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Online Medicine Selling E-Commerce

Shraddha Parmeshwar Dabhade[1], Shravani Dilip Jarhad[2], Prof.N.S. Kharatmal[3]
Students, Computer Science and Engineering[1,2]
Lecturer, Computer Science and Engineering[3]
Matsyodari Shikshan Sanstha's College of Engineering and polytechnic, Jalna, India
shraddhadabhade57@gmail.com,shravanijarhad@gmail.com,nanditakharatmal1126gmail.com

Abstract: *Online medicine e-commerce platforms provide a digital solution for purchasing pharmaceutical products and healthcare essentials with home delivery. These platforms allow users to browse medicines, upload valid prescriptions for regulated drugs, and complete secure online payments. Orders are reviewed and verified by licensed pharmacists before dispatch, ensuring safety and authenticity. Online pharmacies improve accessibility to medicines for elderly patients, individuals with chronic illnesses, and people in remote areas.*

They also offer benefits such as price transparency, refill reminders, and convenient order tracking. However, the sector operates under strict legal and regulatory frameworks to prevent misuse, counterfeit drugs, and unauthorized sales. Proper compliance, data security, and ethical practices are essential for building trust and ensuring safe, reliable healthcare delivery through online medicine e-commerce systems. The rapid growth of digital technology has transformed the healthcare sector, leading to the development of online medicine selling e-commerce platforms. This system provides a convenient, fast, and reliable way for customers to purchase medicines and healthcare products through the internet. The platform allows users to browse medicines, upload prescriptions where required, place orders, make secure online payments, and track deliveries from the comfort of their homes..

Keywords: Online Pharmacy, Medicine E-Commerce, Pharmaceutical E-Commerce, Digital Healthcare, Prescription Drug Sales, Healthcare Supply Chain, E-Health Platforms, Medical Product Delivery, Regulatory Compliance, Consumer Trust

I. INTRODUCTION

The way people access healthcare products by combining digital technology with Online medicine selling through e-commerce has transformed pharmaceutical services. It allows customers to browse medicines online, upload prescriptions when required, and receive products at their doorstep in a convenient and time-saving manner. These platforms are typically operated in partnership with licensed pharmacies and follow strict regulations to ensure safety, authenticity, and proper handling of medicines.

Online medicine e-commerce plays an important role in improving access to healthcare, especially for elderly patients, people with chronic illnesses, and those living in remote areas. By offering transparent pricing, easy refills, and home delivery, it supports a more efficient and patient-friendly healthcare system while maintaining legal and medical standards.

This project is useful for patients, especially elderly people and those living in remote areas. It saves time, reduces effort, and ensures easy access to medicines. The system also helps pharmacies manage orders, stock , and customer details efficiently. Overall the online medicine selling e-commerce project makes the medicinebuying process faster, safer, and more convenient using modern technology.

II. LITERATURE SURVEY

2.1 Growth of E-pharmacy platforms:

Several Researchers have observed that online medicine selling has grown rapidly due to widespread internet access and smartphones adoption. Studies show that customers prefer online pharmacies for convenience and doorstep

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delivery ,especially in urban and semi-urban regions. E-pharmacy adoption is linked with rising digital literacy and trust in online transaction.

2.2 Accessibility & Convenience:

Many studies highlight that online medicine platform improve access to healthcare products for elderly people, working professionals ,and remote area residents who find it difficult to visit physical pharmacies. Online platform allow 24*7 ordering and repeat prescriptions.This accessibility has helped chronic patients manage their medication more efficiently.

2.3 Cost & Pricing Advantages*:*

Literature indicates that e-commerce pharmacies often offer competitive discounts and subscription models.This has reduced out-of-pocket costs for customers compared to traditionnal pharmacy prices.Bulk purchase benefits and seasonal offers also attracts more users.

2.4 Adoption & Customers behavior*:*

Studies analyse user motivations (convenience,price,confidentiality),trust factors (brand,reviews),and barriers(prescription handling,fear of counterfeit medicines),recent systematic /scoping reviews show continued growth in customer intent to purchase madicines online but highlight concerns around safety and verification.

2.5 Technology Integration:

Research show that modern technologies like mobile apps,secure payment gateways cloud-based inventory systems,and AI-based prescriptions checks play a significant role in improving online medicine services.Integration of telemedicine with e-pharmacies is highlighted as a future trend.

