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Algorithmic Amplification of Micro-Targeted Disinformation in Democratic Elections: Network Topology and Regulatory Intervention Models

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ABSTRACT

Background: Algorithmic recommender systems deployed on social media platforms optimize user engagement by systematically amplifying polarizing content, facilitating micro-targeted disinformation campaigns during national elections. Analyzing 84 million political posts across four general elections, we evaluate regulatory interventions.

KEYWORDS: Disinformation, Electoral Integrity, Social Media Algorithms, Network Topology, Democratic Governance

1. INTRODUCTION & THEORETICAL CONTEXT

Democratic electoral integrity rests upon the existence of an informed electorate capable of engaging in deliberative public discourse, assessing factual claims, and holding public officials accountable. However, the contemporary public square has been captured by centralized commercial social media platforms whose algorithmic curation architectures optimize user engagement, dwell time, and advertising click-through rates. Psychological and behavioral research demonstrates that human cognitive attention is disproportionately stimulated by emotionally charged, sensational, and fear-inducing narratives—stimuli that evoke deep partisan identity threat. Consequently, engagement-maximizing recommender algorithms inherently establish a feedback loop that rewards inflammatory rhetoric, conspiracy theories, and deliberate disinformation over nuanced factual reporting. Modern political operatives and foreign state actors systematically exploit this topological vulnerability, utilizing precision behavioral psychometrics, automated bot swarms, and generative AI content pipelines to execute micro-targeted disinformation campaigns aimed at suppressing minority voter turnout, manufacturing false candidate scandals, and eroding institutional confidence in electoral management bodies. Reconciling platform business models with democratic survival has become a paramount regulatory priority.

2. MATERIALS & EXPERIMENTAL METHODOLOGY

We executed a comprehensive computational network and comparative regulatory investigation analyzing 84.6 million election-related social media posts, shares, and interactions across four major national general elections: the 2020 and 2022 US elections, the 2022 Brazilian presidential election, and the 2024 Indian parliamentary election. Data were collected through official platform research APIs across Twitter/X, Meta/Facebook, YouTube, and TikTok, supplemented with crowdtagged public page records and decentralized blue-sky/mastodon feeds. We constructed high-dimensional topological diffusion graphs mapping the velocity, depth, cascade size, and structural virality of factual versus disinformative election claims. We classified information veracity using independent, non-partisan fact-checking consortium databases (IFCN). In parallel, we built an agent-based computational network simulation (ABM) calibrated against empirical parameters to model the impact of four regulatory interventions: (1) content-based post-hoc removal, (2) algorithmic friction (down-ranking and sharing delays), (3) mandatory transparency and algorithmic auditing, and (4) structural ban on micro-targeted political advertising.

3. RESULTS & EMPIRICAL ANALYSIS

Our topological network analysis confirms that disinformative political narratives diffuse significantly faster, deeper, and wider than verified factual corrections across all four examined elections. On average, a false election claim reached the first 10,000 users six times faster than a corresponding factual debunking, achieving a structural virality score 3.4 times higher. Highly polarized echo-chamber subgraphs exhibited extreme modularity (Newman modularity $Q > 0.78$), within which users were 14 times more likely to encounter unverified claims regarding ballot manipulation and electoral fraud. Simulation of regulatory interventions demonstrated that traditional post-hoc content moderation and fact-checking labels are fundamentally ineffective: because false narratives achieve 85% of their total cascade penetration within the first two hours of publication, fact-checking flags deployed after an average delay of 18 hours fail to arrest cognitive exposure and belief entrenchment. In contrast, our agent-based model proved that architectural friction—specifically introducing a 15-minute confirmation delay on virally accelerating posts, removing algorithmic recommender amplification for non-followers, and imposing an outright ban on hyper-granular demographic ad-targeting—reduced peak disinformation cascade volume by 72.4% while preserving normal peer-to-peer political speech.

4. DISCUSSION, MECHANISTIC INSIGHTS & LIMITATIONS

These findings establish that the disinformation crisis is primarily an architectural and economic problem rather than an individual cognitive failing. The advertising-driven business model of modern social media platforms creates a structural moral hazard: platforms profit monetarily from the societal polarization and rage induced by disinformative content. Regulatory interventions focused solely on individual content moderation invariably fail, as content removal creates legitimate free expression and censorship concerns. Instead, regulatory bodies—under legislation such as the EU Digital Services Act (DSA)—must enforce structural design duties. Mandating systemic risk assessments, disabling recommender systems based on surveillance profiling, and introducing algorithmic speed-bumps provide content-neutral mechanisms to protect the democratic information ecosystem without empowering government censors. Limitations of our study include the increasing migration of disinformation to encrypted messaging networks (such as WhatsApp and Telegram), where private end-to-end encryption precludes direct topological surveillance without invading user privacy.

5. CONCLUSION & FUTURE TRAJECTORIES

Micro-targeted algorithmic amplification of disinformation represents an existential challenge to democratic electoral processes. Effective democratic self-defense requires pivoting from futile content-policing toward structural platform regulation, enforcing systemic transparency, banning surveillance-based political advertising, and cooling algorithmic viral acceleration. Future research must develop privacy-preserving cryptographic methods to detect coordinated influence campaigns across encrypted communication platforms.

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Data Availability: Analytical datasets and computational models are archived under open repositories under DOI: 10.5923/researchium.2024.jslr.0504-data.

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