

# Promoting Remote Employee Well-being: Role of Emotion Detection, Social Media Analysis, Mental Health Monitoring, and Performance Tracking

<sup>1</sup>Kushan Dimantha De Silva, <sup>2</sup>Hivindu Punsith, <sup>3</sup>H.D. Nethmi Prabodhika Damayanthi, <sup>4</sup>Ramith Perera, <sup>5</sup>Sanjeevi Chandrasiri, <sup>6</sup>Hansi De Silva

<sup>1,2,3,4,5,6</sup>Department of Computer Science & Software Engineering, Faculty of Computing, Sri Lanka Institute of Information Technology, New Kandy Road, Malabe, Sri Lanka

Authors E-mail: <sup>1</sup>[kushandimantha533@gmail.com](mailto:kushandimantha533@gmail.com), <sup>2</sup>[hivindupunsith@gmail.com](mailto:hivindupunsith@gmail.com), <sup>3</sup>[prabodhikanethmi@gmail.com](mailto:prabodhikanethmi@gmail.com), <sup>4</sup>[ramithp00@gmail.com](mailto:ramithp00@gmail.com), <sup>5</sup>[sanji.c@slit.lk](mailto:sanji.c@slit.lk), <sup>6</sup>[hansi.d@slit.lk](mailto:hansi.d@slit.lk)

**Abstract** - This research focuses on detecting and monitoring human emotions in remote employees to enhance mental well-being and work efficiency. Emotions are seen using cameras and heart rate measurements, comparing the two for accuracy. Sequential deep-learning models and sentiment analysis are employed to analyze social media behavior, with the goal of identifying and understanding the emotions expressed. Music recommendations are made based on the identified emotions. The study also monitors the mental health of remote employees by collecting feedback, predicting stress levels, and recommending therapies based on sleep data and emotional inputs. Additionally, employee performance is tracked by monitoring task completion and web activity, providing insights into work hours and productivity. This research aims to improve remote employees' mental health and work outcomes through emotion detection, social media analysis, mental health monitoring, therapy recommendation, and performance tracking.

**Keywords:** Emotion detection, Music recommendations, Performance tracking, Social media analysis, Stress prediction.

## I. INTRODUCTION

In today's rapidly evolving world, most employees are engaged in remote work using modern technology. The global outbreak of the COVID-19 pandemic further accelerated the adoption of remote work, prompting a significant increase in the number of employees working from home. As remote work becomes increasingly prevalent, companies need to recognize the mental well-being of their employees. While numerous software solutions exist to optimize company operations and increase profits, few prioritize their workforce's mental health and emotional state. However, it is crucial to acknowledge that sustainable gains can only be achieved when employees are operating at optimal mental levels. Currently,

some systems aim to address employee well-being; however, they cannot often identify real-time mental states and provide timely interventions to alleviate stress or emotional strain. This research focuses on developing an innovative approach to employee well-being, integrating facial recognition technology and heart rate monitoring to detect and analyze employee emotions accurately. Combining these two data sources enables a more comprehensive understanding of employee emotions, enabling organizations to identify emotional states as high, medium, or low based on heart rate patterns. Emotion detection will be accomplished by implementing Convolutional Neural Networks (CNN).

Furthermore, this study also explores the influence of employee social media behavior on their emotional well-being. Analyzing the content shared on platforms like Facebook can detect and correlate emotions with the employee's emotional state. This analysis encompasses both English and Sinhala texts, ensuring the inclusivity of diverse language usage. Based on the identified emotions, personalized music recommendations will be made from platforms like YouTube. This empowers employees to actively regulate their moods by listening to recommended music, enhancing their overall well-being and productivity.

Moreover, this research addresses employee mental health concerns using employee feedback collected during working days. By leveraging this feedback, it becomes possible to identify employees experiencing stress. Heart rate variability measurements can then be used to accurately assess the individual's stress levels. Additionally, data relating to sleep patterns, such as bedtime, wake-up time, and other factors like alcohol consumption, will be gathered. By combining these data points with the results of emotion detection and performance evaluations, the research will generate personalized therapy recommendations to reduce stress levels and promote mental relaxation. These recommendations encompass mind relaxation therapies,

discussions on work environment concerns, and timely notifications to ensure ongoing monitoring of employees' mental health progress. Finally, the research paper explores the impact of the work environment on employee motivation and performance. According to the article [4], the authors highlight their investigation of clock-in and clock-out data for analyzing employee performance. Unfortunately, the authors miss the need to monitor employees' computer utilization to have a complete and holistic knowledge of their overall productivity and efficiency. Employee work motivation can be gauged by tracking web activity and task updates. Should an employee excessively engage in non-work-related web browsing, appropriate warnings can be sent.

