


# AI for Bharat Hackathon

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**Team Name : SmartFlow**

**Team Leader Name : Dhrumil Amin**

**Problem Statement : Bridging the Analog-to-Digital Gap for India's  
63 Million MSMEs Through Agentic AI**

## SmartFlow: India's First Self-Auditing Document Intelligence Platform

### The Problem We're Solving:

India's MSME sector contributes ₹36.5 trillion to GDP, yet 87% of field operations rely on handwritten documentation. Every day, contractors, electricians, and small business owners lose clients because their rough quotations look unprofessional and contain calculation errors.

### Our Innovation:

SmartFlow employs a breakthrough Dual-Agent AI Architecture. Instead of just scanning, two specialized AI agents work in sequence:

**Agent 1 (Perception):** Reads messy handwritten notes, understands spatial layouts, and extracts structured business data from chaotic formats—working on napkins, whiteboards, or torn paper.

**Agent 2 (Auditor):** Acts as a real-time compliance officer, verifying calculations, validating GST rates, and flagging inconsistencies before document finalization.

**Result:** A field worker photographs rough handwritten notes, and within 10 seconds receives a branded, GST-compliant, mathematically verified PDF ready to share via WhatsApp—transforming analog chaos into digital professionalism.

## How It Solves the Problem


**Speed:** Reduces 15-minute manual digitization to 10-second automated processing, enabling real-time deal closure at client sites.


**Accuracy:** Dual-agent verification eliminates human calculation errors. If handwriting recognition extracts "5" but the total doesn't add up, the Auditor Agent flags it for review.


**Professionalism:** Transforms napkin sketches into branded, GST-compliant invoices that increase payment conversion rates by making SMEs appear established and trustworthy.

**Accessibility:** Works on any surface (notebooks, whiteboards, receipts), supports Hinglish, and operates on low-bandwidth networks.

## Unique Selling Proposition (USP)

 **World's Only Self-Correcting Document AI:** Dual-agent architecture where Perception extracts and Auditor verifies—creating a fail-safe system unmatched by any competitor.

 **Built for Bharat:** Handles Hinglish naturally, understands Indian business practices (18% GST, MSME formats), and optimized for 3G/4G networks in field conditions.

 **Transparent AI:** Complete audit trail shows exactly what the AI changed and why, building user trust and meeting compliance requirements for tax filing.

## How SmartFlow is Different

Limitation of Existing Solutions	SmartFlow's Advantage
Google Lens/CamScanner: "Dumb OCR" that just reads text without context	<b>Semantic Intelligence:</b> Understands that "18%" means GST, recognizes Hinglish terms like "ka rate"
Invoice Generators: Require manual data entry into fixed templates	<b>Zero Manual Entry:</b> Photo-to-invoice in one tap, no typing required
Excel/Tally: Need users to perform calculations	<b>Autonomous Auditor:</b> AI catches math errors humans miss (e.g., if "5000 + 900 = 6000" but should be 5900)
No verification: Users responsible for accuracy	<b>Self-Correcting System:</b> Flags errors before client delivery

## List of Features

### 1. Smart Scan Engine

Multimodal Vision AI (Llama 3.2 90B) processes handwriting, printed text, and mixed layouts

Handles crossed-out text, margin notes, arrows, and spatial complexity that breaks traditional OCR

Zero-shot learning works without training on specific formats

### 2. Autonomous Auditor

Real-time mathematical verification: validates Subtotal + GST = Grand Total

GST compliance checker: validates GSTIN format, verifies 5%/12%/18%/28% tax rates

Logic validation: checks date formats, phone number patterns, address completeness

### 3. Confidence Heatmap UI

Color-coded visual feedback: Green (high confidence), Yellow (needs review), Red (error)

Tap-to-correct interface for low-confidence fields—fix errors in 2 seconds

Progressive enhancement: works offline, syncs data when connectivity returns

### 4. Brand Engine

One-time logo upload applies automatically to all future documents

Customizable color schemes match business identity

Professional templates: invoices, quotations, receipts, delivery notes

### 5. Auto-MOM (Minutes of Meeting)

Converts whiteboard/meeting notes into structured action items

Extracts task assignments, deadlines, and decision points automatically

Generates shareable PDF summaries with attendee tracking

### 6. Multi-Channel Distribution

WhatsApp Business API: Direct sharing to client contacts with read receipts

Email integration: Professional delivery with payment links

UPI/Razorpay integration: Embed payment QR codes in invoices (upcoming)

