EMOTRAK: BLOCKCHAIN-BASED AI-POWERED EMOTIONAL RECOGNITION AND NEURO-EMOTIONAL ANALYTICS TO IMPROVE FUTURE HRWELL-BEING

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ABSTRACT

Emotional well-being in the workplace is often overlooked, even though it plays an important role in employee performance and retention. Field observations at Sultan Event Organizer and Perhutani office in Purwodadi revealed symptoms of emotional fatigue, such as withdrawal and lack of enthusiasm. This finding was supported by an interview with the HRD of Mitra Swalayan, who reported that many employees tend to resign without proper explanation and often feel uncomfortable expressing their emotions directly. Based on this issue, a solution called EmoTrak was proposed—a website-based platform that utilizes Artificial Intelligence to detect facial and voice expressions regularly, and Blockchain technology to protect emotional data securely. EmoTrak aims not only to monitor employee mood but also to assist HR in analyzing resignation risks and designing personalized development programs. With this approach, companies are expected to create a more empathetic, sustainable, and human-centered work culture. This idea also supports the Sustainable Development Goals (SDGs), particularly Goal 3 (good health and well-being) and Goal 8 (decent work and economic growth), by promoting emotional support in the digital work environment.

Keywords: *emotional well-being, digital HR, AI, blockchain, resignation*

INTRODUCTION

In today's digital era, many companies have begun to integrate technology into human resource (HR) management, ranging from attendance systems and performance evaluations to attendance recap reports. However, one crucial aspect that often goes unnoticed is the emotional well-being of employees. Emotional health plays a significant role in shaping motivation, resilience, and loyalty to one's job. Employees who experience psychological pressure or mental fatigue may not always display visible symptoms, yet such conditions greatly affect their productivity and decisions to remain in the organization.

Field observations at Sultan Event Organizer and the Perhutani office in Purwodadi revealed signs of emotional exhaustion, manifested through passive behavior, withdrawal from teamwork, and low enthusiasm in discussions. This situation was further confirmed by interviews with the HRD of Mitra Swalayan, who highlighted that many employees tend to resign abruptly without providing clear reasons. Such findings indicate that employees often feel uncomfortable expressing their emotional state openly, even to HR representatives.

This issue is consistent with previous studies, which found that emotional pressure in the workplace significantly decreases employee performance [1]. Moreover, emotional intelligence is essential in helping employees adapt to stress and maintain resilience in dynamic work environments [2]. Unfortunately, most organizations still rely on annual surveys or limited counseling sessions, which fail to capture daily mood fluctuations in real time. The World Health Organization (WHO) emphasizes that workplace mental health has a direct impact on productivity, engagement, and workforce stability, while also stressing the importance of sustainable and privacy-protected psychological monitoring systems [3].

Given these gaps, there is an urgent need for a system capable of monitoring and interpreting employee emotional conditions on a regular basis without violating their privacy. EmoTrak is introduced as a solution a website-based platform that combines Artificial Intelligence (AI) to recognize facial expressions and voice intonations with blockchain technology to ensure secure and transparent data protection. Through this approach, companies are not only able to measure performance but also gain deeper insights into the emotional dynamics of their workforce. Ultimately, this innovation is expected to foster a more empathetic, sustainable, and human-centered work culture in the modern workplace.

METHOD

This article was developed using a qualitative descriptive approach that focuses on formulating futuristic ideas and solutions based on field observations, interviews, and literature reviews. The first step was conducting direct observations in two workplaces, namely Sultan Event Organizer and the Perhutani office located in Purwodadi. These observations aimed to identify symptoms of emotional fatigue, such as reduced participation, withdrawal behavior, and signs of exhaustion that were not explicitly expressed by employees.

Subsequently, interviews were conducted with a representative from the Human Resources Development (HRD) department of Mitra Swalayan to strengthen the findings from

field observations. These interviews provided further insight into patterns of sudden resignation and the underlying, often unspoken, emotional pressures experienced by employees.

