

## Guest Editorial Preface

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## Special Issue on Data Science and AI Innovation in Banking and Finance

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In the domain of Project Management, research highlights the latest instruments and tools for managing high-end technology-based projects. To exemplify, the banking services and financial industry are booming while concerning the fast-paced world of money, credits, shares, and investments. Their digital shift is already underway, long before the pandemic, and has accelerated contact-free payments, deposits, and transfers. The inevitable role of both banking and finance nurtures the economy in terms of liquidity, management of risk and returns, pricing of assets, capital markets, etc. which involve customers including individual people or corporates. The banking aspects and financial facilities are being driven by today's most cutting-edge technologies such as Data Science and Artificial Intelligence (AI) since both consumers and financial institutions seek reliable and secure transactions with minimal customer service interactions.

This special issue "Data Science and AI Innovation in Banking and Finance" has brought novel ideas for project performance and project appraisal with vivid applications of Data Science and AI in banking and financial services. The objective is to closely connect high-quality and innovative research on machine learning, deep learning, natural language processing, data science, and artificial intelligence across banking innovations, financial markets, their operations, processes, quantitative trading, financial forecasting, financial cycles, fraud detection, and risk management.

This special issue of the *International Journal of Information Technology Project Management* (IJITPM), IGI Global, has received a total of 16 articles, out of which seven articles have finally been accepted that cover a range of aspects of Data Science and Artificial Intelligence. Each of these articles has undergone a rigorous double-blinded peer-review process, prior to being accepted for the special issue.

The first paper is “FDI Inflow in BRICS and G7 an Empirical Analysis” by Somesh Sharma, Manmohan Bansal, and Ashish Kumar Saxena. The authors have given prospects of FDI inflow into the BRICS and G7 that have been examined experimentally. The best-fit ARIMA model predicts that FDI inflow will increase in the BRICS while remaining stable and declining in the G-7. The results conclude that FDI inflow into the BRICS and the G7 is expected to follow the same pattern as in the past. The trend of FDI input into the BRICS has been increasing over the last decade, while FDI inflow into the G7 countries has been dropping. The forecasted FDI inflow estimates for the next decade revealed a rising trend in the BRICS that supports because of the solid economic development rate, population growth rate, more flexible foreign investment laws, growth rate, employment opportunities, per capita income, industrial output, and demand. Research reveals that the BRICS could overtake the G7 nation’s economy.

Archana Purwar, Indu Chawla, Sarthak Jain, Rahul Malhotra, and Dhanesh Chaudhary have presented “Stock Recommendation and Trade Assistance” to minimize financial risks and maximize profits on investments. They have proposed a stock recommendation and trade assistance system that takes into consideration several financial and social factors to predict the changes in the stock market and provide assistance for investments. Their system has used the past performance of the stock to predict its future performance using the linear regression model. The linear regression model forecasts the next day’s closing price of the stock as well as the closing price trend for the next month for the same stock. The dataset in the study is extracted from the historic stock data of Reliance industries limited (RIL). To analyze whether to buy or sell the stock, four financial algorithms, namely- Bollinger Bands, Moving Average Convergence/Divergence indicator (MACD), Money Flow Index (MFI), and Relative Strength Index (RSI) are employed to find the composite result. Moreover, sentiment analysis of the news depending upon the earning calls and the annual general meetings is done to provide an overall stock and market sentiment analysis. An in-depth balance sheet analysis of the company is also done using various instruments to make the trade assistance more accurate. All these results are merged to predict whether to invest in the same stock or reinvest the earnings or part of earnings in another stock to maximize the profit.

In “Predicting Churn of Credit Card Customers Using Machine Learning and AutoML”, Rajeev Kumar Gupta, Santosh Bharti, Nikhlesh Pathik, and Ashutosh Sharma have performed a comparative analysis of different machine learning algorithms for the credit card churn prediction. The algorithms such as Random Forest Classifier, Decision Tree Classifier, AdaBoost Classifier, and Extreme Gradient Boosting are used and the performance of the model is compared by using accuracy score and recall value. The highest accuracy and recall value that the authors have achieved without balancing the dataset is 97.37% and 86.68%, respectively. When they have done the oversampling using SMOTE and AutoML, the highest accuracy and recall values are 97.53% and 86.68 respectively. For a given dataset, the features “Total Transaction Amount” and “Total Transaction Count” have proved to be the most useful in predicting customer attrition. They have figured out the most important features in which the prediction is highly dependent and using only the top 4 features, they have achieved an accuracy of 92.23%.

