

Chapter 3

The Role of Artificial Intelligence in Ad Fraud Detection in the Blockchain and Programmatic Advertising Ecosystem

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ABSTRACT

The role of artificial intelligence (AI) in ad fraud detection within the blockchain and programmatic advertising (PA) ecosystem is becoming increasingly crucial. As digital advertising continues to evolve, the complexities and scale of real-time transactions pose significant challenges for advertisers and publishers. Ad fraud, including click fraud, results in substantial financial losses, projected to reach \$172 billion by 2028. AI technologies, such as machine learning and deep learning, have proven effective in identifying fraudulent activities and enhancing the accuracy and reliability of ad campaigns. Additionally, blockchain technology offers transparency and security by recording and verifying each ad interaction, ensuring data integrity and trust. This book chapter explores the significance of AI and blockchain in addressing ad fraud, highlighting their potential to transform the digital advertising

DOI: 10.4018/979-8-3693-7041-4.ch003

landscape and improve the efficiency and effectiveness of advertising investments.

INTRODUCTION

With the continuous advancement of digital advertising, digital advertising spaces have undergone a significant transformation by incorporating new forms into marketing methods, posing numerous challenges for stakeholders operating within the PA ecosystem. For advertisers and publishers, the large volume of real-time advertising transactions involving numerous variables and intermediaries creates substantial obstacles in monitoring and evaluating ad effectiveness and fraud (Kim et al., 2023). Alongside these operational complexities, brand safety has emerged as a crucial concern, with advertisers facing increased pressure to ensure that their ads appear only in environments that align with their brand values, protecting their reputation amid the complexities of digital advertising.

From the user perspective, issues such as violating privacy due to unnecessary or unwanted ads and the media environment appearing complex and cluttered have come to the forefront. As the budgets allocated for digital media increase, new fraud methods aiming to profit from ads not being seen by real people are also developing. The advertising industry needs more quality and transparency at a time when investments must be effective and efficient to build trust. Ad fraud is a ‘significant source of digital media waste’ (Pritchard, 2020, p. 27), as well as causing budget losses and reduced campaign effectiveness for advertisers and lost revenue for publishers (Keserwani et al., 2022; Sisodia & Sisodia, 2023) and poses a severe risk to both parties by causing reliability issues. The absence of brand safety measures, allowing ads to appear in low-quality or potentially harmful contexts, further jeopardizes the integrity of ad campaigns and risks damaging brand perception.

In 2023, \$84 billion was lost globally due to ad fraud, including click fraud (DataReportal, 2024). Moreover, it is estimated that \$172 billion of the advertising budget will be lost due to ad fraud by 2028 (Juniper Research, 2023). This type of digital ad fraud is considered one of the most widespread and persistent forms of online fraud, and it is estimated to affect approximately 90% of all PPC (pay-per-click) campaigns (Trajcheva, 2024). Such high levels of fraud erode advertiser budgets and increase the risks to brand safety, exposing ads to unverified or unsuitable media environments that could harm brand reputation and consumer trust.

On the other hand, the emergence of new fraud and hacking software and algorithms has heightened the threat to web users’ privacy. Various regulations, such as GDPR and the Global Privacy Assembly, have been implemented worldwide to prevent these malicious actions (Anderson, 2023). Major technology companies that have taken measures to comply with these regulations—such as the phasing out of

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