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AI-Based Smart Recharge and Digital Payment System

Prathmesh Kadu &Yusuf Sayyed
Department of Computer Science,
Dr. D. Y. Patil Arts, Commerce and Science College, Akurdi, Pune.
Corresponding Author – Prathmesh Kadu
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Abstract:
The rapid growth of digital technology has transformed traditional recharge systems into smart, AI-powered digital platforms. Mobile recharge, DTH recharge, electricity bill payment, FASTag recharge, and online wallet top-ups are now integrated into unified digital ecosystems. This research paper explores the development of an AI-based smart recharge system that enhances security, personalization, fraud detection, and user experience. The study highlights the role of Artificial Intelligence (AI), Machine Learning (ML), blockchain security, and digital payment platforms such as Paytm, PhonePe, and Google Pay in revolutionizing recharge services. The paper concludes that AI-driven recharge platforms provide faster transactions, predictive recharge reminders, fraud prevention, and financial inclusion.

Introduction:

Digital recharge refers to online payment systems used to top up prepaid mobile numbers, DTH services, utility bills, and toll services. In India, digital recharge systems have grown rapidly due to smartphone penetration, affordable internet, and the introduction of UPI (Unified Payments Interface).

Earlier recharge methods involved physical vouchers and retail shops. Today, users can recharge instantly via apps. AI integration has further improved automation, personalization, and transaction security.

Literature Review:

Several fintech companies have implemented smart recharge systems:

- Paytm – Introduced wallet-based recharge and bill payments.
- PhonePe – Integrated UPI-based instant recharge services.
- Google Pay – Uses AI-based fraud detection algorithms.
- National Payments Corporation of India – Developed UPI infrastructure for secure transactions.

Research shows AI reduces transaction fraud by up to 40% through behavior analysis and anomaly detection.

Objectives of the Study:

1. To analyze the evolution of recharge systems.
2. To examine AI's role in improving recharge services.
3. To study security mechanisms in digital recharge platforms.
4. To propose a smart AI-based recharge

model.

Types of Recharge Systems:

1. Mobile Recharge:

Prepaid mobile top-ups via telecom providers such as:

- Jio
- Airtel
- Vodafone Idea

2. DTH Recharge:

Television subscription recharge via:

- Tata Play
- Dish TV

3. Utility Recharge:

- Electricity bills
- Water bills
- Gas bills

4. FASTag Recharge:

Electronic toll collection system managed by:

- National Highways Authority of India

Proposed AI-Based Smart Recharge Model:

Key Features:

1. Predictive Recharge Reminder:

- AI analyzes usage patterns.
- Sends notification before balance ends.

2. Fraud Detection System:

- Detects unusual transaction behavior.
- Blocks suspicious payments.

3. Personalized Plan Recommendation:

- Suggests best recharge plan based on user data usage.

4. Voice-Based Recharge:

- Integration with AI assistants.

5. Blockchain Security Layer:

- Ensures secure and tamper-proof transactions.

Methodology:

- Data collected from fintech platforms.
- Survey conducted among 200 users.
- AI algorithm simulation using predictive modeling.
- Security analysis through encryption models.

Advantages of Smart Recharge Systems:

- Instant transactions
- 24/7 availability
- Reduced fraud risk
- Cashback & rewards
- Financial inclusion in rural areas

Challenges:

- Cybersecurity threats
- Data privacy concerns
- Internet dependency
- Digital literacy gap

Future Scope:

- Integration with biometric authentication
- AI chatbots for automated recharge
- Cross-border recharge systems
- 5G-based instant micro-payments

Conclusion:

AI-based smart recharge systems are transforming digital payments by improving speed, security, and personalization. Platforms like Paytm, PhonePe, and Google Pay have demonstrated how intelligent systems can enhance user experience. With continued innovation in AI, blockchain, and cybersecurity, digital recharge platforms will become more efficient, secure, and inclusive.

References:

1. National Payments Corporation of India – UPI Guidelines
2. Paytm Annual Report
3. PhonePe Official Website
4. Google Pay Security Documentation