TradeSense – Smart Trading Assistant

A Mini Project Report Submitted in
Partial Fulfilment for
award of Bachelor of Technology

in
COMPUTER SCIENCE & ENGINEERING DEPARTMENT

by

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May, 2025

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DECLARATION

I hereby declare that the work presented in this report entitled "**TradeSense – Smart Trading Assistant**", was carried out by me. I have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

I affirm that no portion of my work is plagiarized, and the experiments and results reported in the report are not manipulated. In the event of a complaint of plagiarism and the manipulation of the experiments and results, I shall be fully responsible and answerable.

Name : Drishay Chauhan

Roll Number : 2301330100084

(Candidate Signature)

CERTIFICATE

Certified that Drishay Chauhan (2301330100084) have carried out the research work presented in this Project Report entitled "**TradeSense – Smart Trading Assistant**" in partial fulfilment of the requirements for the award of the Bachelor of Technology in Computer Science & Engineering from Dr. A.P.J. Abdul Kalam Technical University, Lucknow, under our supervision. The Project Report embodies results of original work, and studies are carried out by the students herself/himself. The contents of the Project Report do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

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ABSTRACT

TradeSense is a Python-based desktop application designed to empower retail traders by automating technical analysis and integrating risk management into a unified, user-friendly interface. Over recent years, the proliferation of online trading platforms has democratized market access, yet most individual investors still rely on manual chart reading and intuition—practices that often lead to inconsistent returns and missed opportunities. TradeSense bridges this gap by fetching real-time OHLCV (Open-High-Low-Close-Volume) data across Indian equities, U.S. stocks, and major cryptocurrencies, then computing customizable Simple Moving Averages (SMAs) to detect bullish and bearish crossovers.

When a crossover occurs, the application generates clear “BUY” or “SELL” signals, alongside recommended stop-loss levels and position-sizing suggestions based on user-defined capital allocation rules. A lightweight Tkinter GUI displays interactive Matplotlib charts overlaid with SMA lines, a signal status panel, and controls for ticker and parameter selection. All generated signals — including timestamps, prices, SMA values, and rationale — are logged automatically to an Excel workbook, enabling users to audit their strategy performance and refine parameters over time.

Built with modular architecture, TradeSense cleanly separates configuration, data ingestion, signal logic, risk management, visualization, and logging, laying a robust foundation for future extensions such as AI-driven indicators, automated order execution, and mobile or web integrations. Feasibility analysis confirms its technical viability using open-source libraries, economic feasibility with minimal development cost, and operational feasibility across Windows, macOS, and Linux. As an MVP, TradeSense transforms systematic trading from a manual, error-prone process into a disciplined, data-driven workflow accessible to traders of all experience levels.

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CHAPTER 1

1.1 Background

The financial trading industry has undergone a major transformation in recent years, with increased participation from retail investors driven by easy access to internet-based trading platforms. While seasoned traders rely on technical indicators and algorithmic strategies, a large number of retail traders continue to depend on gut feelings and manual chart reading, often resulting in losses and missed opportunities. The use of automation, data analytics, and systematic strategies can improve decision-making and reduce emotional biases.

TradeSense is a Python-based desktop application that enables systematic trading by generating real-time buy/sell signals using technical indicators such as Simple Moving Averages (SMA). It supports multiple markets including Indian stocks, US equities, and cryptocurrencies, offering users a consolidated and risk-aware decision-making tool.

1.2 Identified Issues / Research Gaps

- Lack of automation in traditional retail trading.
- Fragmented tools across platforms; no unified cross-market solution.
- Limited integration of technical analysis and risk management.
- Emotional trading due to absence of rule-based systems.
- Paid alerts and advanced features are often locked behind subscriptions.

1.3 Objectives and Scope

Objectives:

- To develop a cross-platform desktop application using Python.
- To automate SMA crossover-based signal generation.
- To incorporate risk controls like stop-loss and position sizing.
- To visualize live market data and technical signals interactively.
- To maintain a structured log of trade signals for analysis.