After gathering field data, the authors conducted a review of relevant literature, including journals and reports that discussed emotional well-being in the workplace, emotional intelligence, and the integration of technology into human resource management. These references were used to establish the conceptual foundation and align the idea of EmoTrak with the current challenges faced by organizations.

The development of EmoTrak was then designed by considering features that meet the needs of employee emotional management, such as AI-based facial and voice expression detection, along with data security systems supported by blockchain technology. The purpose of this methodological framework is to ensure that the proposed idea is not only conceptually sound but also feasible for practical implementation in the future.

RESULT

The EmoTrak platform offers an innovative solution to address the challenges of emotional well-being in the modern workplace. This idea was designed based on observations and interviews, then analyzed through a digital technology approach that can be applied in practice. The following are the main features of EmoTrak developed from this concept:

1. Smart Recruitment Module

   This feature is designed to revolutionize the recruitment process by not only assessing candidates' technical abilities but also evaluating their emotional readiness and psychological compatibility. EmoTrak is able to analyze documents such as CVs and cover letters using natural language processing (NLP) technology, measure candidates' emotional stability through AI-based psychometric assessments, and conduct virtual interviews supported by facial expression and voice tone analysis. This helps HR gain a more comprehensive understanding of potential employees before they are officially hired.

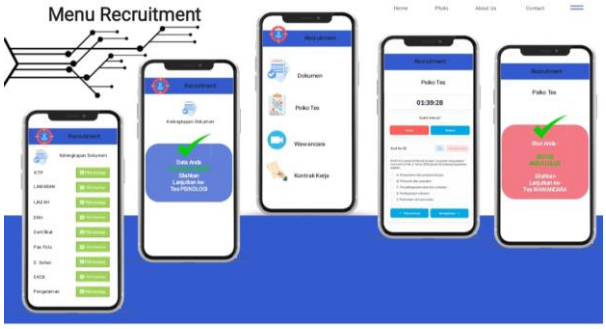

Figure 1. Display of Smart Recruitment Module screening form with automatic document analysis using AI

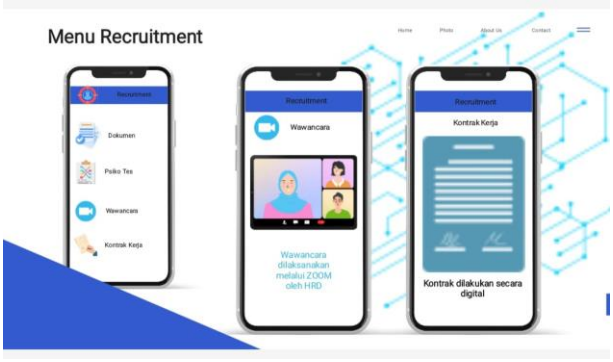

Figure 2. Illustration of virtual interviews with facial and voice expression analysis in the Smart Recruitment Module

2. Daily Mood Check-in via Kamera

   Through this feature, employees can perform attendance while checking their emotional condition every day using the camera. The system records facial expressions for 3–5 seconds and identifies emotions such as happiness, sadness, anxiety, or neutrality. This data is then used as an emotional baseline to observe long-term emotional trends.