### 7. Audit Trail & Compliance

Complete history of AI modifications for transparency

Side-by-side comparison of original vs. corrected data

Export audit logs for GST filing and tax compliance

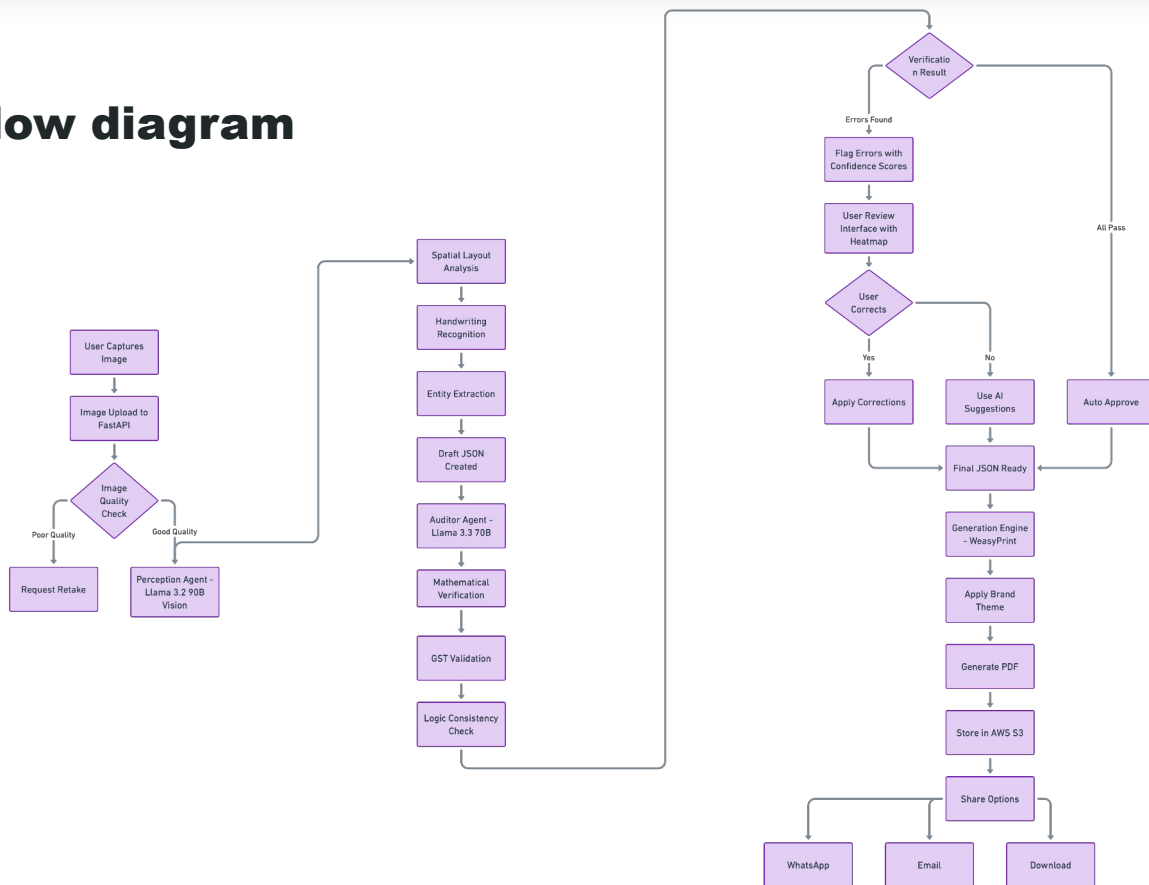
### 8. Offline-First Architecture

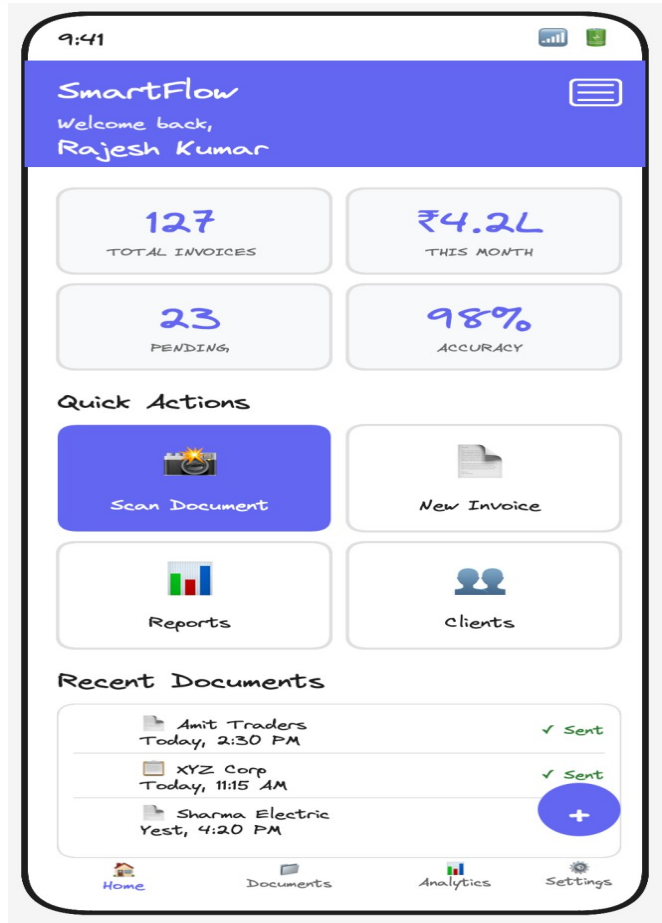
Capture and queue documents without internet

Automatic background sync when connectivity restored

Local storage ensures zero data loss

## Process flow diagram





## SmartFlow - Screen Flow

Main Journey:

