ISSN: 2229-7359 Vol. 11 No. 12s, 2025

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Decoding Leadership: Leveraging Machine Learning For Enhanced Talent Management

Bhanumathi P¹, Bhoomika K N² and B Sathish Babu³

¹Ramaiah Institute of Management, Bangalore-54, Karnataka, India

Abstract: Artificial Intelligence and Machine learning are finding their way into different functional business areas because of their immense popularity and applicability. As businesses accumulate data in volumes, they want to explore Artificial Intelligence technologies to leverage their data assets to make strategic decisions. These decisions cut across various departments of the organization, including business administration. One of the critical functional areas is human resource management, where policies and rules are in place to get the best from the employed workforce. Business leaders and managers are exploring the application of Artificial intelligence and machine learning to bring out the best in their talent pool. The proposed work focuses on developing a data science and machine learning approach for identifying the leadership style one possesses. This work used a detailed questionnaire, and exploratory data analysis (EDA) was carried out to determine the correlations and features from the collected responses. Later, Machine learning models were developed to predict the leadership styles of an employee. Out of the experiments conducted, the support vector machine (SVM) model has been identified as one of the potential models with an 86% accuracy for this purpose. The outcome of the work can be used to shortlist potential employees for leadership roles and groom them with the necessary training and skills.

Keywords: Artificial Intelligence, Leadership Styles, EDA, Attributes, Machine Learning

I INTRODUCTION

The growth of any organization depends on leaders, their skill sets, and the leadership style they exhibit. Leadership is a process by which they influence the behavior of employees or people so that they can achieve or accomplish the group objectives. Leaders should possess essential abilities that help maintain good interpersonal relationships with all their followers or subordinates.

A Importance of Leadership

The leader leads the group, communicates policies and plans to start work, and monitors them to complete the task on time. Leaders will use motivation as a driving force through financial and non-financial incentives and instruct their followers or subordinates to perform effectively and efficiently so that the employees' skills and efforts don't get wasted[1]. The leader recognizes the followers' or subordinates' efforts and clearly explains their role in achieving their goals. The leader will maintain personal contact to build confidence among members and help employees resolve problems quickly. The leader will listen to the employee's views and encourage them to agree in case of disagreement by providing appropriate explanations. This enables a positive and productive work environment, which helps the organizations to have better and more stable growth. A leader establishes employee coordination to realize their interests and inspires them to accept changes without much resistance and discontent. The leader will ensure employees feel secure about the organizational changes and achieve them.

B Leadership Features

The features of leadership in any workspace are mentioned in figure 1 below. The leadership features explanation is provided in Annexure II.



²NortheasternUniversity, Boston, USA

³RV College of Engineering, Bangalore-59. Karnataka, India

¹bhanumathi@msrim.org, ²bhoomikaknb1105@gmail.com and ³bsbabu@rvce.edu.in

ISSN: 2229-7359 Vol. 11 No. 12s, 2025

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Fig 1: Leadership Features

C Leadership Styles

Leadership style is a behavioral approach of the leaders to inspire, direct, and motivate group members and followers. It talks about how well leaders implement their plans and strategies to accomplish group objectives, which will account for the stakeholder expectations, the well-being and soundness of their group. A leader's leadership style is usually associated with personality, emotional intelligence, thinking, life experiences, and family dynamics [3].

Thus, leaders must be in a position to understand their leadership style so that they can be more effective. A particular type of leadership style leads to better collaboration of team members, active engagement, strengthening of the group, effectiveness, and communication among group or team members. Fig. 2 shows various types of leadership styles. The definitions are provided in the annexure-I. Table 1 shows different attributes of leadership styles over which the questionnaire was prepared.

