features for models, as they may not account for inter and intra- individual differences instress physiology. Future work will further investigate these personalized stress detectionsystems with the aim of implementing approaches that account for temporal changes in the individual stress response and physiological signals. many more features and facilities can be added to the application. As we know with the increase in number of students, books, complexity other workloads, there can be a need of shifting the library data from the local database to the cloud. So, this software application can be transferred to a cloud database by doing necessary changes to it. With the help of cloud technology, you will get data backup facility, remotely updating and syncing of files, more security of data, lifetime storage etc. Online lectures, previous year examination papers, videos and an assignment submission section are all possible additions. Teachers can shoot the videos of their lectures and upload them on it. A group chat function might be included to the app so that students can share their concerns and doubts which will ultimately makes it more interactive and useful for an academic institution. [20][21]

VI.CONCLUSION

This study highlights the effectiveness of a personalized stress detection system in addressing individual differences in physiological responses and the time-series nature of stress signals. By leveraging a personalized time-series interval approach, the model demonstrated superior classification performance compared to generalized models, reinforcing the importance of tailoring feature selection for each individual. The results further revealed that window size variations influence the relevance of physiological features, with blood pressure emerging as a key marker for stress classification. Additionally, the comparison of traditional supervised classifiers with the benchmark A Bayes classifier indicated that indirect approximations can introduce minor to moderate variations in performance. These findings emphasize the necessity of carefully selecting human-machine interfaces (HMIs), sensors, and features to ensure reliable stress detection. Future work will focus on refining personalized models by incorporating adaptive mechanisms that account for temporal variations in stress physiology, with the goal of enhancing real-time stress monitoring and intervention strategies in high-risk environments. This paper mainly focuses on how we can improve the traditional method of working of a library because the traditional method includes doing all the things in manual mode which is slow, less efficient, less secure, and difficult to manage. The solution to this is an online library management system which take care of all the work by automating and digitizing the whole process. Our application is based on Java and is linked to a relational database (sql). The frontend part has been coded using Java and its packages like awt and swing. The backend is supported and connected with database using java, its libraries and APIs. With the increase in the workload of the library, new features can be added to the existing application to make it relevant in the future as well.

VII.REFERENCES

[1] J. E. Driskell, E. Salas, J. H. Johnston, and T. N. Wollert, Stress Exposure Training: An Event-BasedApproach (Book and management). London, U.K.: Ashgate, 2008, pp. 271–286.

[2] I. Barshi, Houston, TX, USA, Tech.Rep., JSC- CN- 35755, 2016.

[3] M. Gjoreski, M. Luštrek, M. Gams, and H. Gjoreski, ''Monitoring stress with a wrist device using context,'' J. Biomed. Inform., vol. 73, pp. 159–170, Sep. 2017, doi: 10.1016/j.jbi.2017.08.006.

[4] M. Zahabi and A. M. A. Razak, ''Adaptive virtual reality-based training: A systematic literature review and framework,'' Virtual Reality, vol. 24, no. 4, pp. 725–752, Dec. 2020, doi: 10.1007/s10055- 020-00434-w.

[5] Y. S. Can, B. Arnrich, and C. Ersoy, ''Stress detection in daily life scenarios using smart phones andwearable sensors: A survey,'' J. Biomed. Informat., vol. 92, Apr. 2019, Art. no. 103139, doi: 10.1016/j.jbi.2019.103139.

[6] A. O. Akmandor and N. K. Jha, ''Keep the stress away with SoDA: Stress detection and alleviation system,'' IEEE Trans. Multi-Scale Comput. Syst., vol. 3, no. 4, pp. 269–282, Oct. 2017, doi: 10.1109/tmscs.2017.2703613.

[7] M. Verleysen and D. Franaois, ''The curse of dimensionality in data mining and time series prediction,'' in Proc. Int. Work-Conf. Artif. Neural Netw. Berlin, Germany: Springer, 2005, pp. 758–770, doi: 10.1007/11494669_93.

[8] S. Tong and D. Koller, ''Bayes optimal hyperplanes? Maximal margin hyperplanes,'' in Proc. IJCAI,1999, pp. 1–5.

