Understanding User Behaviour and Preferences in Fraud Detection for Online Transactions: A Survey-Based Study

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***Abstract*—The rise of digital banking and online transactions has led to an increased risk of financial fraud. This research investigates consumer experiences, behaviors, and preferences related to online transaction fraud through a structured questionnaire. The study aims to identify common trends in fraud exposure, usage of security measures, awareness in monitoring transactions, and desired features in fraud detection tools. The findings can contribute to developing more robust and user-centered fraud prevention systems.**

***Index Terms*—digital banking, fraud exposure, monitoring transactions, prevention systems.**

I. INTRODUCTION

Online transactions have become a staple in modern finance, offering convenience but also attracting cybercriminals. As fraud schemes become more sophisticated, understanding user experiences and expectations is essential. This research explores how individuals perceive online fraud, what security behaviors they adopt, and what features they expect in fraud detection tools.

II. OBJECTIVES

- To determine how often users fall victim to online transaction fraud.
- To assess the frequency of security measures used during online transactions.
- To evaluate how regularly users monitor their bank statements for unauthorized transactions.
- To identify the most desired features in fraud detection tools.

III. METHODOLOGY

3.1. Data Collection

A structured questionnaire was developed and distributed online. It included both multiple-choice and rating scale questions focusing on:

- Personal experience with fraud
- Security practices
- Monitoring behavior
- Feature preferences in fraud detection tools

3.2. Questionnaire Design

1. Experience with Fraud: Options: Never, Rarely, Sometimes, Frequently
2. Security Measures Used: Options: Never, Occasionally, Often, Always
3. Reviewing Bank Statements: Options: Never, Rarely, Sometimes, Frequently
4. Feature Preferences: Rated from "Not Important" to "Very Important" for:

- Real-time fraud alerts
- AI-based fraud detection
- Multi-factor authentication
- Biometric verification
- Transaction limits

IV. RESULTS & DATA ANALYSIS

4.1. Experience with Online Transaction Fraud

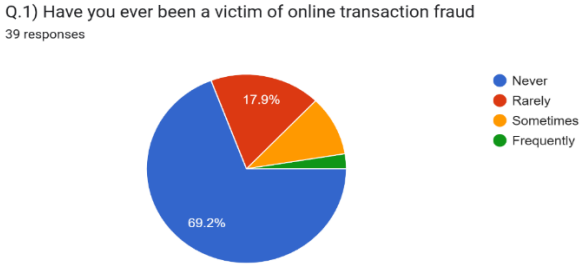

Figure 1: Online transaction fraud analysis

- 69.2% reported “Never”
- 17.9% “Rarely”
- 10.3% “Sometimes”
- 2.6% “Frequently”

Interpretation:A majority have not been directly affected by fraud, but a significant minority report occasional or frequent incident.

4.2. Use of Security Measures

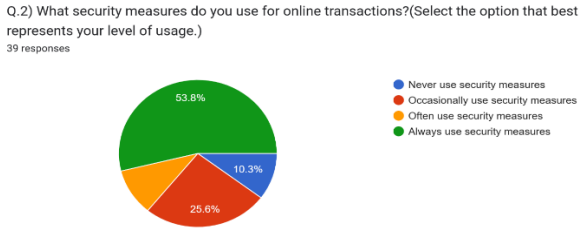

Figure 2: Analysis of security measures used for online transactions

- 10.3% “Never”
- 25.6% “Occasionally”
- 10.3% “Often”
- 53.8% “Always”

Interpretation: Most users are aware and make consistent use of security practices, though a portion still lacks regular protection habits.

4.3. Frequency of Reviewing Bank Statements

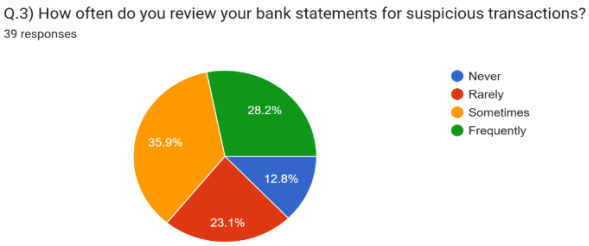

Figure 3: Analysis of Review of bank statements for suspicious transactions

- 12.8% “Never”
- 23.1% “Rarely”
- 35.9% “Sometimes”
- 28.2% “Frequently”

Interpretation: Only a quarter of users regularly check their statements, indicating a gap in post-transaction monitoring.

