

Premium Rate Services Fraud Detection

Mariella Rivas, Richard Roach, Patrick Hosein

The University of the West Indies, St Augustine, Trinidad and Tobago

Telecommunications Services of Trinidad and Tobago, Port-of-Spain, Trinidad and Tobago

mariellarivas93@hotmail.com, rroach@tstt.co.tt, patrick.hosein@sta.uwi.edu

Abstract – Premium Rate Services (PRS) destination fraud occurs when telephone calls are made to high-cost (premium) destinations through fraudulent means. Early detection and termination of such calls can significantly reduce the cost they incur. We investigate various features of such calls to determine which can be used to quickly predict and terminate them. This is achieved through feature selection and clustering analyses followed by fraud detection using a Classification and Regression Tree (CART) model. Additionally, we propose the use of costs/benefits to evaluate the model's performance through the consideration of an adjusted decision tree cost function at the training level. This approach is compared to the traditional decision tree to highlight its advantages.

Keyword —Fraud Detection, Machine Learning, Network Management, Premium Rate Destination



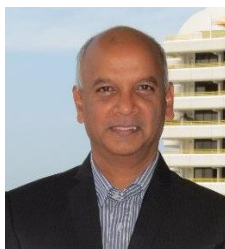
Mariella Rivas was born in Trinidad and Tobago, in May 1993. She received the BSc degree in actuarial science and MSc degree in statistics from The University of the West Indies, St Augustine, Trinidad and Tobago, in 2016 and 2019 respectively.

In 2016, she joined the Finance Department of the Trinidad and Tobago Unit Trust Corporation (TTUTC), Port-of-Spain, Trinidad and Tobago as an Associate Professional. Ms. Rivas later became a part of the Strategic Analytics and Performance Department, Telecommunications Services of Trinidad and Tobago (TSTT), Port-of-Spain, Trinidad and Tobago as an Intern Data Scientist in 2019. Since January 2021, she has performed as a Data Scientist at Guardian Group, Port-of-Spain, Trinidad and Tobago. Presently, her main research interests include machine and deep learning, optimization, analytics translation, and real-time big data analysis.



Richard Roach was born in Trinidad and Tobago, in August 1983. He received the BSc degree in economics with minor studies in mathematics and finance from The University of the West Indies, St Augustine, Trinidad and Tobago and the International Master of Business Administration (MBA) from Arthur Lok Jack Graduate School of Business, Mount Hope, Trinidad and Tobago in 2006 and 2011 respectively.

He joined Repsol YPF as a Commercial Analyst in November 2007, and has been with the Strategic Analytics and Performance Department, Telecommunications Services of Trinidad and Tobago (TSTT), Port-of-Spain, Trinidad and Tobago as a Strategic Analyst since 2017. His major areas of research interest are financial modelling, relationship management, and dashboard design with analytics translation.



Dr. Hosein has received five degrees including a PhD in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (MIT).

He has worked at Bose Corporation, Bell Laboratories, AT&T Laboratories, Ericsson and Huawei. Currently, he is the administrative and technical contact for the TT top level domain, CEO of the TTNIC, and a Professor of Computer Science at The University of the West Indies.

He has published extensively with over 150 refereed journal and conference publications. He holds 41 granted patents in the areas of telecommunications and wireless technologies. In 2004, he was nominated for the Ericsson Inventor of the Year award and was later awarded as the Huawei US Wireless Research Employee of the year and an Anthony Sabga Caribbean Laureate for Science and Technology in 2007 and 2015 respectively. His present research interests are applied data science, operations research and performance, and pricing optimization for cellular networks.