Additionally, by analyzing task completion times and web activity usage, a comprehensive evaluation of employee performance can be obtained, leading to informed decision-making regarding performance enhancement strategies. This research paper presents an integrated approach to employee well-being and performance by leveraging advanced technologies and data analysis techniques. Organizations can foster a healthier work environment that promotes employee satisfaction, productivity, and overall success by prioritizing employee emotions, social media behavior, mental health well-being, and work motivation.

## II. LITERATURE REVIEW

In today's rapidly evolving world, the majority of employees are engaged in remote work using modern technology. The global outbreak of the Covid-19 pandemic further accelerated the adoption of remote work, prompting a significant increase in the number of employees working from home. As remote work becomes increasingly prevalent, it is essential for companies to recognize the mental well-being of their employees. While numerous software solutions exist to optimize company operations and increase profits, few prioritize the mental health and emotional state of their workforce. However, it is crucial to acknowledge that sustainable profits can only be achieved when employees are operating at optimal mental levels. Currently, there are systems available that aim to address employee well-being; however, they often lack the ability to identify real-time mental states and provide timely interventions to alleviate stress or emotional strain.

This research focuses on the development of an innovative approach to employee well-being, which integrates facial recognition technology and heart rate monitoring to accurately detect and analyze employee emotions. By combining these two sources of data, a more comprehensive understanding of employee emotions can be achieved, enabling organizations to identify emotional states as high,

medium, or low based on heart rate patterns. Emotion detection will be accomplished through the implementation of Convolutional Neural Networks (CNN). By combining two modalities, work attempts to improve the precision and dependability of emotion recognition. [1]"Emotion & Heartbeat Detection using Image Processing", [2]"Human Emotion Recognition: Review of Sensors and Methods,", [3]"Wearable Emotion Recognition Using Heart Rate Data from a Smart Bracelet" The above-mentioned papers did not use these kind of approaches in those papers. Method combines physiological and visual clues to better grasp emotional states than the previously stated articles, which concentrate on specific areas of emotion recognition. Capture the physiological reaction to emotional stimuli using heart rate data from smartwatches, and this data offers insightful information about the strength and valence of emotions that people feel. To capture the visual depiction of emotions, simultaneously examine facial expressions. Study tries to produce a more accurate evaluation of emotion levels by merging these two types of data. Novel strategy for emotion recognition combines heart rate data with facial expression analysis, providing a fresh perspective that advances knowledge of emotional states and helps to classify emotions more precisely.

Furthermore, this study also explores the influence of employee social media behavior on their emotional well-being. By analyzing the content shared on platforms such as Facebook, emotions can be detected and correlated with the employee's current emotional state. This analysis encompasses both English and Sinhala texts, ensuring the inclusivity of diverse language usage. Based on the identified emotions, personalized music recommendations will be made from platforms like YouTube. This empowers employees to actively regulate their moods by listening to recommended music, thereby enhancing their overall well-being and productivity.

For emotion Identification using social media content referred to in the following research papers. Gain and Bharat (Gain, Syal and Padgalwar, 2019)[11] created a system to identify emotions in English texts from social media platforms. They employed two approaches: NLP with an Emotion Word set algorithm and machine learning classifiers. Twitter data was used to train the model, which recognized six emotions: Happiness, Sadness, Anger, Surprise, and Disgust. However, real-time mood identification was a limitation. Despite this, their system achieved significant accuracy in detecting emotions from Twitter. The researchers also devised a method to automate self-training and developed a sizable emotional dataset for future algorithms. In summary, Gain and Bharat's system effectively detects and classifies emotions in

English texts, with promising accuracy and potential for further advancements in real-time emotion analysis.

