

Project Synopsis: VyapaarAI-Business Assistant for Indians

0. Cover

- **Project title:** VyapaarAI
- **Team name & ID:** BusinessBuddy (T83)
- **Institute / Course:** GLA University, Mini-Project
- **Date:** 5 Feb 2026

1. Overview

- **Problem statement:** Most existing automation and CRM solutions are designed primarily for English-speaking users and do not effectively support Indian regional languages. Additionally, small businesses lack affordable and easy-to-use platforms that can automate customer interaction, order management, and basic business analytics through a familiar interface like WhatsApp.
- **Proposed Solution:** The proposed system is an AI-powered WhatsApp Business Assistant that can automatically understand and respond to customer messages in multiple languages such as Hindi, Urdu, and English.
- **Non-goals:** Payments, shipping, and nationwide logistics in v1.
- **Objectives:**
 - To develop a multilingual AI chatbot integrated with WhatsApp
 - To design a web-based dashboard for business owners to manage messages and orders
 - To implement machine learning models for intent detection and spam/scam filtering
 - To provide analytical insights such as daily revenue and most popular products

Mentor: Dr. Gourav Bathla

Signature

2. Scope and Control

2.1 In-scope

- Voice-based customer interaction system
- Mobile application for business owners
- GST invoice generation
- Advanced sales prediction and inventory forecasting

2.2 Out-of-scope

- Online payments, delivery.

2.3 Assumptions

- All users have Whatsapp profile.
- Basic knowledge of using chatbots such as asking questions etc.

2.4 Constraints

- 8-week timeline, shared lab server, beginner team skills in React/Node.

2.5 Dependencies

- SMTP service for verification, object storage for images, campus SSO (optional).

Sign-off table

Stakeholder	Role	Decision area	Signature/Approval	Date
Dr. Gourav Bathla	Mentor	Scope, final acceptance	Approved	5 February 2026
Syed Adeeb Hussain	Product Lead	Release readiness	Approved	5 February 2026

3. Stakeholders and RACI

Activity	Responsible (R)	Accountable (A)	Consulted (C)	Informed (I)

Requirements	Mohammad Ashhar	Syed Adeeb Hussain	Mentor	Team
Design	Syed Adeeb Hussain	Syed Adeeb Hussain	Mentor	Team
Implementation	Krishan Chauhan, Mohammad Ashhar	Syed Adeeb Hussain	Mentor	Team
Testing	Syed Adeeb Hussain	Syed Adeeb Hussain	Mentor	Team
Release	Dr. Gourav Bathla	Syed Adeeb Hussain	Mentor	Dept

4. Team and Roles

Member	Role	Responsibilities	Key skills	Availability	Contact
Mohammad Ashhar	Product Lead	Scope, backlog, reviews	Product, APIs	8 hrs/wk	mohammad.ashhar_cs.aiml23@gla.ac.in
Syed Adeeb Hussain	Tech Lead & Backend	Arch, APIs, security	Node, Express, SQL	10 hrs/wk	syed.hussain_cs.aiml23@gla.ac.in
Krishan Chauhan	Frontend	React UI, state, ally	React, TS	10 hrs/wk	krishan.chauhan_cs.aiml23@gla.ac.in
Mohammad Ashhar	QA & Docs	Test plan, E2E, docs	Playwright, writing	8 hrs/wk	mohammad.ashhar_cs.aiml23@gla.ac.in

5. Week-wise Plan and Assignments

(Example schedule for Sep–Oct 2025; adjust to your calendar.)

