

Online Shopping Website Review System Using Predictive AI

Anmol Chaturvedi, Chetan Sharma, Madhur Chaturvedi

Under the Guidance of Ms. Sarika Pal (Associate Professor)

(Department of CSE-AI) IIMT College of Engineering, Greater Noida

Abstract—

This document introduces a novel AI-driven framework for validating online shopping reviews by integrating a BERT-based semantic analyzer with XGBoost behavioral modeling. The system allows customers to submit natural-language feedback, which is automatically classified as genuine or fraudulent in real time. Classified outputs update the review database: authentic entries are published immediately, while suspect ones trigger automated moderation actions (account verification, vendor alerts). Designed for non-technical stakeholders, it provides clear, human-readable rationales for each decision. Applications include e-commerce platforms, customer support dashboards, and merchant analytics tools. Experimental evaluation on a multi-category retail dataset demonstrates 93 % classification accuracy and a 38 % drop in fraudulent accounts, underscoring its potential to enhance trust without manual oversight.

INTRODUCTION :

In today's digital marketplace, reliable customer reviews are critical to purchase decisions yet are often undermined by fabricated feedback. Traditional moderation relies on manual inspection or simple keyword filters, which neither scale nor capture nuanced patterns. We propose an intelligent, AI-powered pipeline that converts free-form review text into a binary publish/flag decision using a hybrid BERT + XGBoost engine—making robust fraud detection accessible to product managers and support teams alike.

RELATED WORK :

Previous efforts in fake-review detection have leveraged rule-based heuristics, standalone machine-learning text classifiers, and deep-learning models trained on linguistic features. Rule-based filters suffer from high false negatives, while pure text models ignore critical behavioral cues. Recent hybrid approaches combine textual embeddings with user-behavior analytics but often lack real-time performance or scalability. Our solution advances these by prompt-tuning BERT for domain-specific semantics and deploying a lightweight XGBoost service for fast behavioral scoring within a microservices architecture.

PROPOSED METHODOLOGY :

We employ iterative prompt engineering on human-labeled review samples across diverse product categories to refine BERT's semantic classification prompts. Each submitted review spawns two parallel services: the BERT microservice returns a semantic confidence score, while the XGBoost module computes behavioral features (e.g., account age, posting frequency, device fingerprint anomalies). A Node.js orchestrator fuses both scores via a weighted ensemble to render the final publish or flag verdict and logs all outcomes for audit and retraining.

RESULTS AND ANALYSIS :

On a benchmark of 50 K annotated reviews spanning electronics, apparel, and home goods, our framework achieved 93 % overall accuracy (precision 91 %, recall 94 %). End-to-end latency averaged 180 ms per review—well within real-time requirements. In a blind usability study of 100 participants, 88 % rated the submission experience “smooth” or “very smooth.” Compared to a text-only LSTM baseline (85 % accuracy), our hybrid model reduced false positives by 42 % and false negatives by 28 %, with behavioral features contributing a 6 % average precision uplift on short reviews.

CONCLUSION AND FUTURE WORK :

We demonstrate a scalable, accurate AI pipeline for automated review moderation that abstracts away technical complexity and delivers immediate trust improvements. By blending generative-NLP reasoning with tabular fraud signals, the system meets both performance and usability goals. Future enhancements will include multimedia review analysis (images, video), voice-input capabilities for mobile users, and a white-label SaaS offering with multi-tenant isolation and customizable moderation policies.

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