The research conducted by Roshanaei, [12] Han, and Mishra (2015) focused on predicting users' current mood by analyzing their recent posts on Twitter. They aimed to capture different features exhibited by users through their social media activities and considered various aspects such as psychological characteristics, personal activities, gender, occupation, sports interests, and sleeping styles to validate the emotions expressed. To analyze these mood features, the researchers employed support vector machine (SVM), MIR (Music Information Retrieval), and LIWC (Linguistic Inquiry and Word Count) algorithms. One significant advantage of this study was its exploration of users' backgrounds and the comparison of these backgrounds with the sentiments expressed on social media. However, it is important to note that this research had the lowest accuracy level among the mood prediction studies discussed. Despite its limitations, the research shed light on the correlation between users' personal attributes and their expressed emotions on social media platforms.

For songs emotion identification and suggestion these are some referred systems. In Chen and Tang (2018) [13], the researchers developed a Chinese song recommendation system that utilized the emotions conveyed in song lyrics. Their goal was to create a content-based music recommendation platform that specifically catered to the Chinese language by employing sentiment lexicon algorithms. The sentiment analysis of lyrics was performed using both corpus-based and lexicon-based methods. However, to reduce computational overhead, the computationally intensive corpus-based analysis was limited in its usage. This approach required a substantial amount of training data to ensure accurate predictions. Chen and Tang utilized lexicon ontology and TF\*IDF analysis to generate a new music emotion matrix, which categorized lyrics based on their emotional content. The matrix also determined the significance of word combinations for specific moods across all moods. Additionally, an emotion point matrix was created to quantify emotions and calculate emotion points. To recommend songs that closely matched a particular emotion, a collaborative filtering model was employed along with the calculated emotion points. This approach measured the similarity between songs and recommended those that were most relevant to the desired emotion. Experimental results demonstrated that the collaborative filtering method was highly accurate in recommending music. However, the study had certain limitations. It focused only on predicting songs based on four specific emotions, and there is a need to incorporate other song features such as tempo and tone to enhance the accuracy of content-based recommendations.

EMOSIC [14], developed by researchers Nathan, Arun, and Kannan in 2017, is an emotion-based music recommendation platform. It aimed to provide accurate music playlists based on the user's current mood by utilizing face recognition technology to analyze real-time pictures. However, this approach had limitations as individuals can manipulate their emotional expressions, leading to inaccuracies. To address this, the authors incorporated Audio Emotion Recognition (AER) and Music Information Retrieval (MIR) methods into EMOSIC. By analyzing the emotional content of songs, considering factors such as tempo and overall musical characteristics, EMOSIC aimed to extract the emotional essence of each song. However, compared to previous works, EMOSIC yielded less accurate prediction results due to its reliance on a limited set of characteristics for analyzing song emotions. The authors themselves acknowledged that facial recognition alone is not the most reliable method for determining the user's current mood. In future studies, the authors recommended incorporating lyrics as an additional factor for analyzing emotional content. By considering lyrics alongside other audio features, EMOSIC could enhance its prediction accuracy and provide more effective music recommendations to users. Moreover, this research aims to address employee mental health concerns by utilizing employee feedback collected during working days. By leveraging this feedback, it becomes possible to identify employees experiencing stress. Heart rate variability measurements can then be used to assess the individual's stress levels accurately. Additionally, data relating to sleep patterns, such as bedtime, wake-up time, and other factors like alcohol consumption, will be gathered. By combining these data points with the results of emotion detection and performance evaluations, the research will generate personalized therapy recommendations aimed at reducing stress levels and promoting mental relaxation. These recommendations encompass mind relaxation therapies, discussions on work environment concerns, and timely notifications to ensure ongoing monitoring of employees' mental health progress.