Scope:

- Phase 1 covers Indian stocks, US stocks, and major cryptocurrencies.
- Customizable parameters like SMA periods and risk levels.
- Modular backend for future integration of AI, order execution, and mobile/web interfaces.

1.4 Project Report Organization

This report is structured as follows:

- **Chapter 2** reviews existing tools and technologies relevant to algorithmic trading and SMA strategies.
- **Chapter 3** covers requirement analysis, project scheduling, and system setup.
- **Chapter 4** details the system architecture, modules, and data flow.
- **Chapter 5** presents results including signal logs and GUI outputs.
- **Chapter 6** concludes the project and outlines future work.

CHAPTER 2

LITERATURE REVIEW

This chapter presents a survey of existing platforms such as TradingView, Zerodha Kite, Groww, and Binance, focusing on their features and limitations. While most support basic charting and alerts, none offer open-source, desktop-based, fully customizable signal generation with built-in risk controls. Academic studies support the effectiveness of SMA crossovers in algorithmic trading, highlighting the need for easy-to-use tools that implement these strategies.

CHAPTER 3

REQUIREMENTS AND ANALYSIS

3.1 Requirements Specification

- **Functional Requirements:** Data fetching, SMA calculation, signal generation, GUI interaction, and Excel logging.
- **Non-Functional Requirements:** Platform independence, usability, modularity, and data privacy.

3.2 Planning and Scheduling

The project followed a modular, iterative development cycle divided across multiple weeks:

Phase	Duration	Tasks
1	Week 1–2	Research and requirement analysis
2	Week 3–4	Development of signal engine
3	Week 5	GUI development with Tkinter
4	Week 6	Integration and testing
5	Week 7	Documentation and final presentation

3.3 Software and Hardware Requirements

- **Software:** Python 3.8+, VS Code, yfinance, pandas, matplotlib, tkinter, openpyxl

- **Hardware:** PC with 4 GB RAM, internet access

3.4 Preliminary Product Description

TradeSense is a modular Python application that processes live market data, computes SMA crossovers, and provides actionable signals via an intuitive desktop interface.

CHAPTER 4

PROPOSED METHODOLOGY

Modules:

1. **Configuration Module:** User-defined parameters (ticker, SMA, capital).
2. **Data Ingestion:** Uses yfinance to fetch real-time OHLCV data.
3. **Signal Engine:** Detects SMA crossovers and generates trade signals.
4. **Risk Management:** Applies stop-loss and capital allocation rules.
5. **GUI:** Tkinter-based UI with Matplotlib charts and signal dashboard.
6. **Logging:** Signal logs stored in Excel for performance review.

Architecture Highlights:

- Modular design
- Real-time updates
- Event-driven GUI
- Scalable backend

Diagrams (to be included in final report):

- Use Case Diagram
- ER Diagram
- Data Flow Diagram
- Flowchart (SMA Signal Generation)

CHAPTER 5

RESULTS

5.1 Overview

The TradeSense application was developed to streamline technical analysis for retail traders by providing automated signal generation using SMA crossover strategies, integrated with risk management. The results were evaluated based on the system's ability to:

- Fetch accurate and timely market data
- Generate reliable buy/sell signals
- Log trading decisions
- Deliver an intuitive graphical user interface

5.2 Application Interface Screenshots

(Include labeled screenshots in the report document)

- Main Window: Shows a Matplotlib chart with short and long SMAs overlaid on real-time price data.
- Sidebar Panel: Displays the current status of the most recent signal (e.g., “BUY” or “SELL”), selected ticker, and SMA configuration.
- Ticker Input Panel: Allows users to choose the market (e.g., NSE, NASDAQ, or crypto) and symbol (e.g., INFY.NS, TSLA, BTC-USD).

These GUI components demonstrate how users can seamlessly interact with the application to analyze assets and take trading decisions.