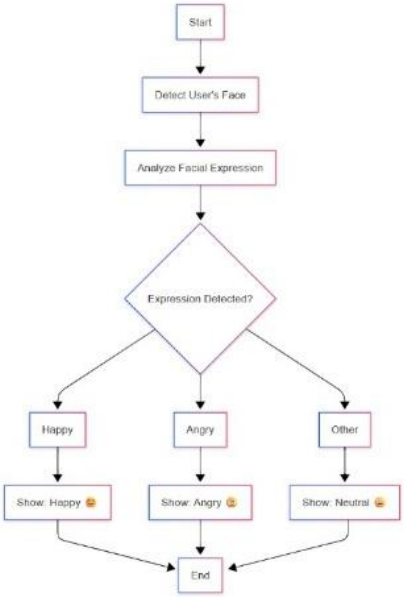

Figure 3. Process flow of facial expression detection in the EmoTrak system

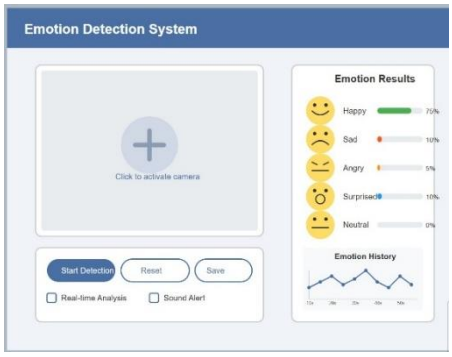

Figure 4. Daily emotion detection system using the camera in the Daily Mood Check-in feature

Figure 5. Dashboard for monitoring employees' moods and long-term emotional trends

3. Employee Retention Prediction

   This feature allows the system to predict the likelihood of burnout or resignation based on daily mood data, attendance, and work performance. HR can receive early warnings if an employee shows repetitive stress patterns or is identified as being at risk of resigning.

Figure 6. Visualization of resignation risk prediction based on stress, attendance, and performance data in the Employee Retention Prediction feature

4. Learning & Development Personalization

   The EmoTrak system also facilitates training based on employees' emotional needs. For instance, if an employee demonstrates certain stress patterns, the system recommends training such as stress management, effective communication, or mindfulness practices. This feature can be synchronized with the company's Learning Management System (LMS).

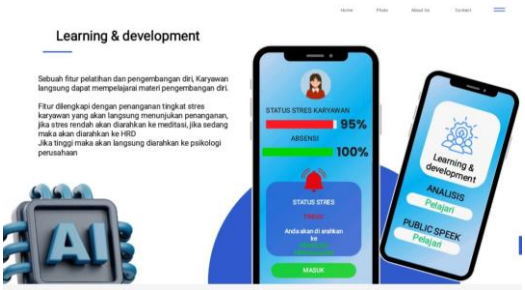

Figure 7. Feature recommendation for personalized training based on employees' stress patterns

5. Exit Feedback System

   This feature is activated when employees submit their resignation. The system provides reflective questions to explore the underlying reasons for the resignation and

automatically collects insights for HR. This allows the company to evaluate and improve its work environment more effectively.

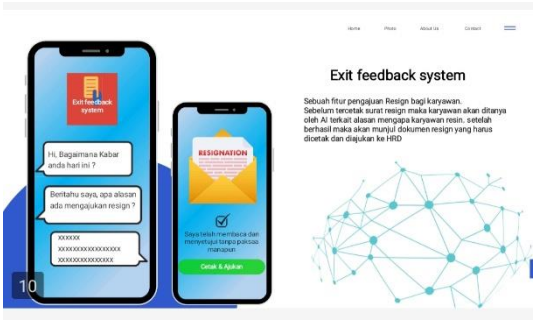

Figure 8. Exit Feedback System that gathers resignation reasons directly and honestly

6. Blockchain-based Protection

   EmoTrak also uses NLP to identify emotional motives such as fatigue or pressure from daily communications or attendance records. Emotional data is stored securely within a blockchain system to ensure privacy and security. With blockchain, the data is encrypted, immutable, and only accessible to authorized parties.

CONCLUSION

The idea of EmoTrak emerges as a response to the need for companies to adopt a more sensitive, modern, and technology-integrated system for monitoring employees' emotional well-being. Based on field observations and interviews, many employees experience emotional strain but lack a proper channel to express their feelings. Through features such as daily mood check-in, risk prediction for resignation, AI-based feedback systems, and blockchain integration, EmoTrak is designed to detect emotional dynamics in real time and assist HR in taking more proactive actions. With the presence of EmoTrak, companies are expected to build a workplace culture that is more empathetic, psychologically healthy, and adaptive to the challenges of today's work environment. The implications of this idea not only enhance employee retention and productivity but also open opportunities for the development of a broader digital HR management system, including integration with performance appraisal systems, digital coaching, and emotional well-being dashboards.

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