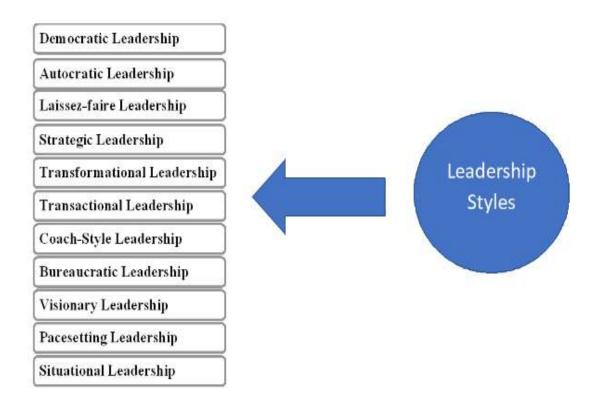


Fig.2. Leadership Styles

 Table 1: Leadership Styles Attributes

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Democratic Leadership	Autocratic Leadership	Strategic Leadership	Transformational Leadership	Coach Style of Leadership	Bureaucratic Leadership	Visionary Leadership	Pace setting Leadership	Situational Leadership	Lassiez- Faire Leadership
Work Under Pressure	Work Under Pressure	Work Under Pressure	Work Under Pressure	Work Under Pressure	Work Under Pressure,	Delegate Tasks	Delegate Tasks	Work Under Pressure	Work under Pressure
Open To Criticism	Collaborate	Define Goals	People Management Skill	Interaction	People Management 5kill	Work Under Pressure	Interaction	Motivating Skill	Use emotional energy
Collaborate	Interaction	Take Responsibility	Interaction	Motivating Skill	Interaction	Defining Goals	Work Under Pressure	Use Emotional Energy	Open to suggestions
People Management Skills	Encourage People	Open To Criticism	Sense Emotional Undercurrents	Effective In work,	Bus Free	Interaction	Defining Goals	Flexible	Ask opinion and ideas
Interaction	Ask Opinions and Ideas	Interaction	Use Emotional Energy	Knowing Ahead	Openness To Suggestions	Motivating Skill	Collaborate	Leadership Role	Team player
Problem Solver	Help Team	Motivating Skill	Discuss Values and Philosophy	Understanding Social Fabric	Able To Brain Storm	Effective In Work	People Management Skill		Leadership role
Encourage People	Uncomfortable When Questioned	Knowledge Abesd	Flexible	Sense Emotional Undercurrents	Ask Opinions and Ideas	Knowing Ahead	Motivating Skill		
Able To Brainsterm	Expects Completion of Work	Understanding Social Fabric	Open To Suggestions	Use Emotional Energy,	Help Team	Understanding Social Fabric	Effective In Work		
Ask Opinions and Ideas	Leadership Role	Sense Emotional Undercurrents	Understanding Issues	Respecting Opponent	Team Player	Sense Emotional Undercurrents	Manage People		
Team Player		Use Emotional Energy	Ability To Sense Others	Get Consensus	Leadership Role	Use Emotional Energy	Allocating Resources		
Leadership Role.		Respecting Opponent	Help Team	Problem Solver		Get Consensus	Knowing Ahead		
		Get Consensus	Trustworthy	Making Strategic Plans		Address Problem	Understanding Social Fabric		
		Problem Solver	Leadership Role	Encourage People		See The Big Picture	Sense Emotional Undercurrents		
		Making Strategic Plan		Ask Opinions And Ideas		Discuss Values And Philosophy	Use Emotional Energy		
		Ability To Sense Others		Help Tenn		Encourage People	Get Consensus		
		Able To Brainstorm		Trustworthy		Understanding Issues	Address Problem		
		Seek Advice		Clear Set Goals		Ability To Sense Others	See The Big Picture		
		Trustworthy		Omdance To Team		Ahle To Brainstorm	Ability To Sense Others		
		Leadership Role		Leudership Role		Clear Vision	Clear Set Goals		
		Ask Opinions and Ideas.				Leadership Role	Team Player		
							Leadership Role		

D Artificial Intelligence and Machine Learning in Leadership

With advanced capabilities, AI transforms how leadership training and development programs are designed and executed [4]. AI helps leaders gain insights into performance and behavior while providing automated feedback systems to help them identify areas for improvement [5]. AI-driven programs can provide valuable insights into the way people interact and the different strategies that can be employed to improve performance. Additionally, AI-driven tools can help identify potential areas for improvement, track progress, and equip leaders with the resources they need to succeed. AI can also identify organizational behavior patterns and help leaders learn how to perform better in various leadership roles. These capabilities allow organizations to scale their investments in leadership development at a maximum level without losing money on low-performing initiatives [6].