Week	Dates	Milestones	Aisha (Lead)	Rohit (Backend)	Neeraj (Frontend)	Priya (QA/Docs)	Deliverables	Status
1	1-7 Feb	Requirements freeze	Finalize scope	API contracts v0	Wireframes	Test plan v0	Draft SRS	Planned
2	8-14 Feb	Architecture & DB	Arch review	Schema & migrations	UI kit	Test data	ERD, API spec v1	Planned
3	15-21 Feb	Backend scaffolding	Risks, unblock	Auth + Users API	Auth screens	Smoke tests	Auth module	Planned
4	22-28 Feb	Frontend scaffolding	Sync	Listings API	Routing, forms	Accessibility checks	UI shells	Planned
5	1-7 Mar	Feature set A	Cut scope	Create/Edit listing E2E	Listing pages	CRUD tests	Feature A demo	Planned
6	8-14 Mar	Feature set B	KPIs	Search API	Search UI + Profile	Perf tests	Feature B demo	Planned
7	15-21 Mar	Hardening	Risk burn-down	Bug fixes	Bug fixes	Regression suite	Test report	Planned
8	22-28	Release & deck	Final sign-off	Release notes	Polish UI	User manual	v1.0, slides	Planned

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6. Users and UX

6.1 Customer Journey

Customer → WhatsApp Message → AI Assistant → Order Confirmation → Payment Link → Payment Success → Final Confirmation

6.2 Business Owner Journey

Login → Dashboard Overview → Orders Management → Payment Tracking → Analytics & Insights

6.3 User stories

As a business owner, I want an automated WhatsApp assistant that can reply to customer queries instantly, so that I do not have to manually respond to every message.

6.4 Accessibility & localization

The system is designed to be simple and accessible for non-technical users, with a clean, mobile-friendly interface, readable text, and minimal input requirements to ensure ease of use even in low-bandwidth environments.

7. Market and Competitors

7.1 Competitor table

Competitor	Product	Target users	Key features	Pricing	Strengths	Weaknesses	Our differentiator
OLX	C2C marketplace	General public	Listings, chat	Free	Large base	Ad clutter	Campus-verified users
Quikr	C2C marketplace	India users	Multi-category	Free	Local reach	UX inconsistency	Student-focused UX

Facebook Marketplace	Social C2C	FB users	Social discovery	Free	Network effects	Trust concerns	Email-verified students
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7.2 Positioning

- **Simple & Clear:** An affordable, multilingual AI assistant that helps Indian SMEs manage customers, orders, and payments directly on WhatsApp.
- **Value-Focused:** A smart WhatsApp-based business assistant that automates customer support, orders, and payments for small businesses in India.
- **Impact-Focused:** Empowering Indian small businesses with AI-driven customer engagement and commerce on WhatsApp.
- **Tech-Angle:** An AI-powered WhatsApp solution for end-to-end customer interaction, order management, and business insights.

8. Objectives and Success Metrics

- To automate customer interactions on WhatsApp using an AI-powered assistant.
- To provide multilingual support and simple order/payment management for SMEs.
- To offer a basic dashboard for monitoring orders and business performance.
- Reduction in average customer response time.
- Increase in successful WhatsApp-based orders.
- User satisfaction and adoption by SMEs.

9. Key Features

Feature	Description	Priority	Dependencies	Acceptance criteria
AI Chatbot	Understands and replies in English, Hindi, and Urdu on WhatsApp.	Must	NLP Models, Whatsapp API	Correct language detection and response in most test cases.
WhatsApp Order Management	Allows customers to place orders via WhatsApp.	Must	Backend, Database	Orders appear correctly on the dashboard.

Payment Link Generation	Sends secure payment links to customers.	Must	Payments Gateway API	Successful payment updates order status.
Web Dashboard	Dashboard to manage orders and products.	Should	Frontend, Backend APIs	Owner can view and update orders/products
Basic Analytics	Shows daily revenue and popular products.	Could	Database, Analytics module	Analytics match stored transaction data.

Detail flows and edge cases stored in design docs.

10. Architecture

10.1 High-level

- **Clients:** WhatsApp(Android/iOS), Web Dashboard
- **Services:** Node.js, Python, NLP
- **Data stores:** Supabase, PostgreSQL, Redis
- **Integrations:** Whatsapp Business cloud API, Razorpay, Qauth, Render

10.2 API spec snapshot

Endpoint	Method	Auth	Purpose	Request schema	Response schema	Codes
/api/webhook/whatsapp	POST	—	Receives incoming WhatsApp messages.	{ senderId, message }	status	200, 400
/api/orders/create	POST	JWT	Creates a new order from chat.	{ customerId, items }	orderId	201, 400, 401

/api/dashboard/orders	GET	—	Fetches orders for dashboard.	Auth Token	orders[]	200 OK, 401
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10.3 Config and secrets

- Configuration values and sensitive credentials (API keys, tokens, database URLs) are securely managed using environment variables and secret managers, and are never hard-coded in the application.