Anupriya Kaur, in her paper, “Perceived Website Efficacy for Life Insurance Companies: Insights From a Best Worst Method”, has explored that the most important website attributes for web users to favor/choose a particular life insurance website. It demonstrates the competitiveness of four life insurance website alternatives (LIC, SBI Life, HDFC Life Insurance, and Max Life Insurance) on specific website attributes using the Best–Worst Method (BWM). Results indicate that although the website of HDFC Life insurance has a slight competitive edge, all alternative aggregated ratings are very similar deeming their websites equally competitive. Similarly, focusing on aspects such as - information fit-to-task, tailored information, and

intuitive operations which also weighed relatively higher than other criteria can bring positive results. Web users vary with high cognitive load (do not want to be mentally taxed) and they carefully balance their time and mental energy to seek credible, timely, well-structured information to facilitate their choice of an insurance product. The content arrangement should be linear and intuitive and less distracting to strengthen Information Fit-to-Task and guide intuitive operations. Employing and investing in new-age technological tools – artificial intelligence, machine learning, big data analytics, and sentiment analysis could lead to meeting the above-mentioned key criteria effectively. To conclude, this study has provided academia, policymakers, and web managers with key insights on improving the competitiveness of life insurance websites.

In “Detecting Community Structure in Financial Markets Using BAT Optimization Algorithm”, Kirti Aggarwal and Anuja Arora have proposed a network formation methodology based on cross-correlation in the stock price of various stocks. For the same, data is extracted using the GOOGLFINANCE function and a network is designed that can reveal the hidden patterns based on internal properties of similar stock price patterns in time series data. Next, an optimized community detection process is requisite due to the large-scale network/graph. Hence, the authors have introduced an optimized metaheuristic BAT algorithm-driven community detection process aiming to achieve maximum fitness or high modularity of formed community partition. The performance of the BAT algorithm for stock community detection is measured using three metrics- modularity, coverage, and performance. Communities have also been detected using two social network community detection approaches- Greedy and Label propagation. The experimental results have illustrated that the proposed BAT algorithm outperforms community detection in comparison to the other two considered approaches for all three performance measures.

Shiba Prasad Mohanty, Ashish Mahendra, and Santosh Gopalkrishnan, in their paper, “‘Soar’ or ‘Sore’: Examining and Reflecting on Bank Performance During Global Financial Crisis – An Indian Scenario”, have examined and reflected on the relationship between bank performance and profitability during global financial crisis situations. This is performed by measuring various key variables and performance metrics. The sample constitutes a total of 33 scheduled commercial banks (SCB’s) that were operative in India during the period extending from 2002 to 2016 by employing a panel data model. It also reports that leverage and management efficiency as internal determinants do have a significant impact, while inflation as an external determinant affects the bank’s profitability. Whereas, the Indian banking industry has been less affected by the influence of external factors as compared to profitability. It is observed that bank profitability is impacted by the chosen variables, which becomes evident through the panel data study. In the Return on Assets model, while both are positive; operating efficiency is statistically significant while liquidity is not; it only goes to show how Indian banks have prudently managed their business during crisis situations and even during post-crisis situations. It also depicts how reduced dependence on international investments and increased focus on domestic business generation by the Indian Banks have proven to its advantageous in creating a natural shield against losses, especially during various global financial crisis situations.

In “A Hybrid Machine Learning Approach for Credit Card Fraud Detection”, Sonam Gupta, Tushtee Varshney, Abhinav Verma, Lipika Goel, Arun Kumar Yadav, and Arjun Singh have discussed an online banking system for transferring a large amount of currency in a millisecond. It leads to fast access to the banking system as it saves more amount of time on online payment and digital shopping. The increase in the rate of use of banking credit and debit card leads to a large amount of fraud in the field of finance. Machine learning has new discovering faces in the field of finance. So, this research work has proposed a Hybrid Model using Logistic Regression, Multilayer Perceptron, and the XgBoost. The study involves both the balance and

imbalance datasets which have included 284315 transactions out of which 492 are stated as fraud. On passing the imbalanced dataset through the classifiers and the proposed model, the highest accuracy, precision, recall, and F1- score i.e., 99.98%, 99.73%, 94.16%, and 96.86% respectively. On the other hand, after using the balanced dataset using the SMOTE the same has been achieved as 100%, 95.63%, 99.995, and 97.76%, respectively. It has shown that the balanced dataset works better as a comparison to the imbalanced dataset using SMOTE. The hybrid combination of classifiers—logistic regression, XgBoost, and multilayer perceptron—has provided a better result and performance for both the imbalanced and balanced datasets as compared to the other single classifiers.

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