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Feasibility Report

Auctora: A Smart Mobile-Based Online Auction System Using Flutter, Dart, Firebase, and Python with Integrated AI Recommendations and AR Previews

Software Engineering Laboratory

AUCTORA

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Team :

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Auctora: A Smart Mobile-Based Online Auction System Using Flutter, Dart, Firebase, and Python with Integrated AI Recommendations and AR Previews

Auctora is a smart, mobile-based online auction system designed to deliver real-time, secure, and engaging bidding experiences. Built using Flutter, Dart, Firebase, and Python, the platform supports dynamic auction types, integrates AI-driven recommendations, and provides Augmented Reality (AR) previews to enhance user decision-making. Auctora aims to modernize traditional auctions by making them more accessible, intelligent, and immersive through mobile-first innovation.

Objectives

- Develop a mobile-friendly auction platform using Flutter and Dart for cross-platform compatibility.
- Implement real-time bidding and notifications through Firebase for seamless user interaction.
- Integrate AI-based recommendation systems to personalize product suggestions for users.
- Ensure secure user authentication and data handling using modern encryption and backend practices.

Scope

- Supports multiple auction types including timed, live, and featured listings.
- Provides an admin dashboard for auction management, user monitoring, and analytics.
- Includes user roles such as bidders, sellers, and administrators with specific permissions.
- Allows in-app bidding, notifications, and payment integration for end-to-end auction participation.
- Scalable for future upgrades like blockchain integration, voice bidding, and NFT auctions.

Tech Stack

- **Frontend (Mobile App):**

Flutter – Cross-platform mobile UI framework

Dart – Programming language used with Flutter

- **Backend:**

Python – For business logic and AI model integration

Flask / FastAPI (optional) – Lightweight API development

- **Database & Cloud:**

Firebase Firestore – Real-time NoSQL database

Firebase Authentication – Secure user login and role management

- **AI & ML:**

Python Libraries – scikit-learn / TensorFlow for recommendation system

Pandas / NumPy – Data processing and analytics

- **Payment Integration:**

Razorpay / Stripe / Google Pay API – Secure in-app payment handling

End-to-End Development Workflow of Auctora

1. Requirement Gathering and Analysis

- Identify target users: bidders, sellers, and administrators.
- Define core features: real-time bidding, auction types, AI recommendations, AR previews, secure payments.
- Analyze existing auction platforms to determine gaps, pain points, and best practices.

2. Feasibility Study

- Technical Feasibility: Assess use of Flutter for UI, Firebase for real-time sync, and Python for AI.
- Economic Feasibility: Estimate cost for development, hosting, and expected returns.
- Operational Feasibility: Ensure intuitive UI/UX and accessibility across devices.
- Legal & Ethical Feasibility: Address user data protection, secure transactions, and fraud prevention.

3. System Design

- UI/UX Design: Create wireframes and interactive prototypes using Flutter.
- System Architecture: Define the interaction between mobile app, backend (Firebase & Python), and third-party services.
- Database Schema: Structure for user profiles, product listings, bids, payments, and auction history.

4. Development

- Develop frontend UI using Flutter & Dart for cross-platform compatibility.
- Build backend logic using Python, and integrate Firebase for database, authentication, and real-time sync.
- Implement AI recommendation engine using Python
- Integrate secure payment gateways like Razorpay or Stripe.

5. Testing

- Conduct unit testing for individual modules (e.g., bidding logic, user authentication).
- Perform integration testing to ensure smooth interaction between frontend, backend, and APIs.
- Execute user acceptance testing (UAT) to gather feedback from real users.
- Ensure security testing for data protection, fraud detection, and transaction safety.

6. Deployment

- Deploy the mobile app to Google Play Store and Apple App Store.
- Host backend services using Firebase Functions or Python-based API servers (e.g., on Heroku or AWS).
- Configure CI/CD pipelines for automated deployment and updates.

7. Maintenance

- Monitor system performance and user activity using Firebase Analytics or third-party tools.
- Fix bugs and address user-reported issues in a timely manner.
- Ensure continued compliance with security protocols and privacy regulations.

8. Updates & Enhancements

- Release feature updates based on user feedback (e.g., voice bidding, chat between users).
- Scale infrastructure for higher traffic and performance.
- Integrate emerging technologies like blockchain for transparent bidding or NFT support for digital assets.

Risks and Mitigation Strategies

Risk	Description	Mitigation Strategy
Security Breaches	Unauthorized access to user accounts or financial data.	Use secure authentication (Firebase Auth), encrypted storage, and conduct security audits.
Payment Failures	Errors or fraud during bidding or payment processing.	Use trusted payment gateways (e.g., Razorpay/Stripe), enable SSL, and maintain transaction logs.
Real-Time Sync Issues	Delayed or missed updates in live bidding or listings.	Use Firebase Realtime Database/Firestore with error handling and fallback logic.
AI Recommendation Bias	Inaccurate or biased product suggestions reduce user satisfaction.	Regularly retrain the model with diverse, up-to-date data; monitor for performance and fairness.
Data Loss or Corruption	Critical data such as bids or user info getting lost or corrupted.	Enable automated backups, implement strong data validation, and maintain recovery systems.

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