Research Proposal (MBA – Human Resource Management)

A Cognitive AI–Driven Sentiment Intelligence Framework for Predicting Workforce Behaviour in Large Organizations

Abstract

The rapid adoption of artificial intelligence (AI) in human resource management has created new opportunities for organizations to understand employee behaviour with unprecedented accuracy. Traditional HR analytics relies heavily on historical data and structured metrics, often failing to capture real-time emotional, motivational, and behavioural indicators. This research proposes the development of an "AI-Enabled Employee Sentiment Intelligence Framework" that integrates natural language processing (NLP), machine learning, and behavioural analytics to predict workforce outcomes such as attrition, engagement levels, job satisfaction, and organizational commitment. Using multi-source sentiment data (emails, feedback forms, internal communication platforms, and pulse surveys), the study aims to provide HR leaders with actionable insights for proactive decision-making. The model will be validated using data from large organizations, ensuring industry relevance and practical applicability. The proposed research contributes to HR literature by presenting a novel predictive sentiment intelligence framework and providing empirical evidence on its impact on strategic HR functions.

1.Introduction

Human resources is transitioning from administrative operations to strategic decision-making. Organizations increasingly rely on analytics to understand workforce patterns; however, most existing HR analytics systems use only structured, numerical datasets such as performance ratings, attendance, and compensation. These measures fail to capture deeper emotional and behavioural drivers that strongly influence performance, engagement, and retention.

Recent advancements in AI, particularly NLP and machine learning, enable automated analysis of textual communication to identify employee sentiment, emotional tone, and behavioural intent. Many global companies (Google, IBM, Accenture) already use AI for talent acquisition and performance management. Yet, the adoption of AI-based sentiment intelligence for continuous workforce monitoring and prediction remains limited in the Indian context. Furthermore, academic research on AI-driven sentiment analytics as a strategic HR tool is still evolving.

This research aims to address this gap by developing a holistic sentiment intelligence framework tailored for HR decision-making in large organizations.

2. Literature Review

2.1 AI in HR Management

Studies (Leicht-Deobald et al., 2019; Tambe et al., 2019) emphasize that AI enhances HR efficiency by automating repetitive tasks and improving data-driven decisions. However, the ethical and behavioural dimensions are underexplored.

2.2 Sentiment Analysis in Organizations

NLP-based sentiment analysis is widely used in marketing, customer service, and social media analytics (Liu, 2020). Its application in employee analytics is an emerging domain. Researchers like Park et al. (2021) demonstrate that sentiment indicators can predict job satisfaction and burnout with high accuracy.

2.3 Predictive HR Analytics

Predictive models have been used to forecast employee attrition (Huang & Miao, 2020), yet these models rely predominantly on structured HR data. The integration of emotional and textual indicators is limited in existing studies.

2.4 Research Gaps Identified

- Minimal research integrating sentiment intelligence + predictive analytics for HR decision-making.
- Lack of frameworks analysing multi-source internal communication to measure real-time employee behaviour.
- Limited empirical studies from an Indian organizational context.
- Need for a comprehensive AI-enabled HR analytics framework to support strategic interventions.

3. Research Gap

Although predictive HR analytics exists, current models do not incorporate behavioural sentiment, emotional cues, linguistic patterns, and real-time communication data. There is no

standardized framework that synthesizes NLP-driven sentiment intelligence with HR strategic decision-making.

4. Problem Statement

Traditional HR analytics fails to capture real-time emotional and behavioural signals from employees, resulting in delayed interventions and inaccurate predictions of workforce outcomes. There is a need for an AI-enabled sentiment intelligence framework that allows HR leaders to proactively understand employees' behavioural tendencies and support strategic decision-making.

5. Research Objectives

1. To explore the role of AI-based sentiment analysis in predicting employee behaviour.
2. To design a novel Employee Sentiment Intelligence Framework integrating NLP, ML, and behavioural analytics.
3. To evaluate the effectiveness of the proposed model in predicting engagement, satisfaction, and attrition.
4. To analyse the impact of sentiment intelligence on strategic HR decisions in large organizations.
5. To develop guidelines for ethical and responsible use of AI in HR sentiment analytics.

6. Proposed Methodology

6.1 Research Design

A mixed-methods approach integrating qualitative and quantitative analysis.

6.2 Data Collection

- **Qualitative:** Interviews with HR managers, focus groups with employees.
- **Quantitative:**
    - Anonymous communication datasets (emails, feedback, internal chat).
    - Organizational HR datasets (attrition, engagement scores, performance metrics).
    - Employee pulse survey text responses.

6.3 Tools and Techniques

- **NLP Techniques:**
    - Tokenization, lemmatization, sentiment scoring, emotional mapping.
- **Machine Learning Models:**

    - Random Forest, SVM, and Neural Networks for predictive modelling.
- **Statistical Methods:**
    - Regression analysis, correlation, ANOVA.
- **Validation:**
    - Precision, recall, ROC curves, predictive accuracy.

6.4 Proposed Framework Development

A multi-layer model will be developed with:

1. Sentiment Extraction Layer
2. Behaviour Prediction Layer
3. Decision-Support Layer for HR managers

6.5 Ethical Considerations

- Full anonymity of employees
- Data protection and consent procedures
- Bias detection and transparency measures

7. Expected Outcomes

- A validated AI-based Employee Sentiment Intelligence Framework.
- Metrics and dashboards for real-time behavioural prediction.
- Enhanced accuracy in forecasting attrition, motivation, and engagement.
- Improved strategic HR decision-making in large organizations.

8. Conclusion

This research focuses on the development of an AI-driven sentiment intelligence system that enables organizations to better understand workforce behaviour and strengthen HR strategy. By integrating predictive analytics with real-time sentiment indicators, the study aims to shift HR from reactive to proactive decision-making. The proposed framework is expected to contribute both academically and practically, offering HR leaders a powerful tool for the future of data-driven HRM.

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