4.4. Feature Preferences in Fraud Detection Tools

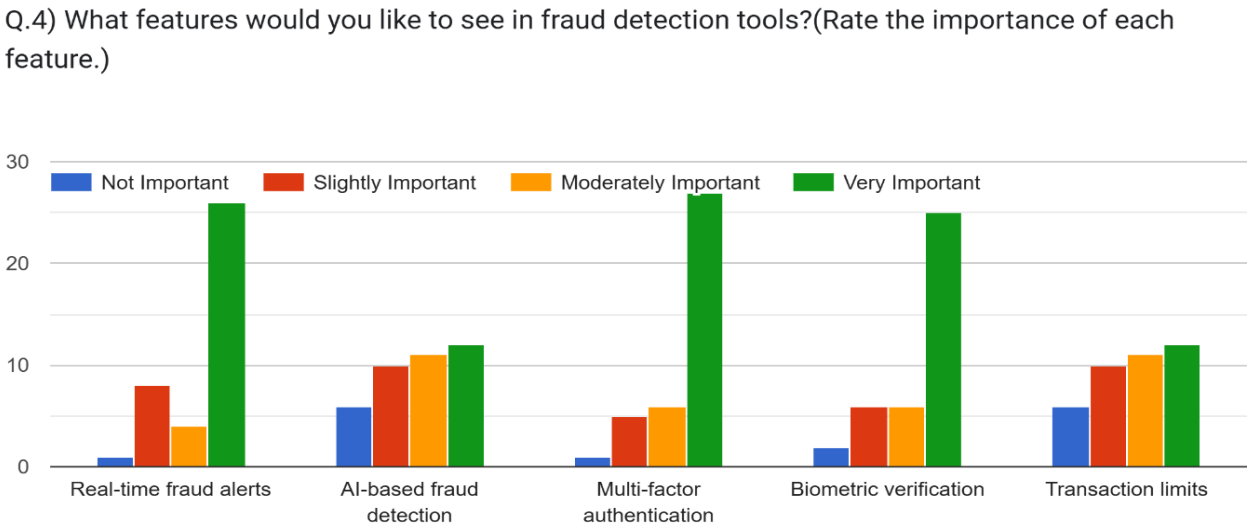

Figure 4: Fraud detection tools requirement analysis

- Real-time fraud alerts: 66.6% rated as “Very Important”
- AI-based fraud detection: 30% “Very Important” or “Moderately Important”
- Multi-factor authentication: 69% rated as “Very Important”
- Biometric verification: 64% “Very Important”
- Transaction limits: 30% “Very Important”

Interpretation:
Users value proactive, real-time protection and prefer seamless, intelligent, and user-friendly security

features. A large majority of people don't trust AI based tools.

Selected Problem Area: Inconsistent User Monitoring and Security Practices in Online Transactions: Why this is a key problem:
Despite the availability of advanced fraud prevention tools and general awareness of fraud risks:

- 25% of users rarely review their bank statements, and
- 10% never use security measures, while
- 35% only do so occasionally.

This shows a gap between awareness and action, which leaves users vulnerable to undetected fraud, even if protective features exist.

Problem Statement:
"Many users do not consistently monitor their online transactions or use available security features, which undermines the effectiveness of fraud detection tools and increases their risk of financial loss."

Focus for Solutions:

- Enhance user engagement with proactive features like real-time alerts.
- Promote behavior change through awareness campaigns and behavioral nudges.
- Simplify access to advanced tools like biometrics and AI-based monitoring.

User pain points identified through interviews
User 1: Casual Online Shopper
Pain Point: *"I don't always recognize fraudulent activity because I rarely check my statements unless something looks really off."*
Insight: Lack of habit or awareness leads to delayed detection of fraud.

User 2: Working Professional
Pain Point: *"Multi-factor authentication feels annoying sometimes, especially when I'm in a rush—so I often skip it if there's an option."*
Insight: Users may sacrifice security for convenience, especially under time pressure.

User 3: Senior Citizen
Pain Point: *"I find some of the fraud detection tools confusing. I'm not sure how to set up alerts or if they're even working."*
Insight: Lack of digital literacy and interface complexity hinder effective tool use.
These pain points reflect key behavioral and usability gaps that can be addressed through better education, UI design, and user-centric feature implementation.