II REVIEW OF LITERATURE

Chen M. & Decary M [7] work focuses on AI-based transformation in the healthcare sector. The study essentially discussed the leadership abilities of health leaders who have appreciated the need for AI in this transformation. The main focus factors were value-based care, efficiency, safety, and access to health services. The study discussed machine learning, natural language processing, and AI voice assistants and their proper use in healthcare. Doornenbal, B. M., Spisak, B. R., & van der Laken, P. worked on leadership traits. They have leveraged machine learning techniques to understand complex trait patterns. ML techniques have been used to understand the complex relationships that exist. It also used cognitive models to predict leadership role occupancy [8]. Gruda, D., Karanatsiou, D., Mendhekar, K., Golbeck, J., & Vakali [9] proposed and examined the relationship between narcissistic leaders and anxious followers. Twitter platform data has been used to account for personality traits in a

ISSN: 2229-7359 Vol. 11 No. 12s, 2025

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large sample of leaders and followers. It has shown gender has no role in attracting less anxious followers. Skrynnyk, O., & Vasylieva [10] research work explains how artificial intelligence enables complex decision-making and supports essential evaluations. Parameters considered were Management behavior, decisions, and activities at all organizational levels. The study explores formulating a corporate leadership model and simulation based on given parameter data for ensuring valid prediction and associated prevention of leadership misbehavior and faulty decisions. Bhatia, S., Olivola, C. Y., Bhatia, N., & Ameen [11] study depicts the correlation of leadership perceptions for prominent individuals. Leadership effectiveness was determined using Machine learning techniques. This has helped predict leadership effectiveness judgments, identify and categorize dimensions people associate with effective leadership, and measure the association. Harrison, J. S., Josefy, M. A., Kalm, M., & Kraus R., a study demonstrated how supervised machine learning (ML) would overcome the various constraints by scaling human-coded data. This study examined the relationships among board leadership, CEO dismissal, and firm performance [12].

III CONCEPTUAL FRAMEWORK

The research study focused on the supervised type of machine learning, the most popularly used AI tool for classification and prediction. The investigation started with detailed data collection by administering the questionnaire and later building an ML model, including training and validation of the data set. The ML results can be used to identify the various attributes of respondents in an organization/Institution. The results were visualized statistically to draw insights into the correlation between the attributes. Finally, the model has been validated for its accuracy and applicability.

The study's conceptual framework(Fig. 3) is given below.

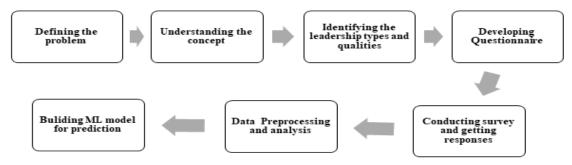


Fig.3: Conceptual Framework

IV RESEARCH METHODOLOGY

A. MOTIVATION FOR THE STUDY

- Artificial Intelligence (AI) has become an integral part of leadership development.
- AI technologies are increasingly used to identify and develop the potential of future leaders.
- AI is crucial in identifying skills and qualities for learning and development (L&D) and human resources (HR) departments.
- AI-powered leadership development programs can help organizations identify, assess, and develop the best candidates for leadership positions.
- AI can help leaders gain insights into their performance and behavior while providing automated feedback systems to help them identify areas for improvement.