11. Data Design

11.1 Data dictionary

Entity	Field	Type	Null?	Allowed values	Source	Notes
Customer	id	String	No	UUID	WhatsApp API	Unique
Order	id	String	No	UUID	System	Unique
Order	id	String	No	Pending, paid, completed	System	Unique
Product	id	String(120)	No	UUID	System	Indexed
Payment	status	String	No	Created, success, failed	Payment API	Payment gateway

11.2 Schemas and migrations

- Database schemas and migrations are used to define, version, and evolve the data structure in a controlled manner, ensuring backward compatibility and safe updates across deployments.

11.3 Privacy, retention, backup/DR

- The system follows privacy best practices, applies defined data retention policies, and uses automated backups with disaster recovery measures to ensure data security and service continuity.

12. Security and Compliance

12.1 Threat model (STRIDE)

Asset	Threat	STRIDE	Impact	Likelihood	Mitigation	Owner
Customer Data	Datal leakage	Information Disclosure	High	low	Encryption access control	Adeeb
WhatsApp Webhook	Fake requests	Spoofing	High	Medium	Webhook signature verification	Krishan Chauhan

12.2 AuthN/AuthZ

The system enforces strong authentication (AuthN) and role-based authorization (AuthZ) to ensure only verified users can access permitted features and data.

12.3 Audit and logging

The system maintains audit trails and structured logs for key actions and errors to support monitoring, troubleshooting, and security compliance.

12.4 Compliance

The system adheres to applicable legal, privacy, and platform policies (e.g., data protection and WhatsApp API terms) to ensure compliant operation.

13. Delivery and Operations

13.1 Release plan

The project follows a phased release plan with incremental feature rollouts, testing, and feedback-driven improvements to ensure stable deployments.

13.2 CI/CD and rollback

The system uses automated CI/CD pipelines for building, testing, and deploying updates reliably and frequently.

13.3 Monitoring and alerting

Metric	Threshold	Alert to	Runbook
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Response Time (P95)	Backend Team	Backend Team	Scale service, investigate slow endpoints
API Error Rate	> 5% in 5 minutes	DevOps Team	Check logs, restart service, rollback if needed

13.4 Runbooks

- **API Latency:** check DB indexes → scale pods → revert change.
- **Error Spike:** inspect logs → roll back → create incident note.

13.5 Communication plan

- Standups Mon/Wed/Fri. Weekly status to mentor each Friday. Bi-weekly demo.

14. Risks and Mitigations

14.1 Risk heatmap

Risk	Probability	Impact	Score	Mitigation	Owner	Status
WhatsApp API downtime	Medium	High	12	Retries, fallback handling	Asar	Open
Payment gateway failures	Low	Medium	9	Retry logic, backup gateway	Krishan	Open
Data privacy breach	Low	Medium	6	Encryption, access control	Adeeb	Open

