Chapter 5
GENALYTICS:
A Deep Dive Into Real-Time Insights via Generative AI

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ABSTRACT

With today being an age of hyper-connected systems and real time decision-making, it is no wonder that real time analytics have emerged as the key to organizations looking to draw actionable intelligence out of constantly changing data streams. Lastly, the chapter talks about the issues of implementation, ethical concerns, and legal issues involved with real-time generative systems. Future directions are explained, such as the changes towards federated learning, autonomous analytics, and quantum-assisted generative AI. The chapter will also be a conceptual guide

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and practical road map to the researcher, practitioners and industry professionals, whether the landscape of intelligent real-time analytics is playing out according to the initial expectations or not.

1. INTRODUCTION

1.1 Background and Motivation

Data in the current hyper connected world has been created in volumes and speeds that have never been witnessed before. Whether they are on social networks or sensor networks in industrial systems, there is no stopping the streams of data that was, is and will always be huge in volume, and usually complex in nature. Analytical techniques that rely on a specific batch-based approach are insufficient when the decisions are required in the real-time environment. This has brought to fore real-time analytics, which is a vital feature to companies that seek to identify patterns, respond to incidents and get insights in real-time. Real-time processing and analysis of data streams is becoming an industry within an industry, whether it be outsourcing financial fraud detection or predictive maintenance (Aggarwal, 2013).

Artificial intelligence has advanced greatly along with this data explosion and especially in the ability to generatively model. Generative AI, which is based on deep learning innovations, has acquired the ability to create new content, find solutions to possible future events, optimize partially complete datasets, and improve poor-quality datasets. GANs or transformers are only a few of the models that have transformed the creative sector but are also taking hold as solutions to more analytical tasks where the results rely on the quality of data, the ability to augment that data, and generate synthesized insight needed to support solutions.

Generative AI and real-time analytics pose an intriguing future of creating intelligent dynamic systems that can respond to emerging events and at the same time produce realistic senses or forecasts. This is the point of contention, and this chapter explains how generative models can be introduced to supplement real-time decision making, make systems more resilient, and introduce high-value applications across several industries (Goodfellow et al., 2014).

1.2 Evolution of Real-Time Analytics

Real-time analytics is a descendent of old decision support systems and online transaction processing applications. Early incarnations of real-time analytics meant reporting close to real-time data within dashboards used in operations. The definition however has expanded enormously with the introduction of big data ecosystem and