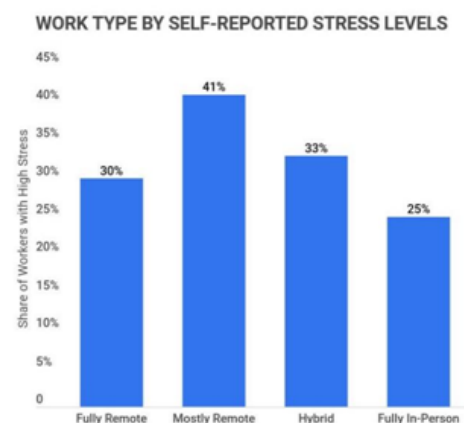


Figure 1: Work type by self reported stress levels

According to the bar chart 41% of workers who do a high amount of remote work say they feel high levels of stress “always” or “most of the time.” [8] By researching past studies on the topic of mental health monitoring and therapy recommendation for remotely working employees, valuable insights can be gained regarding the challenges and potential solutions in this context. “Mental Health of remote working Employees in Europe.” [9] This study focuses on the effects of the ongoing COVID-19 pandemic, particularly the increase in remote work, and its impact on mental health, including social disconnection and heightened anxiety. The objective of the research is to analyze various aspects of mental health and propose strategies to support the mental well-being of European workers who have transitioned to remote work due to the pandemic. “Using the Patient Health Questionnaire-9 to Measure Depression among Racially and Ethnically Diverse Primary Care Patients.” [10] This study aimed to evaluate the effectiveness of the Patient Health Questionnaire depression scale (PHQ-9) in diagnosing and measuring depression severity, as well as assessing treatment outcomes.

Finally, the research paper explores the impact of the work environment on employee motivation and performance. Previous research in this review has concentrated on various aspects of performance tracking, such as employee motivation detection using image and audio processing [4], measuring employee productivity through engagement [5], face recognition for employee tracking and attendance [6], and a comparison of data-driven and traditional performance assessment approaches [7]. While previous studies have made major contributions, proposed research adopts a fresh way of determining employee performance by merging total work hours with employees' web usage. By tracking web activity and task updates, employee work motivation can be gauged. Should an employee excessively engage in non-work-related web browsing, appropriate warnings can be sent. Additionally, by analyzing task completion times and web activity usage, a comprehensive evaluation of employee performance can be obtained, leading to informed decision-making regarding performance enhancement strategies.

Overall, this research paper aims to present an integrated approach to employee well-being and performance by leveraging advanced technologies and data analysis techniques. By prioritizing employee emotions, social media behavior, mental health well-being, and work motivation, organizations can foster a healthier work environment that promotes employee satisfaction, productivity, and overall success.

### III. METHODOLOGY

The methodology for this research paper is structured into four key components, each focused on a specific aspect of enhancing employee well-being and performance. These components include emotion detection and heart rate monitoring, analysis of social media behavior, assessment of employee mental health, and tracking of work environment and performance.

To detect and analyze employee emotions, facial recognition technology is utilized. The implementation involves capturing real-time facial expressions of employees using a camera or webcam during their work activities. These facial images are then processed and analyzed using Convolutional Neural Networks (CNN), a deep learning technique known for its effectiveness in image recognition tasks. The CNN model is trained on a dataset comprising labeled facial expressions to enable accurate emotion classification. Simultaneously, heart rate monitoring is conducted using smartwatches worn by the employees. The smartwatches measure heart rate data throughout the work duration, providing insights into the physiological response corresponding to different emotional states. The collected facial and heart rate data are synchronized and compared to determine the exact emotion experienced by the employee.

The analysis of employee social media behavior focuses primarily on Facebook usage. Data from employees' Facebook accounts, such as shared posts, are collected and processed to detect emotional cues. Natural Language Processing (NLP) techniques are applied to analyze the textual content of these posts, both in English and Sinhala languages, ensuring inclusivity. Emotion detection algorithms are implemented to identify the prevailing emotions expressed in the posts. The identified emotions are then used to suggest appropriate music recommendations from platforms like YouTube. The music recommendations are based on the emotional resonance of specific songs and aim to provide employees with mood-regulating options during their work hours.

The assessment of employee mental health incorporates multiple data sources. Firstly, employee feedback is collected through regular surveys conducted during working days. These surveys assess employees' self-reported stress levels and provide valuable insights into their mental well-being. Additionally, heart rate variability measurements are employed as a physiological indicator of stress levels. The smartwatches worn by employees continuously monitor heart rate variability, capturing variations in the intervals between consecutive heartbeats. The collected stress-related data, along with information on sleep patterns (bedtime, wake-up time, awakenings), and lifestyle factors like alcohol consumption, form a comprehensive dataset for evaluating employee stress levels.