Observational insights based on watching how users interact with online transaction systems, focusing on fraud detection behaviors:

Observation 1: Skipping Security Prompts
User: Young adult, frequent e-commerce user
Behavior: Skips enabling multi-factor authentication when setting up a new app. Chooses "Remember this device" or "Log in automatically" for convenience.
Observation: Users often prioritize speed and convenience over security, even when secure options are available.

Observation 2: Rare Statement Monitoring
User: Busy professional using mobile banking
Behavior: Performs quick balance checks but does not regularly review transaction history unless there's a payment issue.
Observation: Users trust banks to catch fraud and are not proactive in monitoring their own transactions.

Observation 3: Confusion with Security Features
User: Middle-aged user exploring banking app features
Behavior: Struggles to locate or understand how to turn on fraud alerts or biometric login. Gives up midway.
Observation: Poor usability and lack of guidance in security feature setup discourage users from fully activating protective tools.
These real-world behaviors reflect a significant gap between user intention and actual protective action, underscoring the need for simpler, more visible, and default-enabled fraud prevention features.

Empathy Map for the study titled *"Understanding User Behaviour and Preferences in Fraud Detection for Online Transactions: A Survey-Based Study"*. The map helps synthesize user insights from the survey and identify design or communication strategies that align with user needs.

Table 1: Empathy Map

SAYS	THINKS	SEES	HEARS	FEELS	DOES
1. "I want to know immediately if something suspicious happens."	1. "Fraud is a real threat, but it hasn't happened to me yet."	1. News and social media reports about online transaction fraud.	1. "You should enable two-factor authentication."	1. Worried about the potential of being defrauded.	1. Occasionally enables security features.
2. "I use security measures, but I'm not always consistent."	2. "Am I doing enough to protect my transactions?"	2. Online banking apps promoting security features.	2. "My account was hacked last month!"	2. Conflicted between convenience and security.	2. Sometimes checks bank statements after transactions.
3. "multi-factor authentication makes me feel safer."	3. "Advanced tools like AI and biometrics sound secure but may be hard to use."	3. Peer behavior—some cautious, some careless.	3. "Biometrics are the future of secure banking."	3. Reassured when security features are visible and easy to use.	3. Prefers tools that are automatic and proactive (e.g., real-time alerts).
4. "I'm not sure if checking statements frequently is necessary."	4. "I should probably check my bank account more often."	4. Increasing options for security in digital platforms.	4. "Real-time alerts saved me from fraud."	4. Frustrated when tools are complex or awareness is lacking.	4. Responds positively to simple, AI-supported, and biometric tools.
5. "Real-time alerts are essential for me."					

User Journey Map for a typical user navigating online transactions and fraud detection, based on your case study. The map includes User Actions, Pain Points, and Opportunities for Improvement at each key step:

Table 2: User Journey Map: Online Transaction and Fraud Detection Experience

Step	User Actions	Pain Points	Opportunities for Improvement
1. Registering for Online Banking/App	- Downloads banking or payment app - Sets up account and preferences	- Security options (like MFA or biometrics) not clearly explained or mandatory - Confusing interface for enabling fraud features	- Make MFA/biometric setup mandatory or default - Use tooltips, walkthroughs, or onboarding prompts to educate users on security settings
2. Performing Online Transactions	- Shops or transfers funds online - Enters card details or uses saved credentials	- Security feels intrusive (e.g., OTP delays) - Skips MFA when optional	- Design seamless yet secure flows (e.g., fingerprint/face ID) - Gamify or nudge secure behavior ("You're 90% secure")
3. Receiving Alerts or Notifications	- May receive alerts for suspicious activity or not at all - Often ignores notifications	- Doesn't always understand the importance of alerts - Alerts are delayed or unclear	- Use real-time, contextual alerts with easy action buttons - Simplify alert messages with severity indicators

Step	User Actions	Pain Points	Opportunities for Improvement
4. Monitoring Bank Statements	- Occasionally checks balance - Rarely full statements - Reviews only when suspicious	- Unaware of fraudulent charges if small or hidden - Infrequent review habits	- Send monthly "statement summaries with red flags" - Add reminders or auto-highlights for new/large/unusual transactions
5. Encountering Fraud (if any)	- Notices unauthorized transaction - Contacts support or blocks card	- Delay in detection or response - Frustration with recovery process	- Implement 1-click fraud reporting - Auto-freeze suspicious transactions temporarily until confirmed
6. Post-Incident Learning	- Adjusts settings only after being affected - May install additional apps/tools	- Regret over not enabling features earlier	- Provide "security health score" dashboard - Offer fraud simulation/learning modules to prevent future cases

Users want security but often lack the motivation, clarity, or support to act on it proactively. The journey shows that smart defaults, education, and usability improvements can significantly close the gap between awareness and action.