15. Research and Evaluation

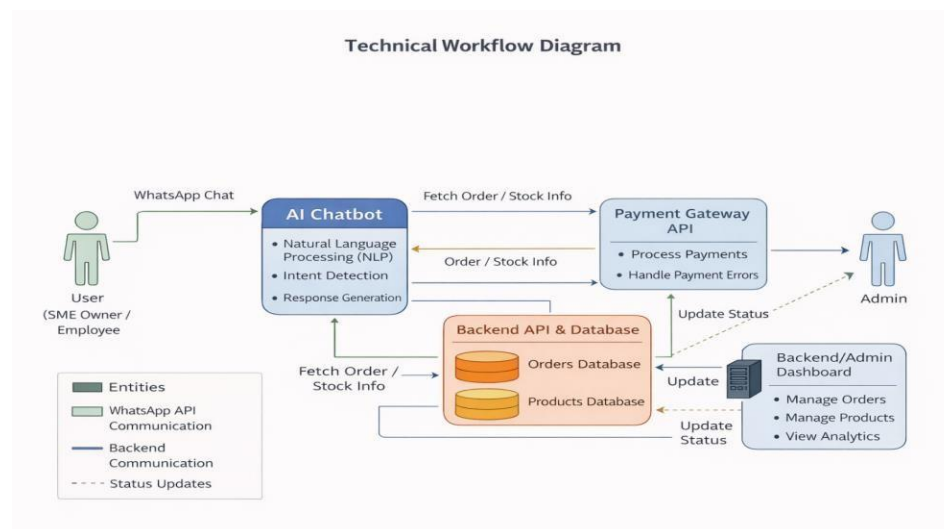
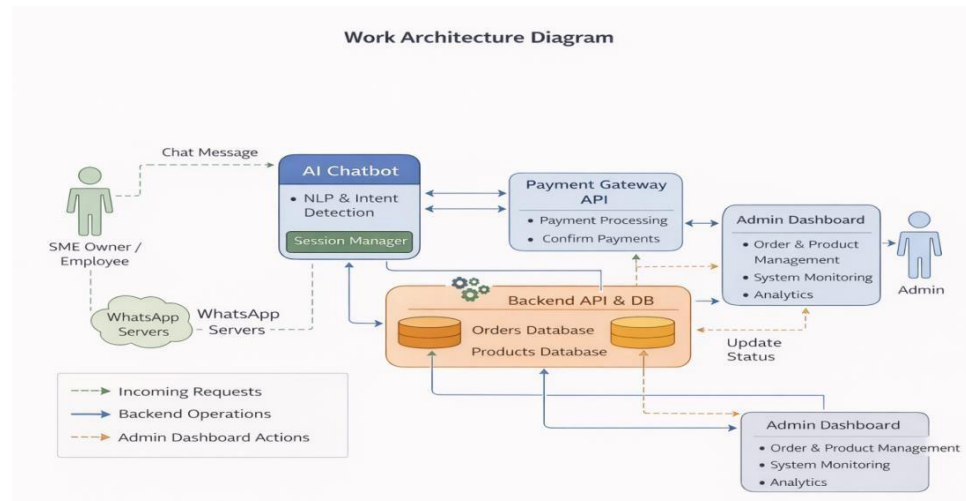
- Review existing WhatsApp automation tools and SME needs.
- Analyze multilingual NLP methods for intent detection.
- Measure response time and order success rate.
- Collect user feedback and monitor system reliability.