Based on the analysis of employee emotions, performance, and stress levels, personalized therapy recommendations are generated. These recommendations include mind relaxation therapies, discussions on work environment concerns, and timely notifications to promote employee well-being and reduce stress. The therapy recommendations are tailored to the specific needs and challenges identified by each employee. Progress monitoring of employee mental health is conducted by regularly assessing the impact of the recommended therapies. Positive or negative changes in mental health indicators, including emotion detection results, stress levels, and performance metrics, are tracked over time to evaluate the effectiveness of the interventions and make adjustments as needed.

To track the work environment and employee performance, web activity monitoring and task updates are utilized. Employees' web activity is tracked to identify excessive non-work-related browsing patterns. This involves monitoring the duration and frequency of web browsing during work hours. Additionally, employees update their task progress, indicating whether a task is done or pending. By analyzing task completion times and web activity usage, the total hours of productive work can be calculated, providing an objective measure of employee performance. These insights enable organizations to identify areas for improvement, implement motivational strategies, and optimize employee productivity.

In conclusion, the methodology employed in this research encompasses various techniques, including emotion detection, social media behavior analysis, assessment of employee mental health, therapy recommendations, and tracking of work environment and performance. By integrating these methodologies, a comprehensive understanding of employee well-being and performance is obtained, enabling organizations to foster a supportive work environment and optimize employee satisfaction and productivity.

and remote employee monitoring are presented in the part that follows. Looked at the effectiveness of emotion recognition by face recognition and heart rate analysis, the effect of social media behavior on emotions, the detection of stress and the advice of therapy, as well as the monitoring of remote workers' productivity. Hoped to learn more about improving emotional health, output, and overall performance in remote work contexts through these experiments. The findings provide insight into the efficiency of various technologies and strategies in encouraging a productive work environment for remote employees.

In this study, Used a mix of facial recognition technology and heart rate monitoring to test the precision of human emotion identification. Participants were observed using cameras and smartwatches to get the heart rate of the employees. Were able to recognize and categorize emotions including happiness, sadness, anger, and surprise by examining facial expressions and comparing them with heart rate patterns. The outcomes demonstrated that the strategy combining heart rate monitoring and face recognition produced the highest accuracy in emotion identification and level rating. Show an illustration of the camera-based face expression recognition technique in the image presented below (see Figure 3). The system correctly identified the participant's expression as being one of happiness in the photograph. This visual illustration demonstrates the system's capacity to recognize and categorize emotions from facial expressions.



Figure 3: Example of Facial Emotion Detection using Camera-based Analysis

Investigated the impact of remote employees' social media usage on their emotional state in addition to evaluating emotions using face recognition and heart rate. Able to identify emotional signs and patterns by keeping an eye on their online behaviors and reviewing the stuff they published. Through natural language processing techniques and machine learning algorithms, Trained model to recognize various emotions expressed in social media posts. Based on the users' present emotional state and this information, appropriate musical suggestions were then made to them. Wanted to increase their well-being and productivity by matching the emotional tone of the music to the observed emotions. For the input gathering part, Utilized the Facebook FeedAPI to gather

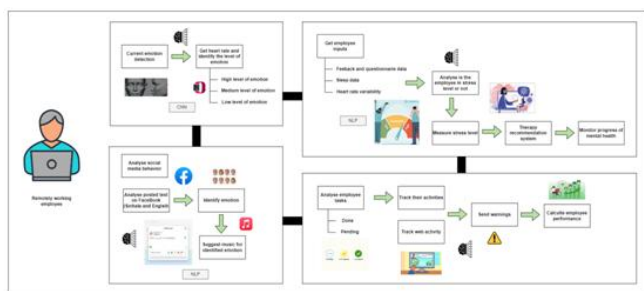


Figure 2: System Overview Diagram

#### IV. RESULTS & DISCUSSION

The results of study on human emotion identification using camera-based face recognition, heart rate monitoring,

data from users' Facebook profiles. The Facebook Feed API allows us to retrieve users' posts within their social network. By accessing this information, Able to analyze their social media behavior and extract valuable insights related to their emotional states. Instead of gathering the entire feed data, adopted an approach that focused specifically on retrieving posts made by the user within the last 24 hours. This approach allows us to capture the most recent and relevant information, which is crucial for analyzing the user's current emotional state.

