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Dept: CSE
Code: SSE-26-11-216-3

3. Prediction of Accuracy in inflation rate using Extre-me Gradient boosting algorithm in comparison with random forest algorithm.

Introduction:

Para 1:

Definition: The prediction of accuracy in inflation rate using extreme gradient boosting algorithm in comparison with random forest algorithm. (O Boukan, 2023)

Importance: companies adjust pricing strategies, wages and procurement plans based on expected inflation to manage costs effectively. (S Zaman, 2023).

Applications:

→ stock market and investment strategies (F Perano, 2021).

→ Banking and credit industry (BE Olusola, 2022)

→ International trade (SE Colemo, 2025)

Para 2:

1. Total No. of articles published in this topic over past 5 years.

Google Scholar - 1200

IEEE explore - 25

2. Most cited:

* Forecasting annual inflation rate of Ethopia (SE Tolemo, 2025).
* The impact of inflation rate on private consumption expenditure and growth (BE olusola, 2022).
* Stock prize prediction using BERT and GAN (P Sonkiya, V Bajpai, A Bansal, 2021).
* The role of information and experience for inflation expectation (C Conrad, 2022)

3. Best among them:

"The role of information and experience for inflation expectation"

(C Conrad, 2022).

Para 3:

1. Handling of numeric data and sensitivity to in-relavant features.

2. Existing Experience in this research.

→ I learnt about Extreme gradient boosting algorithm from coursera and the great learning.

→ After that I had discussion with my guide and came to a conclusion for providing better accuracy in inflation rate prediction.

3. Aim of study:

→ prediction of inflation rate using ml algorithm

→ Improving the accuracy.

Materials and Methodology:

Para 1: study setting: SIMATS, SSE

No. of groups: 2

i) Group 1: Extreme gradient boosting algorithm.

ii) Group 2: Random forest Algorithm.

Total sample size: 240

Dataset: Inflation and Economic Indicators

Kraggle.com

Para 2: Sample preparation of Group 1:

Extreme gradient boosting algorithm

→ pre-processing Datasets.

→ applying XGBoost algorithm.

→ calculate accuracy

Para 3: Sample preparation of Group 2:

Random Forest Algorithm.

→ pre-processing dataset

→ applying Random Forest algorithm

→ calculate accuracy.

Para 4: → Testing setup: → Google collab

→ is intel 12th gen Processor

→ 8GB RAM

→ windows OS.

→ Testing procedure:

→ pre-processing the dataset

→ Train 80% of the dataset.

→ use 20% of data for Testing

Para 5: Data collection

Data is collected from the kaggle.com

dataset name: economic indicators and inflation

Para 6:

statistical software: SPSS

Independent Variables: unemployment_rate, GDP

Dependent Variables: Accuracies, inflation rate

Analysis done: Yes

Results and Discussion:

Para 1: In this study we observed that xGBoost has better prediction capacity than Random Forest algorithm

Para 2: The graph represents the comparison of Prediction of inflation rate using xGBoost algorithm in comparison with Random Forest algorithm

→ xGBoost haves high accuracy.

Para 3: Data collection

Site: www.kaggle.com

Para 4: Statistical software: SPSS

Independent variable: unemployment_rate, GDP

dependent variable: accuracy, inflation rate

Analysis done: Yes.

→ Comparison of xGBoost and Random Forest algorithm

Limitations: The only limitation is small size.

Future scope: Accuracy improved using XGBoost algorithm.

Conclusion:

→ The overall model prediction of inflation rate based on past information of data

→ The accuracy of extreme gradient boosting is higher as compared to Random Forest

→ The proposed algorithm Extreme gradient boosting has 90.28% of accuracy over random Forest algorithm has 73.40%.

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Accuracy	XGBoost Algorithm	10	90.2680	1.71360	.54189
	Random Forest Algorithm	10	73.4030	1.82631	.57753

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Accuracy	Equal variances assumed	.203	.658	21.321	18	.000	16.88500	.79195	15.22118	18.54882
	Equal variances not assumed			21.321	17.927	.000	16.88500	.79195	15.22069	18.54931