



## Project Report

**Topic: Food Delivery System**

**Course Code: Cse 227**

**Course Name: System Analysis & Design**

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## **QuickBite Bangladesh**

### **Brand Description**

QuickBite Bangladesh is a secure, culturally-aware food delivery ecosystem designed for both urban and semi-urban contexts. It integrates strong mobile applications, auditable order tracking, and human-centered workflows to provide timely, accurate, and transparent food delivery. Key features include multilingual interfaces (Bangla-first), authenticated restaurants and riders, tamper-evident packaging, and verifiable delivery trails.

The system is engineered for Bangladesh's traffic, network constraints, and logistics challenges—leveraging offline-first operation, resilient infrastructure, and transparent processes to build trust across a diverse customer base.

### **Focus on the Secure Ordering & Delivery Workflow**

QuickBite applies complex engineering principles to the entire ordering lifecycle: order placement → restaurant confirmation → rider assignment → real-time tracking → delivery → payment → audit.

The workflow aims for:

- Frictionless customer experience
- High reliability in constrained environments
- Strong accountability and transparency
- Secure, verifiable transactions and tracking

Key objectives include intuitive ordering, error-proof restaurant selection, cryptographic sealing of transactions, real-time tracking accuracy, dual-channel notifications, post-delivery photo verification, and immutable audit logs.

### **EP1 – Depth of Knowledge Required**

A strong understanding of food delivery technologies, logistics processes, and SDLC rigor is required. Comparative analysis includes traditional phone-based ordering, hybrid app + human workflows, and fully automated app ecosystems.

Key domain insights:

- GPS-based live tracking
- Secure payment gateways (bKash, cards)
- Dynamic pricing and delivery time estimation
- Human-factor engineering in last-mile delivery

These insights shape a solution optimized for Bangladesh's urban and semi-urban reality.

### **EP2 – Range of Conflicting Requirements**

Food delivery systems face several trade-offs between real-time tracking, secure payments, offline resilience, and feature-rich UIs. Constraints include a 6-month timeline and a BDT 1,200,000 pilot budget. The chosen approach is a hybrid model with app-based ordering, SMS fallback notifications, and offline-first caching for stable performance.

### **EP3 – Depth of Analysis Required**

Functional requirements are prioritized based on reliability and security. Threat modeling includes order fraud, fake riders, payment downtime, GPS spoofing, and app crashes. Mitigations include encrypted communication, role-based access, secure payments, delivery proof photos, immutable logs, and audits.

## **Requirements Collection Procedures**

### **1. Interviews**

Conducted with customers, restaurant owners, and riders to identify needs for:

- Bangla-first UI
- Simple navigation
- Clear confirmation prompts
- Offline fallback during connectivity loss

## 2. Workshops

Stakeholders emphasized:

- Real-time order tracking
- Secure payment confirmation
- Transparent delivery verification

## 3. Surveys

Key customer priorities include:

- Trust and reliability
- On-time delivery
- Transparent pricing
- Photo-proof delivery

### Stakeholder Identification

Primary Stakeholders:

- Customers
- Restaurant Partners
- Delivery Riders

Secondary Stakeholders:

- App Developers
- Logistics Coordinators
- Customer Support
- Payment Gateway Providers

Regulators:

- Food safety authorities
- Digital transaction oversight bodies

## Requirement Specification

Functional Requirements:

- Customer authentication: OTP login, profile management
- Restaurant browsing: Filters, images, ratings

- Order placement: Cart, promo codes, summary
- Payment: Cash, bKash, card; secure processing
- Live tracking: GPS, ETA updates
- Delivery confirmation: Photo proof, OTP handover, ratings

Non-Functional Requirements:

- Uptime: 99.5% peak
- Security: SSL, RBAC, fraud detection algorithms
- Performance: UI < 3s, order placement < 30s
- Accessibility: Bangla-first, voice assistance
- Auditability: Immutable records, dispute support

## Feasibility Analysis

Alternatives:

1. Phone-based system: Low cost, no scalability → Rejected
2. Advanced AI system: High efficiency but expensive → Future phase
3. Hybrid app + SMS + call center: Selected