Put in place a stress monitoring system to help remote workers' mental health even more. Able to recognize people who were under a lot of stress by combining physiological indications, such as heart rate variability and self-reported stress levels. Suggested therapy choices for people who had been identified based on their individual requirements. Sought to lessen the harmful effects of stress and enhance overall employee well-being by intervening early and offering the necessary support. The results of this component demonstrate the significant impact of the remote working environment on the mental health of employees. The findings from user feedback, heart rate variability analysis, sleep data, and emotional assessments provide a comprehensive understanding of the challenges faced by remote employees and the need for targeted interventions. The results emphasize the importance of implementing strategies to manage stress, promote healthy sleep habits, and address emotional well-being to support the mental health of remote workers.

Created a thorough monitoring system that recorded numerous aspects of remote workers' work to evaluate their effectiveness. This system kept tabs on their working hours, output, and compliance with tasks. Additionally, it tracked the caliber of work by routine assessments, web usage, and comparisons with predetermined standards. An automated report that gave administrators a summary of each employee's performance and development was produced at the end of each month. This data-driven strategy enabled proactive management of distant teams and informed decision-making. The Linear SVC method to examine total work hours and web activity data to evaluate the performance tracking system. The algorithm classified employee performance levels with an astonishing 83% accuracy. This result demonstrates the effectiveness of technique in appropriately assessing and classifying people based on performance.

Overall, this study showed how accurate emotion recognition can be achieved by fusing heart rate monitoring and faces recognition. The mental well-being of remote workers was improved by the integration of social media activity monitoring and the personalization of music recommendations. Additionally, intended to promote their

mental health by identifying stress levels and proposing therapy. Administrators may now manage remote teams more successfully thanks to the complete remote work monitoring system, which enabled better evaluation and reporting. This study establishes the groundwork for utilizing technology to raise productivity and emotional health in remote work settings.

## V. CONCLUSION

The recent surge in remote work has sparked interest in flexible work arrangements. Despite benefits like autonomy, remote work also introduces challenges such as isolation and stress. To tackle these issues, this study explores emotion detection, social media analysis, mental health monitoring, therapy recommendations, and performance tracking to boost remote employees' well-being and productivity. Emotion monitoring relies on visual cues and physiological measures. Cameras capture expressions, while heart rate gauges emotional arousal. By comparing these, accuracy in remote emotion detection is assessed, allowing tailored interventions.

Social media behavior's role in emotion identification is also studied. Deep learning models analyze posts, revealing emotional states and interests. Insights guide personalization, such as suggesting music aligned with emotions, fostering a positive remote experience.

Mental health's link to work quality is a focus. Feedback collects emotional and stress data, predictive models anticipate stress. Early support curbs burnout, prioritizing mental health in remote employees. Custom therapy recommendations stem from data. Emotional detection, social media insights, and mental health data guide choices like counseling sessions or resources, showing commitment to well-being. Performance tracking matters too. Observing tasks and web activity unveils work patterns and aids feedback, resource allocation, and schedule optimization, elevating overall outcomes. In sum, this research addresses remote work's mental health and efficiency challenges. Emotion detection, social media analysis, mental health monitoring, therapy proposals, and performance tracking together create a caring, productive remote work culture, enriching remote employees' lives and the future of remote work.

## REFERENCES

- [1] K. Kanakia, L. Moharkar, S. Patil, and S. Sabnis, "Emotion & Heartbeat Detection using Image Processing," vol. 9, no. 3, 2018.
- [2] A. Dziedzickis, A. Kaklauskas, and V. Bucinskas, "Human Emotion Recognition: Review of Sensors and Methods," *Sensors*, vol. 20, no. 3, p. 592, Jan. 2020, doi: 10.3390/s20030592.