[9] I. Rish, ''An empirical study of the naive Bayes classifier,'' in Proc. IJCAI Workshop Empirical Methods Artif. Intell., 2001, vol. 3, no. 22, pp. 41–46.

[10] F. Shaffer, R. McCraty, and C. L. Zerr, ''A healthy heart is not a metronome: An integrative reviewof the heart's anatomy and heart rate variability,'' Frontiers Psychol., vol. 5, p. 1040, Sep. 2014, doi: 10.3389/fpsyg.2014.01040.

[11] B. Kim, Y.-S. Jeong, and M. K. Jeong, ''New multivariate kernel density estimator for uncertaindata classification,'' Ann. Oper. Res., vol. 303, nos. 1–2, pp. 413–431, Aug. 2021.

[12] E. Smets, W. De Raedt, and C. Van Hoof, ''Into the wild: The challenges of physiological stress detection in laboratory and ambulatory settings,'' IEEE J. Biomed. Health Informat., vol. 23, no. 2, pp. 463–473, Mar. 2019, doi: 10.1109/JBHI.2018.2883751.

[13] D. Jones and S. Dechmerowski, ''Measuring stress in an augmented training environment: Approaches and applications,'' in Foundations of Augmented Cognition: Neuroergonomics and Operational Neuroscience. Berlin, Germany: Springer, 9744, pp. 23–33, 2016, doi: 10.1007/978-3-319-39952-2_3.

[14] T. T. Finseth, ''Adaptive virtual reality stress training for spaceflight emergency procedures,'' Ph.D.dissertation, Aerosp. Eng., Iowa State Univ., 2021.

[15] T. Finseth, M. C. Dorneich, N. Keren,W. D. Franke, S. Vardeman, J. Segal, A. Deick, E. Cavanah, and K. Thompson, ''The effectiveness of adaptive training for stress inoculation in a simulated astronauttask,'' in Proc. Human Factors Ergonom. Soc. Annu. Meeting, Baltimore, MD, USA, 2021, pp. 1541– 1545.

[16] T. Finseth, M. C. Dorneich, N. Keren, W. D. Franke, and S. Vardeman, ''Training for stressful operations using adaptive systems: Conceptual approaches and applications,'' in Proc. Interservice/Industry Training, Simul. Educ. Conf. (I/ITSEC), Orlando, FL, USA, 2021, pp. 1–13.

[17] H. F. Posada-Quintero and K. H. Chon, ''Innovations in electrodermal activity data collection and signal processing: A systematic review,'' Sensors, vol. 20, no. 2, p. 479, Jan. 2020, doi: 10.3390/s20020479.

[18] B. M. Kudielka, D. H. Hellhammer,

and S.Wust, ''Why do we respond so differently? Reviewing determinants of human salivary cortisol responses to challenge,'' Psychoneuroendocrinology, vol. 34, no. 1, pp. 2– 18, Jan. 2009, doi: 10.1016/j.psyneuen.2008.10.004. [19] L. V. Dammen,
T. T. Finseth, B.
H. McCurdy, N. P. Barnett, R. A. Conrady, A. G. Leach, A. F. Deick,
A. L. Van Steenis, R. Gardner,
B. L. Smith, A. Kay, and E. A. Shirtcliff, ''Evoking stress reactivity in virtual reality: A systematic review and meta-analysis,'' Neurosci. Biobehavioral Rev., vol. 138, Jul. 2022, Art. no. 104709, doi: 10.1016/j.neubiorev.2022.104709.

[20] S. L. Bowers, S. D. Bilbo, F. S. Dhabhar, and R. J. Nelson, ''Stressorspecific alterations in corticosterone and immune responses in mice,'' Brain, Behav., Immunity, vol. 22, no. 1, pp. 105–113, Jan. 2008, doi: 10.1016/j.bbi.2007.07.012.

[21] U. Reimer, E. Laurenzi, E. Maier, and T. Ulmer, ''Mobile stress recognition and relaxation support with SmartCoping: User-adaptive interpretation of physiological stress parameters,'' in Proc. 50th Hawaii Int. Conf. Syst. Sci., 2017, pp. 3497–3606, doi: 10.24251/HICSS.2017.435.