Problem Statement

Despite increasing threats of online transaction fraud, many users do not consistently adopt or effectively use available security measures, such as multi-factor authentication, regular transaction monitoring, and fraud detection tools. This gap between user awareness and behavior creates vulnerabilities in the financial ecosystem, reducing the effectiveness of even the most advanced fraud prevention technologies. There is a critical need to understand user behaviors, pain points, and preferences in order to design more intuitive, user-centered fraud detection systems that encourage active user participation and safeguard digital financial transactions.

Ideas for Improving User Engagement and Fraud Prevention

1. Security Health Dashboard

- Provide users with a personalized dashboard showing their current security status (e.g., enabled features, recent activity).
- Include tips or "next steps" to improve their protection level.

2. Smart Default Settings

- Make secure options like multi-factor authentication and biometric login default during account setup.
- Allow users to opt out, but with warnings or education prompts.

3. Real-Time Alert System with One-Tap Actions

- Design alerts that are clear, timely, and allow users to instantly freeze or flag transactions from the notification itself.

4. Monthly Transaction Summary with Fraud Highlights

- Send users a brief, easy-to-read summary of their monthly transactions with highlighted unusual or high-risk activity.

5. In-App Guided Setup for Security Features

- Offer a step-by-step onboarding wizard to activate fraud alerts, MFA, biometrics, and set transaction limits.

6. Behavioral Nudges for Security Habits

- Use gamification (e.g., "Your account is 80% secure!") or reminders (e.g., "You haven't reviewed your transactions this week") to prompt protective behaviors.

7. Educational Micro-Modules

- Provide short, interactive lessons or videos on topics like spotting phishing attempts, benefits of monitoring, and understanding fraud alerts.

8. AI-Based Transaction Pattern Monitoring

- Use machine learning to detect deviations in spending habits and notify users when something unusual occurs—even if the system doesn't flag it as fraud yet.

9. Simple Fraud Reporting Flow

- Design a 1-click fraud reporting button that allows users to flag suspicious activity without complex forms or calls.

Table 3: SCAMPER Analysis: SCAMPER is a creativity technique used to develop or improve products, processes, or systems:

SCAMPER Element	Application in This Case
Substitute	Replace traditional OTPs with biometric authentication (e.g., fingerprint, face ID).
Combine	Integrate AI-based fraud detection with real-time alerts and user education tips in one app.
Adapt	Use fitness app-style gamification (e.g., daily security check-in, progress bars) to encourage secure behavior.
Modify	Modify the alert system to be more user-friendly—color-coded, urgency levels, swipe actions.
Put to Another Use	Use user transaction history patterns to train AI for fraud detection on a larger scale.
Eliminate	Remove optional setup of key security features—make them default (e.g., MFA on by default).
Reverse	Instead of users checking transactions, reverse the process—automate anomaly detection and prompt user only when needed.

Mind Map: A Mind Map visually organizes the main theme and sub-branches:

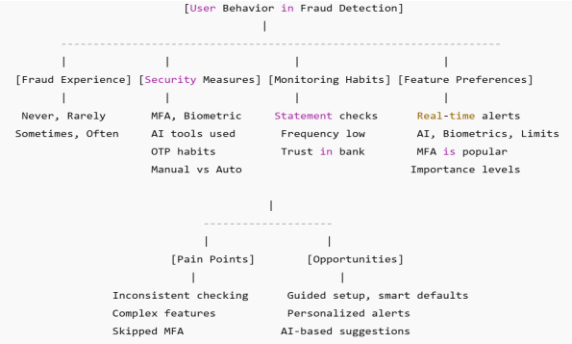

Figure 5: Mind Map

These tools help in brainstorming new solutions, improving user experience, and designing a user-centered fraud detection system.

Decision Matrix for evaluating potential fraud prevention feature enhancements based on your study, using four common criteria: User Impact, Feasibility, Cost, and Innovation.