**Dashboard** → View stats (127 invoices, ₹4.2L revenue, 98% accuracy), tap "Scan Document"

**Camera** → Capture handwritten document with guided viewfinder

**AI Processing** → Perception Agent extracts data, Auditor Agent verifies math/GST (10 seconds)

**Review & Edit** → Confidence heatmap shows high (green), medium (yellow), low (red) confidence fields; tap to correct

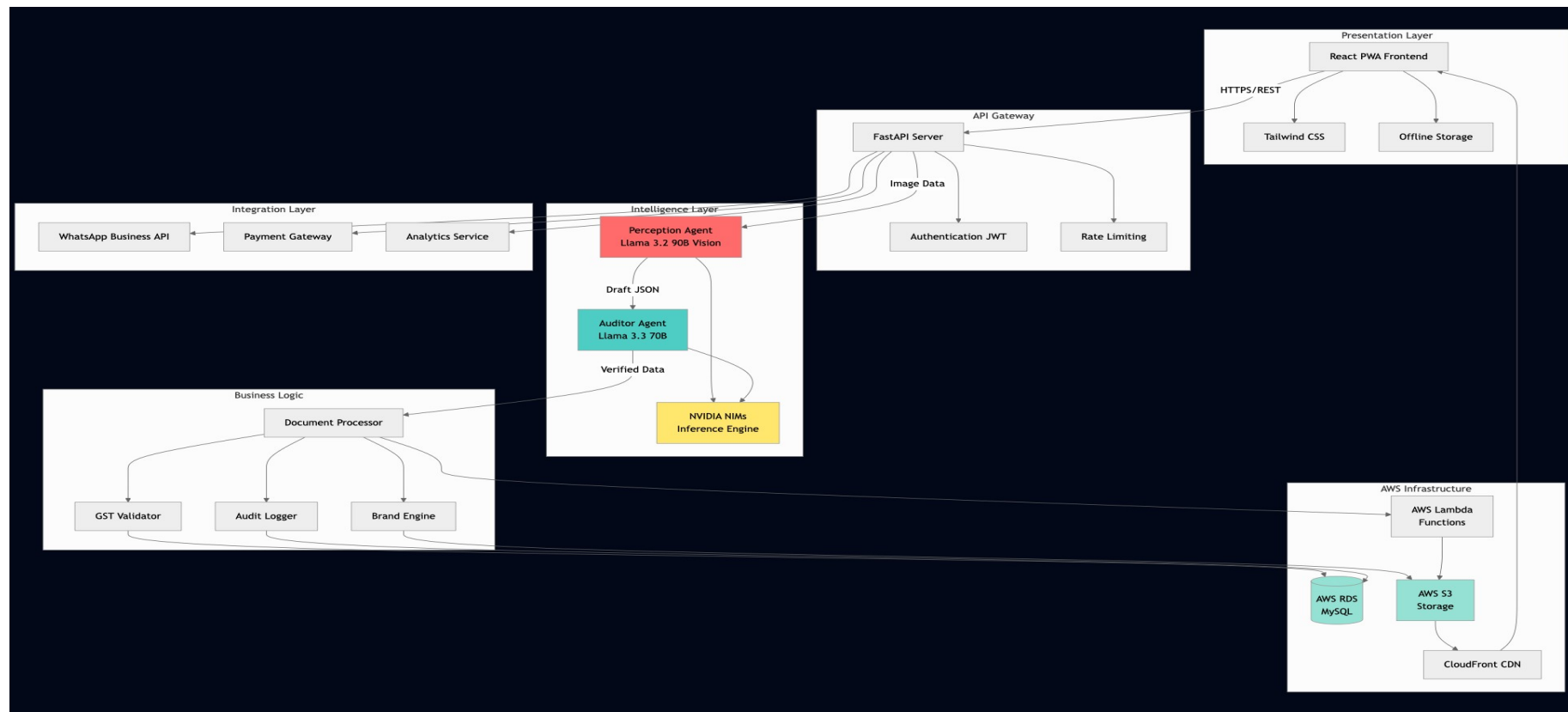
**Generate PDF** → Apply branding, create professional invoice

