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Evolving statistics in support of central bank policies

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Annex B_ Capstone Paper IFC Version

Brief Description

Finding irregularities or detecting "not-normal" instances in a small amount of time is the main objective of an audit.

This can be cumbersome if it involves a voluminous amount of data.

It takes three (3) days on the average for auditors to manually produce an audit report.

thus, anomalous cases take time to determine and full investigation of these cases were delayed.

Also, auditors are having difficulty in prioritizing which item should come first thus it is important to have a formal framework that auditors can use to conduct the audit more efficiently.

This capstone project proposed an alternative framework for intelligent prioritization of account.

Statistical and machine learning techniques were used in identifying the priority level of audit of foreign exchange records.

These techniques involve data decomposition using Seasonal and Trend decomposition using Loess (STL), Cubic Spline Smoothing, Automatic autoregressive integrated moving average (ARIMA), Generalized Extreme Studentized Deviate (GESD) test, unsupervised outlier detection model using Isolation Forest and Density-based spatial clustering of applications with noise (DBSCAN) and Clustering Large Applications based on RANdomized Search (CLARANS) with Recency, Frequency and Monetary (RFM) Analysis for its customer segmentation.

The proposed methodology seeks to augment the existing audit process and reduce processing time in auditing monthly foreign exchange records and not necessarily replace the current audit process.

Since each component investigated different aspect that influences a record, scoring of a record was done equally.

While results of each component was produced independently, results were designed to be read as one output, each complementing the other.

The proposed framework performed well, at 93%, with no Information Rate.

Furthermore, adopting the framework supported the objective of an audit, which is to have a more holistic view of records compared to the traditional method.