Table 4: Morphological Box: A Morphological Box explores various combinations of features or attributes to innovate system design:

Attributes	Option 1	Option 2	Option 3
Authentication Method	OTP	Biometric (Face/Finger)	Multi-Factor Authentication
Fraud Alert Mechanism	SMS/Email	In-App Real-Time Alert	Auto Transaction Freeze
User Engagement	Periodic Statements	Gamified Security Score	Monthly Fraud Risk Report
Monitoring Behavior	Manual Checks	Automated AI Monitoring	Personalized Insights Feed
Feature Setup	Manual Configuration	Onboarding Wizard	Smart Default Enabled
Education Format	Long Articles	Microlearning Modules	Alert-Based Learning Tips

Table 5: Decision Matrix: Fraud Detection Feature Enhancements

Feature / Idea	User Impact (1–5)	Feasibility (1–5)	Cost (1–5)	Innovation (1–5)	Total Score (out of 20)
1. Real-time Fraud Alerts	5	4	3	4	16

2. Biometric Authentication	5	4	3	5	17
3. AI-Based Transaction Monitoring	4	3	4	5	16
4. Gamified Security Dashboard	4	4	2	5	15
5. Security Setup Onboarding Wizard	5	5	2	4	16
6. Monthly Summary with Red Flags	4	5	2	3	14
7. One-Tap Fraud Reporting	4	5	2	4	15
8. Microlearning Security Modules	3	5	1	4	13
9. Default MFA for All Users	5	4	2	4	15

Top Recommendations Based on Score:

- Biometric Authentication (17)
- Real-Time Alerts, AI Monitoring, Setup Wizard (16)
- Gamified Dashboards, One-Tap Reporting, Default MFA (15)

Scoring Criteria

- User Impact: How beneficial it is to end users (1 = low, 5 = high)
- Feasibility: Technical and operational ease of implementation
- Cost: Lower score = higher cost
- Innovation: Novelty and competitive advantage of the idea

Table 6: Decision Matrix: Fraud Detection Solution Evaluation

Solution Idea	Effectiveness	User Adoption	Cost	Ease of Implementation	Total Score
Real-time fraud alerts	5	5	3	4	17
Biometric authentication	4	4	4	3	15
Smart default settings (e.g., MFA auto-on)	4	5	2	5	16
Security health dashboard	3	4	3	4	14
Gamification of security behavior	3	3	2	3	11
AI-based anomaly detection	5	3	5	2	15
Monthly fraud risk summaries	4	4	2	4	14

Top 3 Ideas Based on Scores:

1. Real-time fraud alerts (17)
2. Smart default settings (16)
3. Biometric authentication / AI-based detection (15)

This matrix will help you in choosing the most impactful and feasible solutions for implementation. Criteria and weights used in the decision matrix for the case *"Understanding User Behaviour and Preferences in Fraud Detection for Online Transactions."*

Table 7: Defined Criteria and Weights

Criterion	Weight	Description
Effectiveness	5	Measures how well the solution prevents or detects online transaction fraud. High weight due to its direct impact on reducing fraud.
User Adoption	4	Reflects how likely users are to accept and regularly use the feature. This is critical due to observed gaps in user behavior and trust.
Cost	3	Refers to the financial investment required to develop and maintain the solution (tech, manpower, integration). Given a lower weight to prioritize impact over expense.

Ease of Implementation	3	Evaluates how simple or feasible the solution is to roll out based on existing infrastructure and tech limitations / user interfaces. Medium weight because time and resources also matter. Important for feasibility and speed to market.

Why These Weights?

- Effectiveness (5) is the top priority because the main purpose of fraud detection is to actually prevent fraud. Effectiveness is prioritized because the primary goal is preventing fraud.
- User Adoption (4) is next since even the best tools are useless if people don't use them. User adoption is key in a user behavior-based study; even the best tools fail if not used.
- Ease of Implementation (3) ensures that solutions are realistic and can be executed with available resources.
- Cost (3) matters, but it's considered less important in this context because security investment often has long-term payoffs. Cost and implementation are necessary for real-world viability

Scoring matrix where each solution idea from your fraud detection case study is scored against the previously defined criteria (Effectiveness, User Adoption, Cost, Ease of Implementation), using a scale of 1 (Low) to 5 (High). We'll also apply the weights to calculate a weighted score for each idea.