B. STATEMENT OF THE PROBLEM

In today's business world, the application of Artificial Intelligence has become an essential part of leadership development activities. Artificial Intelligence identifies the skills and qualities needed to improve leadership abilities and can be a valuable tool for an organization. Organizations leverage Artificial Intelligence for leadership decision-making, enhancing accuracy, optimizing operations, increasing profitability, and reducing errors. Develop a data science and machine learning-based solution for predicting an individual's leadership style (11 Types). This AI-based model will enable the organization/institutions to identify the best-suited leadership style of the member based on the attributes.

C. RESEARCH QUESTIONS

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- i. What are the different attributes that contribute to leadership styles?
- ii. Does a correlation exist among identified attributes of a particular leadership style?
- iii. How to predict leadership styles using Artificial Intelligence?

D. OBJECTIVES OF THE STUDY

- ✓ To study the various leadership styles practiced in an organization.
- ✓ To Identify the influencing attributes for the leadership styles.
- ✓ To study the correlation that exists between identified attributes of a leadership
- ✓ To develop the machine learning model(AI-based solution) to predict the leadership style.,

E. HYPOTHESIS

Ho: AI-based solutions will not predict leadership styles based on attributes

H1: AI-based solutions will predict leadership styles based on attributes

F. METHODOLOGY

The descriptive study describes a leader's various attributes and the style they need to manage the team or group in any organizational setup. The study has covered Bangalore's students, working professionals, and academicians. Convenience sampling was used to identify management institutions and firms in Bangalore. The data were collected from 170 respondents. The primary data about the various attributes were collected by administrating the detailed questionnaire. Secondary data was from articles, magazines, and websites. Qualitative and quantitative data were collected by developing a questionnaire. The interview method collected data on the various attributes contributing to a particular leadership style. The questionnaire was developed by formulating a Likert scale and dichotomous questions to get responses from students, working professionals, and academicians to understand the various leadership attributes required for a particular leadership.

A questionnaire was developed to study the attributes contributing to the particular leadership style, including 43 attributes of a person's leadership quality. The questionnaire was developed by focusing on two aspects. The first section focused on the demographic details, namely gender, age, educational qualification, and occupation. The second section was designed to identify the attributes of a respondent contributing to the particular leadership style. A data set has been created by administering the questionnaire. The machine learning model is to be developed based on the responses to predict the leadership style for any organizational setup.

V DISCUSSION

Data pre-processing was done to clean the data, check the missing values and inconsistent data, and make it suitable for developing the machine learning model. The data set was coded, and all the categorical labels were converted to binary values. A heat map was visualized to understand the relationship between a leader's various attributes (43 attributes). According to the coefficient correlation rule, the correlation's strength increases from 0 to +1 and 0 to -1. No correlation is considered when the value is close to 0, a complete correlation or perfect correlation when the value is close to 1, and the strongest correlation is considered when the value is closest to +1 (positive correlation) or -1 (negative correlation). 0.6 and above indicates a strong positive correlation among the attributes/qualities of a leader. Heat maps having 0.6 and above were considered for the model shown in Fig. 3.

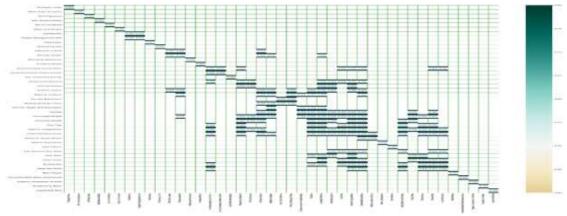


Fig. 4. Heat map of various leadership attributes with correlation value > 0.6

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The strong and positively correlated attributes(Fig.4.) are considered, classified, and mapped into 11 types of leadership styles. Each attribute of a particular leadership style is assigned weights (Table 2). Later, a logic is developed to label every response. Each of these labels indicates the kind of leadership an individual possesses.