Assessment:

- Technical: Feasible with smartphones, GPS, and secure payments
- Operational: Matches existing workflows
- Economic: Fits within budget and scalable via commissions

## Decision Table – Order Acceptance

Conditions	Rule 1	Rule 2	Rule 3	Rule 4
Restaurant Open	Yes	Yes	No	Yes
Items Available	Yes	No	-	-
Delivery Zone Covered	Yes	Yes	Yes	No
Actions				
Accept Order	✓			
Suggest Alternatives		✓		
Reject with Reason			✓	✓

Conditions	Rule 1	Rule 2	Rule 3	Rule 4
Notify Customer	✓	✓	✓	✓

## Decision Tree – Delivery Completion

Delivery Completed?

- No → Continue tracking → Update ETA → Notify customer
- Yes → Request delivery proof → Verify → Confirm delivery → Release payment → Complete order → Request rating

## Feasibility Analysis

Alternatives:

- Phone-based system – Low cost, poor scalability → X Rejected
- Advanced AI system – High efficiency, high cost → X Future phase
- Hybrid app + SMS + call center – ✓ Selected (balanced efficiency and cost)

Assessment:

- Technical: Feasible with smartphones, GPS, and secure payment APIs
- Operational: Matches current restaurant and rider workflows
- Economic: Affordable within BDT 1.2 million pilot budget; scalable through commission-based revenue

## Budget and Timeline

Pilot Budget (BDT 1,200,000):

- Development: 700,000
- Hardware/Operations: 300,000
- Contingency: 200,000

Gantt Chart (6 months):

Month 1: Requirements & Research

Months 2–3: Design (UI/UX, Architecture)

Months 3–5: Development (Backend, Mobile Apps, Payments)

Month 5: Testing (Unit, Integration, UAT)

Month 6: Pilot Launch, Monitoring, Feedback

## Implementation Procedures

Hardware:

- Smartphones (customers, riders)

- Tablets + printers (restaurants)

Software:

- React Native apps
- Node.js backend + REST + WebSockets
- JWT authentication, encrypted database, GPS tracking

Authentication & Access:

- Roles: Customer, Restaurant, Rider, Admin
- OTP login, shift-based rider login

I/O Design:

Input: Touch UI, voice search, photo uploads

Output: Push notifications, SMS, map tracking, receipts

## Testing

White-Box Testing

- Payment encryption validation
- API authentication paths
- Rider assignment logic
- Secure order handling

Black-Box Testing

- First-time order
- Modified order and refunds
- Delivery delays
- Poor network performance scenarios

Test cases: UI latency <3s, GPS accuracy ±5min ETA, secure payment failure handling.

## Quality Targets

- Reliability: ≥95% order completion
- Security: Zero fraud, verifiable logs
- Usability: ≥90% success rate in pilot

## Maintenance and Future Development

Routine Tasks: Server checks, app performance, payment monitoring.

Continuous Improvement: User feedback loops, UI/UX updates.

Periodic Audits: Security reviews, compliance checks.

Future Roadmap:

- AI route optimization
- Loyalty and rewards
- Corporate accounts
- Multi-city expansion
- Verified payment workflows

## Chapter 5 – Conclusion

### 5.1 Summary:

QuickBite Bangladesh presents a secure, reliable, and culturally optimized food delivery ecosystem suitable for Bangladesh's urban and semi-urban environments. It ensures transparency, security, and efficiency while balancing usability, performance, and cost constraints.

### 5.2 Limitation:

Limited automation and analytics in the pilot version. Full scalability and AI optimization planned later.

### 5.3 Future Work:

Future versions will introduce AI-based dynamic routing, multi-city integration, advanced analytics, and enhanced fraud detection. These developments will strengthen the system's reliability and expand its reach across Bangladesh.

## References

- [1] Sommerville, Ian. Software Engineering, 10th Edition. Pearson, 2015.
- [2] Pressman, Roger S. Software Engineering: A Practitioner's Approach. McGraw-Hill, 2014.
- [3] Food Delivery Trends in South Asia, Quick Service Tech Reports, 2024.