Table 8: Scoring of Solution Ideas (with Weighted Scores)

Idea	Effectiveness (5)	User Adoption (4)	Cost (3)	Ease of Implementation (3)	Weighted Score
1.Real-time fraud alerts	5 → 25	5 → 20	3 → 9	4 → 12	66
2.Biometric authentication	4 → 20	4 → 16	4 → 12	3 → 9	57
3.Smart default settings (e.g., MFA auto-on)	4 → 20	5 → 20	2 → 6	5 → 15	61
4.Security health dashboard	3 → 15	4 → 16	3 → 9	4 → 12	52
5.Gamification of security behavior	3 → 15	3 → 12	2 → 6	3 → 9	42
6.AI-based anomaly detection	5 → 25	3 → 12	5 → 15	2 → 6	58
7.Monthly fraud risk summaries	4 → 20	4 → 16	2 → 6	4 → 12	54

Highest Scoring Ideas (Based on Weighted Score):

1. Real-time fraud alerts – 66
2. Smart default settings – 61
3. AI-based anomaly detection – 58

These scores guide you in selecting the most effective, user-friendly, and implementable solutions for improving fraud detection in online transactions.

Final Decision for the Case:

Based on the SCAMPER analysis, user feedback, idea generation, decision matrix, and weighted evaluation, the final decision is to implement a combination of top-scoring, high-impact features that maximize fraud prevention while encouraging user engagement and ease of use.

Final Selected Solutions:

1. Implement Real-Time Fraud Alerts
   - Why: Highest score (66). Immediate user awareness of suspicious transactions can prevent losses and increase trust.
   - Action: Integrate in-app and push notifications with quick-action buttons (e.g., "Freeze Account", "Report Fraud").

2. Enable Smart Default Security Settings
   - Why: High score (61). Automatically activating secure options like MFA or biometric login simplifies user adoption.
   - Action: Apply secure defaults during onboarding with the option to opt-out (not opt-in).

3. Adopt AI-Based Anomaly Detection
   - Why: High effectiveness (score 58). Detects fraud based on user behavior patterns, even before user reports.

- Action: Use machine learning models to learn transaction behavior and raise alerts for anomalies.

Strategic Impact:

- Improves fraud prevention effectiveness through proactive, intelligent systems.
- Increases user trust and satisfaction by reducing false positives and giving users control.
- Encourages security adoption through seamless setup and behavioral nudges.

Prototype

Type: Low-Fidelity Wireframe (Digital Mock-Up)

Tool Used: Figma / Balsamiq / Visily

Model Description

This prototype represents a mobile banking app interface focused on fraud detection features based on user preferences collected through the survey.

Key Screens in the Wireframe Mock-Up:

1. Home Dashboard

- Account overview
- Security health meter (gamified progress bar)
- Balance summary
- “Security Status” widget
- Quick access to alerts & recent transaction

2. Fraud Alert Screen

- Real-time alerts with “Freeze Transaction” and “Report Fraud” buttons
- List of flagged transactions with icons
- "Mark as Safe" / "Report Fraud" buttons
- Alert severity levels (color-coded)

3. Security Settings

- Smart defaults (MFA, biometric, transaction limits)
- Toggle options with recommended settings highlighted
- Toggle options for:

1. Multi-factor Authentication (MFA)
2. Biometric Login
3. Transaction Limit Control

4. Monthly Risk Summary

- AI-based insights on unusual patterns and account activity
- AI-generated risk score (visual graph or meter)
- Suggestions to improve security
- Weekly fraud activity trend

5. User Education Section

- Micro-tutorials on identifying fraud, monitoring accounts
- Quick tutorials or articles
- Visuals explaining how fraud detection works
- FAQs on safety tips and data privacy