Doma granhia I as dambin	•		
Demographic Leadership Attributes	Weights Assigned		
Work Under Pressure	Weights Assigned 0.075		
Open to Criticism	0.05		
Collaborate	0.03		
People Management skill	0.2		
Interaction	0.05		
Problem Solver	0.025		
	0.05		
Encourage People Able to Brainstorm	0.1		
	0.1		
Ask Opinions and Ideas	0.1		
Team Player	0.05		
Leadership Role	0.03		
Autocratic Leadership Attributes	Weights Assigned		
Work Under Pressure	Weights Assigned 0.075		
Collaborate	0.05		
Interaction	0.05		
Encourage People	0.05		
Ask Opinions and Ideas	0.05		
Help Team	0.025		
Clear Set Goals	0.3		
Team Player	0.05		
Uncomfortable When Questioned	0.1		
Expects Completion of Work	0.2		
Leadership Role	0.05		
Transformational Leadership	XX7 * 1 * A * * * 1		
Attributes	Weights Assigned		
Work Under Pressure	0.05		
People Management skill	0.1		
Interaction	0.1		
Sense Emotional Undercurrents	0.05		
Use Emotional Energy	0.05		
Discuss Values and Philosophy	0.1		
Flexible	0.1		
Open to Suggestions	0.1		
Understanding Issues	0.1		
Ability to Sense Others	0.1		
Help Team	0.05		
Trustworthy	0.05		
Leadership Role	0.05		
Strategic Leadership	XXX + 1		
Attributes	Weights Assigned		
Work Under Pressure	0.025		
Defining Goals	0.1		
Take Responsibility	0.1		
Open to Criticism	0.025		
Interaction	0.025		
Motivating Skill	0.025		

International Journal of Environmental Sciences ISSN: 2229-7359

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knowing Ahead	0.1			
Understanding Social Fabric	0.025			
Sense Emotional Undercurrents	0.025			
Use Emotional Energy	0.025			
Respecting Opponent	0.1			
Get Consensus	0.025			
Problem Solver	0.1			
Making Strategic Plans	0.025			
Ability to Sense Others	0.025			
Able to Brainstorm	0.1			
Seek Advice	0.025			
Trustworthy	0.05			
Leadership Role	0.025			
Ask Opinions and Ideas	0.05			
Bureaucratic Leadership				
Attributes	Weights Assigned			
Work under Pressure	0.05			
People Management skill	0.085			
Interaction	0.05			
Bias-Free	0.2			
Open to Suggestions	0.05			
Able to Brainstorm	0.025			
Ask Opinions and Ideas	0.3			
Help Team	0.09			
Team Player	0.1			
Leadership Role	0.05			
Situational Leadership				
	Weights Assigned			
Situational Leadership	Weights Assigned 0.1			
Situational Leadership Attributes				
Situational Leadership Attributes Work under Pressure	0.1			
Situational Leadership Attributes Work under Pressure Motivating skill	0.1			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy	0.1 0.1 0.1			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible	0.1 0.1 0.1 0.65			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role	0.1 0.1 0.1 0.65			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership	0.1 0.1 0.1 0.65 0.05			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes	0.1 0.1 0.1 0.65 0.05 Weights Assigned			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction	0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.1 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents	0.1 0.1 0.1 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy	0.1 0.1 0.1 0.05 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy Get Consensus Address Problem	0.1 0.1 0.1 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.1 0.025 0.01 0.025 0.1 0.025 0.1 0.025 0.1			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy Get Consensus Address Problem See the Big Picture	0.1 0.1 0.1 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.01 0.025 0.01			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy Get Consensus Address Problem See the Big Picture Discuss values and philosophy	0.1 0.1 0.1 0.65 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy Get Consensus Address Problem See the Big Picture Discuss values and philosophy Encourage People	0.1 0.1 0.1 0.05 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.1 0.025 0.025 0.025 0.1 0.025 0.025 0.1 0.025 0.025 0.1 0.025 0.1 0.025			
Situational Leadership Attributes Work under Pressure Motivating skill Use Emotional Energy Flexible Leadership Role Visionary Leadership Attributes Delegate Tasks Work under Pressure Defining Goals Interaction Motivating skill Effective in work knowing Ahead Understanding Social Fabric Sense Emotional Undercurrents Use Emotional Energy Get Consensus Address Problem See the Big Picture Discuss values and philosophy	0.1 0.1 0.1 0.05 Weights Assigned 0.025 0.075 0.1 0.025 0.025 0.025 0.1 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025 0.025			