- [3] L. Shu et al., “Wearable Emotion Recognition Using Heart Rate Data from a Smart Bracelet,” *Sensors*, vol. 20, no. 3, p. 718, Jan. 2020, doi: 10.3390/s20030718.
- [4] H. P. H. Wathsara, M. L. P. D. Dhananjana, D. A. Nanayakkara, B. B. K. R. Dharmarathne, L. H. S. Chandrasiri, and J. K. Joseph, “Employee Work Motivation Detection using Image and Audio Processing,” *IJCA*, vol. 175, no. 31, pp. 34–40, Nov. 2020, doi: 10.5120/ijca2020920862.
- [5] T. R. S. De Silva, K. Y. Dayananda, R. C. Galagama Arachchi, M. K. S. B. Amerasekara, S. Silva, and N. Gamage, “Solution to Measure Employee Productivity with Employee Emotion Detection,” in *2022 4th International Conference on Advancements in Computing (ICAC)*, Colombo, Sri Lanka: IEEE, Dec. 2022, pp. 210–215. doi: 10.1109/ICAC57685.2022.10025132.
- [6] A. Chowanda, J. Moniaga, J. C. Bahagiono, and J. Sentosa Chandra, “Machine Learning Face Recognition Model for Employee Tracking and Attendance System,” in *2022 International Conference on Information Management and Technology (ICIMTech)*, Semarang, Indonesia: IEEE, Aug. 2022, pp. 297–301. doi: 10.1109/ICIMTech55957.2022.9915078.
- [7] N. Sharma and P. Hosein, “A Comparison of Data-Driven and Traditional Approaches to Employee Performance Assessment,” in *2020 International Conference on Intelligent Data Science Technologies and Applications (IDSTA)*, Valencia, Spain: IEEE, Oct. 2020, pp. 34–41. doi: 10.1109/IDSTA50958.2020.9264033.
- [8] “How To Recognize And Avoid Workplace Stress,” *Zippia*, Feb. 26, 2023. <https://www.zippia.com/advice/remote-work-burnout-statistics/> (accessed Jul. 04, 2023).
- [9] T. Fritz and J. M. Cotilla Conceição, “Mental Health of Remote Working Employees in Europe,” Mar. 2021.
- [10] F. Y. Huang, H. Chung, K. Kroenke, K. L. Delucchi, and R. L. Spitzer, “Using the Patient Health Questionnaire-9 to Measure Depression among Racially and Ethnically Diverse Primary Care Patients,” *Journal of General Internal Medicine*, vol. 21, no. 6, pp. 547–552, 2006, doi: 10.1111/j.1525-1497.2006.00409.x.
- [11] D. Nori, “Hero: Automated Detection System for Prescription Stimulant Overdose via AI-Based Emotion Inference, Metabolite Detection, and Biometric Measurement,” *Open Journal of Applied Sciences*, vol. 10, no. 12, Art. no. 12, Dec. 2020, doi: 10.4236/ojapps.2020.1012056.
- [12] M. Roshanaei, R. Han, and S. Mishra, “Features for mood prediction in social media,” in *Proceedings of the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2015*, in *ASONAM '15*. New York, NY, USA: Association for Computing Machinery, Aug. 2015, pp. 1580–1581. doi: 10.1145/2808797.2809342.
- [13] X. Chen and T. Y. Tang, “Combining Content and Sentiment Analysis on Lyrics for a Lightweight Emotion-Aware Chinese Song Recommendation System,” in *Proceedings of the 2018 10th International Conference on Machine Learning and Computing*, in *ICMLC 2018*. New York, NY, USA: Association for Computing Machinery, Feb. 2018, pp. 85–89. doi: 10.1145/3195106.3195148.
- [14] K. S. Nathan, M. Arun, and M. S. Kannan, “EMOSIC — An emotion based music player for Android,” in *2017 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, Dec. 2017, pp. 371–276. doi: 10.1109/ISSPIT.2017.8388671.

**Citation of this Article:**

Kushan Dimantha De Silva, Hivindu Punsith, H.D. Nethmi Prabodhika Damayanthi, Ramith Perera, Sanjeevi Chandrasiri, Hansi De Silva, “Promoting Remote Employee Well-being: Role of Emotion Detection, Social Media Analysis, Mental Health Monitoring, and Performance Tracking” Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 7, Issue 10, pp 42-48, October 2023. Article DOI <https://doi.org/10.47001/IRJIET/2023.710006>

\*\*\*\*\*