III. EXISTING MODELS AND CURRENT LIMITATIONS

Despite notable advancements in opinion spam detection, existing systems deployed by major e-commerce and online pharmacy platforms continue to suffer from critical limitations. These shortcomings become more pronounced in the Indian online medicine-selling ecosystem, where linguistic diversity, informal health descriptions, and high-risk consumer decisions demand greater contextual awareness.

3.1 Over-Reliance on Pure Textual Analysis Most baseline detection models treat a medicine review as an isolated block of text, applying conventional Natural Language Processing (NLP) techniques to identify spam patterns. While such approaches can successfully detect template-based or automated bot reviews, they are largely ineffective against human-written deceptive reviews generated by professional review farms

3.2 Hinglish and Medical Code-Switching Blind Spot A major limitation of global detection models is their linguistic rigidity. Most are trained on standard English corpora and lack awareness of Indian code-switched language, especially in healthcare contexts. The inability to process Hinglish medical slang severely undermines detection accuracy in Indian e-pharmacy platforms [3], [14].

3.3 Vulnerability to "Slow-Burn" Deception in Health Reviews Traditional anomaly detection systems focus on identifying sudden spikes or "bursts" of review activity. However, modern review farms targeting online medicine platforms increasingly employ slow-burn deception tactics, distributing fake reviews gradually over extended periods.

3.4 Inability to Detect Sentiment–Rating Dissonance in Health Feedback Many current frameworks analyze star ratings and review text independently, failing to evaluate their logical consistency. In the context of online medicine sales, this limitation is especially problematic. A review may assign a 5-star rating while simultaneously mentioning adverse effects, inefficacy, or delayed relief.

3.5 Absence of Cross-Platform Behavioral Intelligence Most review detection systems operate in isolated silos, analyzing user behavior within a single platform. In reality, deceptive reviewers often operate across multiple online pharmacy and e-commerce platforms, reusing similar behavioral patterns

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IV. PROPOSED MODEL AND METHODOLOGY

A. System Architecture

Rather than employing a generic black-box classifier, the proposed Feature-Enriched Machine Learning (FEML) framework is designed as a tiered interrogation pipeline. In the context of online medicine-selling e-commerce, each review is treated as a behavioral trace reflecting user intent, rather than a static textual artifact.

1. Preprocessing of Code-Switched (Hinglish) Medical Review Data: Real-world Indian medicine review data is highly unstructured, linguistically diverse, and often noisy. Unlike conventional pipelines that apply aggressive text cleaning, the FEML framework employs selective normalization. While excessive emoji usage, repetitive symbols, and promotional spam are removed, code-switched Hinglish and medical slang are explicitly preserved.Terms such as *"ghatiya"* (poor quality), *"ek number"* (top-tier), and *"paisa vasool"* (value for money) carry strong emotional and experiential weight in Indian medicine reviews and are retained as meaningful sentiment indicators. This culturally aware preprocessing step prevents the misclassification of genuine patient feedback as low-quality noise.

2. Tri-Layer Analytical Logic

The core intelligence of the FEML framework lies in its three-layer interrogation model, each layer examining a different dimension of deception.

Layer 1: Linguistic DNA Analysis: This layer evaluates the structural and semantic properties of review text. Features such as lexical richness, repetition patterns, excessive use of superlatives (e.g., *"best medicine ever"*, *"100% cure"*), and abnormal punctuation density are analyzed. A key red flag identified is falsified enthusiasm, where exaggerated praise appears without any mention of dosage, treatment duration, or health outcomes—an anomaly commonly observed in incentivized medicine reviews.

Layer 2: Behavioral Fingerprint Analysis: This layer focuses on reviewer activity patterns over time. The system tracks account age, review frequency, temporal clustering, and category-specific rating behavior. Special attention is given to "bursty" accounts profiles that remain inactive for long periods and suddenly post multiple high-rating reviews during health campaigns, seasonal discounts, or sale events. Such behavioral anomalies are strong indicators of coordinated manipulation in online pharmacy platforms.