International Journal of Environmental Sciences ISSN: 2229-7359

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Able to Brainstorm	0.025		
Clear Vision	0.1		
Leadership Role	0.025		
Coach-Style Leadership			
Attributes	Weights Assigned		
Work under Pressure	0.01		
Interaction	0.1		
Motivating skill	0.1		
Effective in work	0.01		
knowing Ahead	0.1		
Understanding Social Fabric	0.065		
Sense Emotional Undercurrents	0.01		
Use Emotional Energy	0.01		
Respecting Opponent	0.01		
Get Consensus	0.1		
Problem Solver	0.05		
Making Strategic Plans	0.1		
Encourage People	0.1		
Ask Opinions and Ideas	0.01		
Help Team	0.01		
Trustworthy	0.1		
Clear Set Goals	0.01		
Guidance to Team	0.1		
Leadership Role	0.005		
Pacesetting Leadership			
Attributes	Weights Assigned		
Delegate Tasks	0.025		
Work under Pressure	0.075		
Defining Goals	0.1		
Collaborate	0.025		
People Management skill	0.025		
Interaction	0.025		
Motivating skill	0.1		
Effective in work	0.025		
Manage people	0.025		
Allocating Resources	0.025		
knowing Ahead	0.1		
Understanding Social Fabric	0.025		
Sense Emotional Undercurrents	0.025		
Use Emotional Energy	0.025		
Get Consensus	0.025		
Address Problem	0.075		
See the Big Picture	0.025		
Ability to Sense Others	0.025		
Clear Set Goals	0.1		
Team Player	0.1		
Leadership Role	0.025		
Laissez-faire Leadership			
Attributes	Weights Assigned		
Work under Pressure	0.1		
Use Emotional Energy	0.1		
Open to Suggestions	0.3		

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Ask Opinions and Ideas	0.3
Team Player	0.15
Leadership Role	0.05

Table 2: Leadership Styles with assigned weights

The labeled dataset has been divided into training and testing sets using the 80:20 rule. The researcher in this study has assigned suitable values for model parameters to build ML models.

Five supervised machine learning classifiers are developed over the pre-processed dataset created from the primary responses: Gradient Boost, Decision Tree, Support Vector Machine, Random Forest, and Naïve Bayes. From the accuracies obtained, the SVM model has the best fit compared to other models (Table 3). Many exist independently since the created dataset has a large dimension with over 43 leadership attributes collected from the questionnaire. The SVMs will make the best decision boundary for classification by creating a suitable hyperplane that cuts across the data points. Another important reason for the best performance of SVM is the used dataset has a higher number of features. The accuracy plots of various models are shown in Fig 5.

Model Names	Accuracy
Gradient Boost	64.70
Decision Tree	70.60
Random Forest	76.50
Support Vector Machine (SVM)	85.30
Naive Bayes	23.52

Table 3. Accuracy of the various models

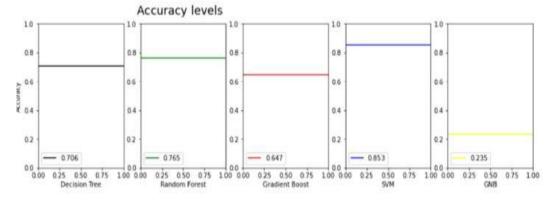


Fig 5: Accuracy Plots of various models

The AI model is developed with an accuracy of 85.30%, opposite to the stated null hypothesis. As a result, an alternate hypothesis is accepted. Therefore, it is interpreted that AI-based solutions can predict leadership styles based on attributes.

VI SUGGESTIONS & CONCLUSIONS

The research proposed a novel approach to identifying a person's leadership traits. The model generated an accuracy of 86% (approx.) with the collected dataset. The model can be further scaled to accommodate more leadership types. The prospective authors may approach the paper authors for the original questionnaire administered and for the source code of the models developed.

