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Project No :- SSE/26/19/314-2

Title - 2 :- A Comparative Analysis of Decision Tree and Support Vector Machines for Predicting Job Rescission in the Industry.

Introduction :-

Paragraph - 1 :-

1) Definition :-

This study compares the predictive performance of Decision Tree and Support Vector Machines (SVM) in forecasting job rescission events in the industry. Job rescission refers to withdrawal of employment offers before an employee starts working.

2) Importance in Today's World :-

- Workforce Stability: Helps employers and employees anticipate job offer withdrawals, allowing for better contingency planning.
- Industry Adaptability: Provides insights into hiring trends and the risks associated with uncertain job markets.
- Decision support for HR: Helps HR departments optimize hiring strategies by understanding rescission patterns.

## Applications of Research:-

### \* Policy Formulation:-

Informing the development of organizational policies aimed at improving employee retention based on identified attrition factors.

### \* Performance Monitoring:-

Continuously assessing the effectiveness of retention strategies through predictive analytics.

## Paragraph 2:-

### 1) Total Number of articles Published in Past 5 years.

→ A systematic literature review covering from 2012 to April 2023 identified 52 relevant peer-reviewed studies on machine learning techniques for predicting employee turnover. This indicates a growing interest and substantial research output in this area over the past decade.

Continuously assessing the effectiveness of retention strategies through predictive analytics.



### Paragraph - 3 :-

#### 1) Existing Experience in Research:-

Extensive studies have applied various machine learning algorithms, including DT and SVM, to predict employee attrition.

For instance, a study achieved 94.7% accuracy using SVM and 98.2% with Decision Tree classifier.

#### 2) Aim of Study:-

To conduct a comparative analysis of Decision Tree and support vector machine algorithms in predicting job resignation, evaluating their performance, strengths and limitations in the context of employee attrition.

### Materials and Methods:-

#### Paragraph - 1 :-

Study setting - SIMATS [SIMATS Engineering]

No. of Groups : 2

Group 1: DT

Group 2: SVM

\* This step took advantage of the data exploration and Quality Verification made earlier to create the final data.

## 2) Most Cited Articles and Findings:-

### \* HVAC Fault Detection:

A study introduced a hybrid approach combining DT and SVM for fault detection in HVAC systems, achieving a prediction accuracy high.

### \* Sentiment Text Analysis:

Research comparing SVM, XGBoost and DT for sentiment analysis found that DT outperformed the other models, suggesting its robustness in handling complex datasets.

## 3) Best Study in our Opinion:-

\* Using an Ensemble of Machine Learning Algorithms to Predict Economic Recession.

— Leakey Omondi

— Nguref Ngugen

— Published :- 1<sup>st</sup> September, 2019

Sample size : 20

Total size : 40

## Paragraph - 2 :-

Same Groups:-

Pseudo Code:-

### Random Forest Algorithm:-

- Import Libraries
- Load data
- Preprocess data
- Split data
- Train model
- Compare model
- Result.

## Paragraph - 3:-

Pseudo Code for Support Vector Machine (svm):-

- Import Libraries
- Process the data
- split the dataset into features
- Compute models
- Update weights
- Compare Models
- Result



## Paragraph - 4:

### Testing Setup:-

- Data preparation
- Feature Engineering
- Data Splitting
- Model Training
- Class Validation
- Comparison

Data Collection:- \* Kaggle \* IEEE Explorer

### Results & Discussion:-

\* In related studies, both DT and SVM have demonstrated high predictive capabilities.

\* Feature Importance: Key factors influencing attrition include monthly income, job level and age. Identifying these factors helps in understanding the underlying causes of employee turnover.

### Limitations:-

- Data quality
- Model Interpretability
- Generalizability

### Future Scope:-

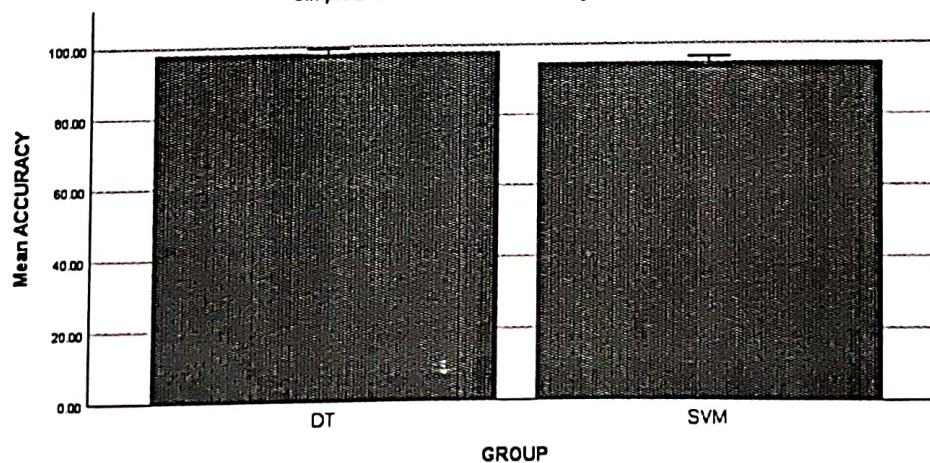
- Integration of Deep Learning
- Real-time Prediction system
- Cross-industry studies.

Conclusion:- Evaluating the accuracy of Decision Trees and Support Vector Machines in forecasting job resignation is essential for improving workforce stability and planning.

Group Statistics					
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
ACCURACY	DT	10	98.2020	.58353	.18453
	SVM	10	94.7200	.76056	.24051

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ACCURACY	Equal variances assumed	.541	.471	11.486	18	.000	3.48200	.30314	2.84512	4.11888
	Equal variances not assumed			11.486	16.869	.000	3.48200	.30314	2.84205	4.12195

Simple Bar Mean of ACCURACY by GROUP



Error Bars: 95% CI  
Error Bars: +/- 2 SD