Layer 3: Sentiment Cross-Examination: The third layer performs a sentiment–rating consistency check, functioning as a digital lie-detection mechanism. Reviews with high star ratings are cross-examined against the emotional polarity of the textual content. For example, a 5-star rating accompanied by statements such as *"medicine achi hai but side effects severe"* triggers a sentiment dissonance alert, significantly increasing the deception probability score.

3. Stacked Ensemble Classification Engine: Features extracted from all three layers are aggregated and passed to a stacked ensemble classifier. This hybrid configuration enables the system to detect both subtle human-written deception and large-scale coordinated review fraud in online medicine-selling platforms.

4. Probabilistic Deception Scoring: Instead of issuing rigid binary labels (genuine vs. fake), the FEML framework outputs a Deception Probability Score ranging from 0 to 100. This probabilistic approach aligns better with real-world moderation workflows, allowing platform administrators to prioritize high-risk reviews while minimizing false positives that could suppress legitimate patient feedback.

B. Methodology

The experimental methodology was designed to reflect the realistic operational challenges of Indian online medicine-selling e-commerce.

Targeted Data Collection: Data was collected from high-risk product categories such as OTC medicines, supplements, and wellness products—segments frequently targeted by professional review manipulation due to intense competition and consumer trust sensitivity.

Technology Stack: The system was implemented using Python 3.11, with SpaCy replacing traditional NLTK pipelines due to its superior performance and scalability when processing large volumes of multilingual review data.

Hinglish Slang Curation: A manually curated lexicon of over 500 Hinglish and health-related slang terms was developed. This lexicon ensures that expressions like *"paisa vasool"* or *"side effects heavy"* are interpreted correctly rather than being misclassified as spelling errors or neutral content.

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Validation: An 80/20 train–test split was employed alongside Stratified K-Fold Cross-Validation to ensure class balance and robustness. This validation strategy ensures that the model learns genuine deception patterns rather than overfitting to specific products, brands, or transient keywords.

V. ALGORITHM

Step-by-Step Algorithm

Start
Display Home Page of the online medicine e-commerce platform.
User selects View Products.
Check Login Status:
    If the user is logged in, go to Step 7.
    If the user is not logged in, go to Step 6.
User selects Add to Cart for the chosen medicine.
System updates the Cart with selected items.
User proceeds to Checkout.
System verifies:
    Delivery address
    Prescription upload (if required)
    Payment method
Order is successfully placed.
End

Flow Chart

VI. OUTPUTS

Category	Data Source	Feature	Detection Logic	Result / Detection Log
Data Processing (Pre-processing)	Review Text (Hinglish / Regional English)	Text Normalization	Slang and informal words (e.g., "ghatiya", "nakli", "bekaar") mapped to standardized sentiment	"Ghatiya medicine quality" normalized and mapped to Negative / Poor Quality instead of

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			labels	**Unknown**
Linguistic Red Flag	**Review Body Text**	**Superlative Density Check**	**Excessive use of terms like "Amazing", "100% cure", "Best medicine ever" without dosage or effect details**	**82% superlative density detected; review flagged as Suspicious Promotional Content**
Behavioral Trigger	**Reviewer Metadata**	**Account Age vs. Review Volume**	**Newly created account posting multiple medicine reviews in a short time window**	**Account created 2 hours before sale event; 10 medicine reviews posted → flagged as Bot-Sleeper Pattern**

VII. CONCLUSION

The online medicine selling e-commerce system has significantly changed the way people access healthcare products. By allowing users to order medicines online, it reduces the need for physical visits to pharmacies, saving time and effort. This is especially beneficial for elderly patients and those with long-term illnesses.

The system also helps pharmacies manage inventory efficiently and reach more customers. Features such as digital prescriptions, order tracking, and online payment increase transparency and convenience. However, challenges such as the need for proper verification of prescriptions, delivery delays, and strict regulatory compliance must be addressed to ensure patient safety. Overall, online medicine e-commerce has a positive impact on healthcare services, but its success depends on responsible use, secure systems, and strong regulations.

Online medicine selling e-commerce platform are an essential part of modern healthcare systems. This project demonstrated the design and implementation of a secure, efficient, and scalable online pharmacy model. By integrating intelligent algorithms, secure transactions, and optimized delivery mechanisms, the system enhances accessibility and user satisfaction.

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