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Dept: CSE Code: SSE_26_11_216_1

Title → 1

1. Efficient prediction of accuracy in inflation rate using extreme gradient boosting algorithm in comparison with decision tree algorithm

Introduction:

Para 1:

Definition: the prediction of accuracy in inflation rate using extreme gradient boosting algorithm in comparison with decision tree algorithm. (Baybuza, I. 2022. Inflation Forecasting 77.4, Russian Journal of Money and Finanle : 42-59.

Importance: Prediction of inflation rate is crucial for governments, businesses, and individuals as it helps in making informed financial decisions. (Das, Pijush kanti and Probin kumar, "Forecasting and analysing Predictors of inflation" Journal of Quantative economics, 22(2). : pp 493-517)

Applications:

→ Market Trend Prediction (FF Malladi, 2024)

→ Sentiment analysis (S Aras, 2022)

→ data Processing (M Simionescu, 2022).

Para-2:

1. Total no. of articles Published in this topic over Past 5 years

Google scholar - 1200

IEEE explore - 30

2. Most cited:

* Prediction of indonesian inflation rate using regression model - (Dharma, 2020)
* Does long term inflation rate predict future inflation - (T Engsted, 2022)
* Predicting inflation with neural networks - (L Paranhos, 2021)
* Forecasting CPI inflation with hierarchial recurrent neural networks (O Barkan, 2023).

3. Best among them:

"prediction of indonesian inflation rate using regression Model"

(Dharma, 2020).

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 algorithms

→ 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: Decision tree algorithm.

Total Sample size: 240

Dataset: Inflation and Economic Indicators (kaggle.com)

Results and Discussion:

Para 1: In this study we observed that XG Boost has better predictive capacity than Decision Tree.

Para 2: Sample preparation of Group 1:
Extreme Gradient Boosting Algorithm

- Preprocessing Datasets
- applying XGBoost algorithm
- Calculate accuracy

Para 3: Sample preparation of Group 2:
Decision Tree algorithm

- Pre-processing dataset
- applying decing tree algorithm
- Calculate accuracy.

Para 4:

→ Testing setup:
  → Google collab
  → is intel 12th gen processor...
  → 8 gb RAM
  → windows OS

→ Testing procedure:
  → pre-processing the dataset
  → Train 80% of the daset dataset
  → use 20% of dataset for Testing.

Para 5: Data collection.

Data is collected from the Kaggle.com website of dataset economic indicators and inflation.

Para 6:

statistical software: SPSS

Independent variables: Group names, data values

Dependent variables: Accuracies

Analysis done: Yes.

Results and Discussion:

Para 1: In this study we observed that XGBoost has better prediction capacity than decision Tree algorithm.

Para 2: The graph represents the comparison of Prediction of inflation rate using XGBoost algorithm in comparison with decision Tree algorithm.

→ XGBoost haves high accuracy.

Para 3: Data collection

site: www.kaggle.com.

Para 4: statistical software: SPSS

Independent variable: Game names, data values

dependent variable: accuracy.

Analysis done: Yes.

→ comparison of XGBoost and decision Tree 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 we compared to decision tree

→ the proposed algorithm Extreme gradient boosting has 90.88% of accuracy over decision Tree algorithm has 77.28%.

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Accuracy	XGBoost Algorithm	10	90.2880	1.71360	.54189
	Decision Tree Algorithm	10	77.2310	.93376	.29528

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	2.604	.124	21.158	18	.000	13.05700	.61712	11.76049	14.35351
	Equal variances not assumed			21.158	13.912	.000	13.05700	.61712	11.73263	14.38137