**Success Screen** → Share via WhatsApp/Email/Download

**Confirmation** → Return to updated dashboard with new entry

**Alternative flows:** Manual entry, view past documents, analytics, client management, settings access via bottom navigation.

# Architecture Diagram



## AI/ML Stack

**Llama 3.2 90B Vision-Instruct:** Multimodal perception agent for handwriting recognition and spatial understanding

**Llama 3.3 70B Instruct:** Reasoning agent for mathematical verification and business logic validation

**NVIDIA NIMs:** Inference optimization platform delivering 3x faster processing than standard GPU deployment

## Cloud Infrastructure (AWS)

**AWS S3:** Object storage for images (source) and PDFs (output) with 99.99% durability

**AWS RDS (MySQL 8.0):** Managed relational database for structured records and audit trails

**AWS Lambda:** Serverless compute for image preprocessing and webhook handlers

**AWS CloudFront:** Global CDN for sub-100ms latency across India

**AWS IAM:** Granular access control and role-based permissions

**AWS CloudWatch:** Comprehensive monitoring, logging, and alerting

## Frontend Technologies

**React.js 18:** Component-based UI framework with concurrent rendering

**Tailwind CSS:** Utility-first styling for rapid, responsive design

**Vite:** Next-generation build tool for instant hot module replacement

**Progressive Web App (PWA):** Installable, offline-capable mobile experience

## Backend Technologies

**Python 3.11:** Core application logic and AI orchestration

**FastAPI:** High-performance REST API framework with async support

**Pydantic:** Type-safe data validation and schema enforcement

**WeasyPrint:** HTML-to-PDF rendering engine for professional document generation

**Celery + Redis:** Distributed task queue for background processing



## Estimated implementation cost (optional):

### Total Investment Required: ₹20 Lakhs

Timeline: 8 months from start to 10,000 active users

### Revenue Model & Unit Economics

#### Pricing Tiers:

Free Plan: 50 scans/month (customer acquisition)

Pro Plan: ₹299/month – Unlimited scans, priority support, custom branding

Enterprise Plan: ₹2,999/month – Multi-user accounts, API access, dedicated support

#### Revenue Projections (Year 1):

Month 6: 500 free users, 50 Pro users → ₹14,950 MRR

Month 9: 2,000 free users, 200 Pro users → ₹59,800 MRR

Month 12: 8,000 free users, 600 Pro users, 5 Enterprise → ₹1,94,395 MRR

## Social Impact & National Benefit

### Financial Inclusion:

- 1) 5M+ informal businesses gain digital records needed for MUDRA loans and bank credit—unlocking ₹50,000Cr in previously inaccessible capital.
- 2) GST Compliance:
- 3) Reduces tax calculation errors by 90%, increasing government revenue collection by an estimated ₹2,000Cr annually from better compliance.
- 4) Women Empowerment:
- 5) 40% of home-based MSMEs are women-led (NSSO data). SmartFlow simplifies financial management for women entrepreneurs with limited accounting education.
- 6) Rural-Urban Bridge:
- 7) Tier 2/3 cities and rural areas gain access to professional invoicing tools previously available only to urban enterprises, democratizing business technology.
- 8) Employment Generation:
- 9) Target: Create 500 direct jobs (tech, support, sales) and enable 100,000+ MSMEs to grow revenue by 30%, generating 50,000 indirect jobs.