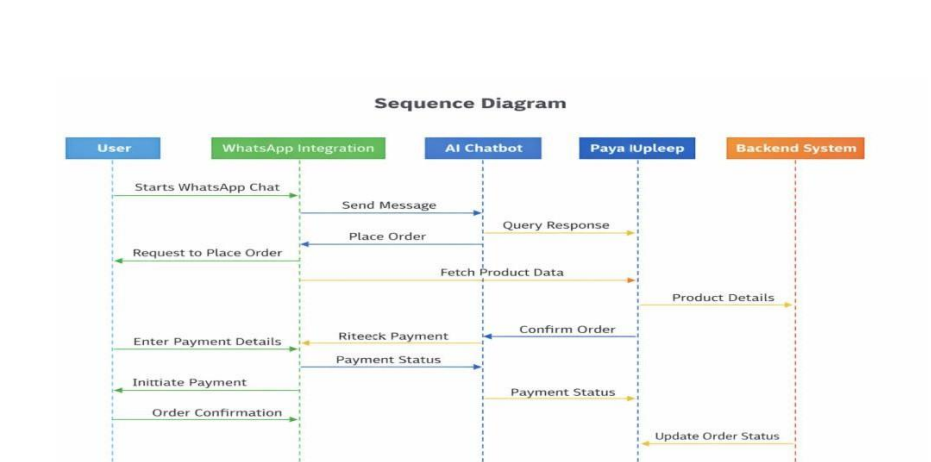
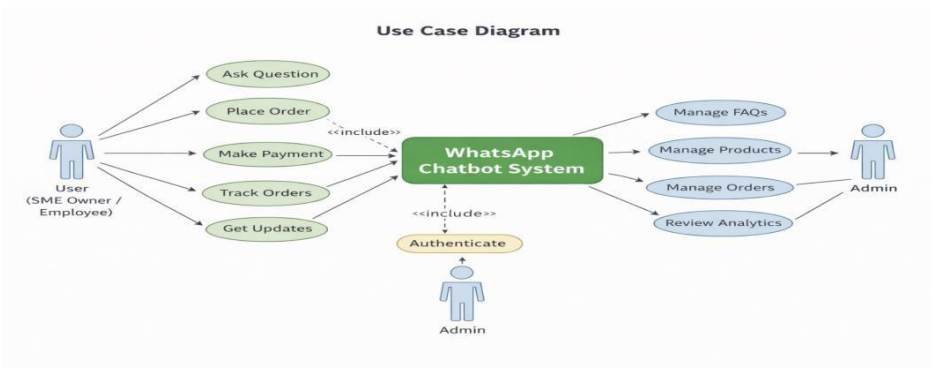
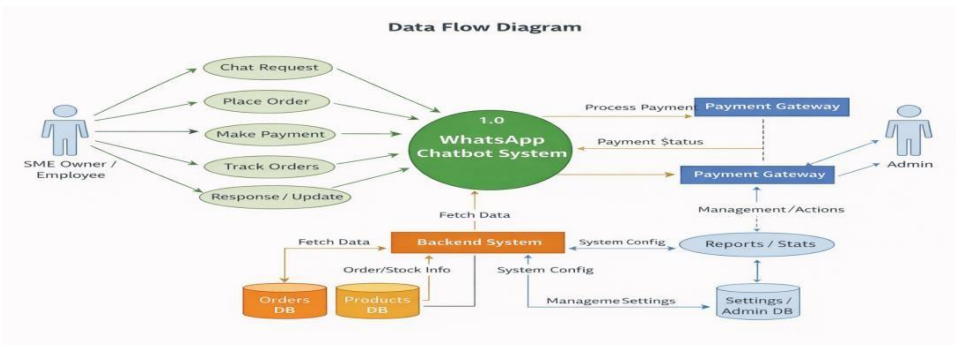
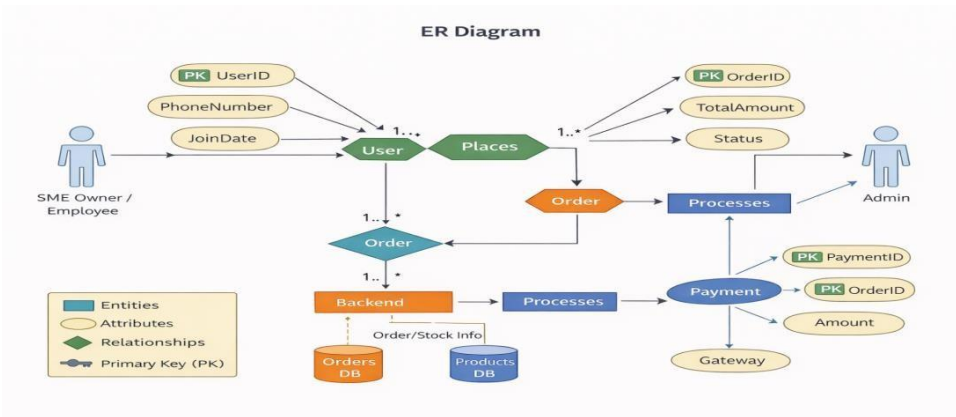
16. Appendices

- Sample API specifications and request/response formats

- UI wireframes and screen mockups
- Data dictionary and schema snapshots
- Test cases and sample datasets
- Deployment and configuration details.

17. Technical Workflow Diagrams





State Transition Diagram