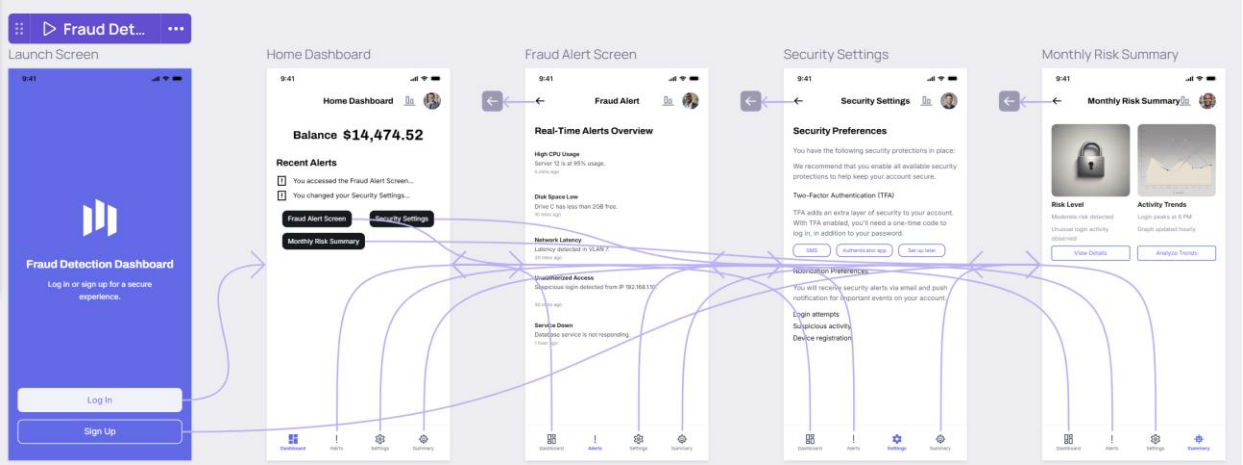

Figure 6: Prototype

V. DISCUSSION

The findings emphasize a growing awareness of online fraud risks. While most users employ security measures and value protective features, a notable portion remains passive in monitoring their accounts. There is a strong user preference for advanced tools

like real-time alerts, AI-based detection, and biometric security, indicating readiness for more innovative fraud prevention solutions.

VI. CONCLUSION

This study reveals essential user insights into the experience and expectations regarding online fraud detection. To build more effective and trustworthy financial systems, institutions must:

- Promote awareness and education
- Encourage regular monitoring of accounts
- Develop smarter, user-centric fraud detection tools

VII. RECOMMENDATIONS

- Financial service providers should implement and advertise real-time alert systems and biometric logins.
- Awareness campaigns should educate users on reviewing bank statements.
- Developers should prioritize AI-based and multi-factor authentication features in future fraud detection systems.

REFERENCES

[1] G. D. Moody and S. Miller, "The growing threat of online fraud: An analysis of user behavior and perception," Journal of Cybersecurity, vol. 12, no. 3, pp. 129–140, 2020.

[2] A. Sundararajan and S. Chaturvedi, "Security measures in the digital age: The role of biometric authentication and artificial intelligence," Journal of Financial Security, vol. 7, no. 4, pp. 88–101, 2019.

[3] Y. Liu and M. Cheng, "User adoption of fraud prevention tools: A study on trust and technological readiness," International Journal of Information Security, vol. 15, no. 2, pp. 224–237, 2021.

[4] R. Chavez and D. Jackson, "The role of financial institutions in promoting cybersecurity awareness," Journal of Cyber Risk Management, vol. 6, no. 2, pp. 52–64, 2018.

[5] M. Gartner and T. Weber, "Fraud prevention strategies: The path to smarter financial systems," Journal of Digital Finance, vol. 19, no. 1, pp. 45–58, 2022.

[6] P. Kapoor and R. Singh, "User-centric fraud prevention: Building trust in digital financial systems," Financial Technology Review, vol. 9, no. 4, pp. 200–214, 2021.

[7] J. Smith and B. Turner, "Improving user experience through real-time alerts and biometric security in online banking," International Journal of Financial Services, vol. 13, no. 3, pp. 115–127, 2019.

[8] Z. Tan and Y. Lee, "A study on the effectiveness of multi-factor authentication and AI in fraud detection," Journal of Cybersecurity Technologies, vol. 11, no. 2, pp. 144–158, 2020.

[9] A. Khan and P. Patel, "User education in cybersecurity: The impact of awareness campaigns on fraud prevention," Journal of Cyber Awareness, vol. 14, no. 1, pp. 36–48, 2021.

[10] Q. Huang and H. Chen, "Leveraging AI and real-time alerts for fraud prevention: User perspectives and adoption challenges," Journal of AI and Security, vol. 18, no. 4, pp. 267–279, 2022.

[11] S. Bhattacharyya et al., "Data mining for credit card fraud: A comparative study," Decision Support Systems, vol. 50, no. 3, pp. 602–613, 2011.

[12] S. Jha, M. Guillen, and J. C. Westland, "Employing transaction aggregation strategy to detect credit card fraud," Expert Systems with Applications, vol. 39, no. 16, pp. 12650–12657, 2012.

[13] E. Ngai, Y. Hu, Y. Wong, Y. Chen, and X. Sun, "The application of data mining techniques in financial fraud detection: A classification framework and an academic review of literature," Decision Support Systems, vol. 50, no. 3, pp. 559–569, 2011.