REFERENCES

- 1. Ciulla, J. B., & Ciulla, J. B. (2020). The importance of leadership in shaping business values. The search for ethics in leadership, business, and beyond, 153-163.
- 2. Radhika, K. (2021). Understanding the Characteristics of Effective Leadership. The Journal of Social Sciences Studies and Research, 1(06), 24-32.
- 3. Carvalho, A., Alves, H., & Leitão, J. (2022). What research tells us about leadership styles, digital transformation and performance in state higher education?. International Journal of Educational Management.
- 4. Moldenhauer, L., & Londt, C. (2018, October). Leadership, artificial intelligence and the need to redefine future skills development. In Proceedings of the European Conference on Management, Leadership & Governance (pp. 155-160).
- 5. Titareva, T. (2021). Leadership in an Artificial Intelligence Era.

ISSN: 2229-7359 Vol. 11 No. 12s, 2025

https://www.theaspd.com/ijes.php

- Smith, A. M., & Green, M. (2018). Artificial intelligence and the role of leadership. Journal of Leadership Studies, 12(3), 85-87.
- 7. Chen, M., & Decary, M. (2020, January). Artificial intelligence in healthcare: An essential guide for health leaders. In Healthcare management forum (Vol. 33, No. 1, pp. 10-18). Sage CA: Los Angeles, CA: SAGE Publications.
- 8. Doornenbal, B. M., Spisak, B. R., & van der Laken, P. A. (2022). Opening the black box: Uncovering the leader trait paradigm through machine learning. The Leadership Quarterly, 33(5), 101515.
- 9. Gruda, D., Karanatsiou, D., Mendhekar, K., Golbeck, J., & Vakali, A. (2021). I Alone Can Fix It: Examining interactions between narcissistic leaders and anxious followers on Twitter using a machine learning approach. Journal of the Association for Information Science and Technology, 72(11), 1323-1336.
- Skrynnyk, O., & Vasylieva, T. (2022, September). The Prediction of Leadership Degree Based on Machine Learning. In ICTERI 2021 Workshops: ITER, MROL, RMSEBT, TheRMIT, UNLP 2021, Kherson, Ukraine, September 28-October 2, 2021, Proceedings (pp. 82-96). Cham: Springer International Publishing.
- 11. Bhatia, S., Olivola, C. Y., Bhatia, N., & Ameen, A. (2022). Predicting leadership perception with large-scale natural language data. The Leadership Quarterly, 33(5), 101535.
- 12. Harrison, J. S., Josefy, M. A., Kalm, M., & Krause, R. (2022). Using supervised machine learning to scale human-coded data: A method and dataset in the board leadership context. Strategic Management Journal.

Annexure

Types of Lewadership:

Democratic Leadership

The leader does decision-making in a collaborative and consultative way by getting input from the group. Everyone will get an opportunity to have a voice in decision-making. It will be a transparent conversation between the members. Also, delegates the work assignment by identifying and utilizing the skill sets and experience of team or group members. This leadership style encourages team members' creativity and engagement, often leading to higher satisfaction and productivity. However, establishing a consensus among team members can be costly and time-consuming when decisions are to be taken immediately.

Autocratic Leadership

Autocratic is just the opposite of democratic as it does not involve or consider the team while making any business decisions. Leaders expect all members to adhere to the decision that is not justifiable in the long run. This style is appropriate and effective only when the leader is knowledgeable, experienced, and know-how about the circumstances of the business. Another instance could be when a decision requires no group or team input.

Laissez-faire Leadership

In this type of leadership, the leaders trust and rely on their team members. Micromanagement is uncommon; leaders do not give their team members too much instruction or guidance. The subordinates and team members have the authentic leadership lead in this type. The leaders take charge only when necessary, and the people are expected to solve problems independently. This type of leadership enhances the people's creativity, and they will be in a much-relaxed environment. Hence the productivity is more.

Strategic Leadership

A Strategic leader uses different management styles, encourages, and guides the team members to achieve a long-term goal that aligns with the organization's vision. A good strategic leader must determine the best strategies to help the organization achieve its long-term plan and sustain itself in the market. Some of the skills that a strategic leader should possess are active listening, empathy, innovation, optimism, integrity, and so on.

Transformational Leadership

In this type of leadership, the employees are encouraged and inspired to innovate and think of new ways to grow and improve toward achieving the organization's goal. Some of the qualities of a transformational leader are motivating people to reach their goals, encouraging positive emotions in others, providing recognition and support, etc. Transformational leaders help their team members by supporting and inspiring them to work hard, stay loyal and perform well.

Transactional Leadership

Transactional leadership focuses on organization, supervision, and performance. Here leaders are often seen to utilize rewards and punishments to motivate their team members. The team members are expected to obey the instructions of the leader. If a follower does what is desired, a reward will follow; if they do not follow the leader's wishes, a punishment will follow.

Coach-Style Leadership

ISSN: 2229-7359 Vol. 11 No. 12s, 2025

https://www.theaspd.com/ijes.php

Coach-Style leadership is characterized by collaboration, support, and guidance. In this type of leadership, the leaders recognize team members' strengths and weaknesses and will help each one improve. Some steps to becoming a good coaching leader are conducting one-on-one sessions, balancing praise and criticism, connecting with employees, following up with designated tasks, and making time to reflect and prepare.

Bureaucratic Leadership

This type of leadership believes in following a hierarchy where duties and responsibilities are prefixed and clear. Leaders work as per rules and regulations set by their authorities. Bureaucratic leader's decisions will be fair and treat employees equally. Group members will clearly understand the task, the risk of confusion is less, and further boost employees in achieving the set targets.

Visionary Leadership / Affiliative Leadership

In this type of leadership, the focus is on future and long-term goals. Leaders encourage collaboration, emotional intelligence, and teamwork. A visionary leader believes that a vision becomes a reality when goals are stated clearly, and a strategic plan is outlined for achieving those goals. Leaders will create a path and make the best plan for employees to follow and execute. They play a significant role in energizing and inspiring people to work towards future goals. They clearly and vividly communicate what the future holds. Visionary leaders will identify potential roadblocks and outline action plans for better organizational growth.

Pacesetting Leadership

Leaders set go-getting standards, and employees are expected to meet those goals precisely. Pacesetting leaders set high standards, rules, and targets for themselves and their team members. Leaders who use this method will lead by example, and the team members are expected to follow the same. They demonstrate the work quality and the speed they expect from their team. The main focus of a Pacesetting leader is the "result." As they race to complete the tasks, little time is provided for considering other factors.

Situational Leadership

Leadership style is based on each unique situation. The leader will assess the situation so that the members are going in the right direction to meet the targets and be more successful. Also, leaders are proactive and confident that change is the only constant. Situation leadership style is vital for startups or any organization requiring frequent changes.

Leadership Features:

Influencing the behaviour of members:

Leadership is an ability of an individual to influence the behaviour of members in the organization to understand the purpose or goal so that they can realize and respond collaboratively to achieve the organizational goals. The relationship between the leader and follower decides the best way to handle any situation and achieve the organizational targets.

Achievement of organizational goals:

The primary aim is to guide members to achieve common organizational goals. The leader plays an active role in developing interpersonal skills among members. This will enable the leader to bring their members' efforts towards attaining organizational goals.

Continuous process:

Leadership is an ongoing and constant process of guiding and monitoring employees to ensure the members have not deviated from the pre-decided specific goals.

Group process:

It talks about how group members work together in a coordinated way to get things done. The group process allows members to interact with each other. It covers how individuals in the group interact, understand the problem, work on possible solutions, and communicate internally and with external people.

Situation based:

Bounded by the situation, there is no single best leadership style to tackle the problem present. It depends on the leader's competency in handling the group, the situation, and the maturity level of the followers.