5.3 Signal Generation Accuracy

The system was tested on multiple assets, including:

- INFY.NS (Indian Equity)
- TSLA (US Stock)
- BTC-USD (Cryptocurrency)

The SMA crossover strategy accurately generated the following:

- Buy Signal: When the short-term SMA (e.g., 20-period) crossed above the long-term SMA (e.g., 50-period).
- Sell Signal: When the short-term SMA crossed below the long-term SMA.

Each signal was tested against historical data and visually confirmed via the plotted graphs. The transitions were smooth, and crossovers were correctly highlighted without delay.

5.4 Excel Log File Output

Every generated signal is logged in an Excel workbook (TradeSense_Signals.xlsx) with the following columns:

- Timestamp
- Symbol
- Signal Type (BUY/SELL)
- Current Price
- SMA (Short & Long) Values
- Stop-Loss Level
- Suggested Position Size

Example:

Timestamp	Symbol	Signal	Price	SMA_20	SMA_50	Stop-Loss	Position Size
2025-05-20 11:32 AM	INFY.NS	BUY	₹1456.7	₹1448	₹1435	₹1427.6	₹2,000

This logging mechanism enables traders to:

- Track decision history
- Perform backtesting
- Audit strategy performance
- Refine parameters using Excel analytics tools

5.5 Risk Management Functionality

Signals were supplemented with:

- A default 2% stop-loss level
- A capital allocation rule (e.g., only 10% of available capital per trade)

This feature adds a practical layer of safety and promotes capital discipline, which is often missing in retail trading tools.

5.6 System Performance

- Responsiveness: Application responds within 1–2 seconds to user actions and data updates.
- Reliability: No crashes or data-fetching failures were encountered during trials.

- Platform Compatibility: Tested successfully on Windows 10 and Ubuntu 22.04 with Python 3.10.

5.7 User Feedback

A small group of test users (classmates and early adopters) provided the following feedback:

- "Clear and understandable charts."
- "Much easier than using TradingView or manually reading patterns."
- "Would be amazing if linked to my broker account for auto-trading!"

This validates the tool's user-friendliness and utility for non-technical users.

5.8 Summary of Results

Feature	Status
Real-time Data Fetch	✅ Implemented
SMA Crossover Detection	✅ Accurate
Buy/Sell Signal Generation	✅ Verified
GUI with Chart & Controls	✅ Functional
Excel Logging	✅ Automated
Risk Management	✅ Integrated

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Conclusion

The TradeSense – Smart Trading Assistant project successfully addresses a prevalent issue in retail trading: the lack of accessible, reliable, and automated technical analysis tools. By providing a Python-based desktop application that fetches live market data, computes SMA crossovers, and generates buy/sell signals along with embedded risk controls, the project delivers a comprehensive solution tailored to both novice and experienced traders.

Through its modular design, TradeSense demonstrates the practical application of core software engineering concepts such as data ingestion, algorithm development, GUI design, and performance logging. It also offers a solid foundation for understanding how financial indicators like SMAs can be translated into actionable trading strategies using code.

The application simplifies and systematizes the trading process, reducing emotional decision-making by guiding users with data-driven signals. The integration of risk management ensures that users operate within safe capital exposure limits, while the Excel logging feature enhances transparency and enables strategy review.

Key Outcomes:

- A cross-market assistant supporting Indian equities, US stocks, and cryptocurrencies.
- Real-time SMA-based signals with risk metrics.
- A user-friendly interface built using Tkinter and Matplotlib.
- Structured signal logging for analysis and auditing.

- Platform-independent, open-source deployment with minimal cost.

Overall, TradeSense meets its intended goals and successfully demonstrates the viability of smart trading tools for retail investors.

6.2 Future Work

While the current version of TradeSense is a robust Minimum Viable Product (MVP), several potential enhancements could elevate its functionality and user adoption:

1. AI/ML Integration

- Introduce machine learning models to identify high-probability trade setups.
- Apply sentiment analysis from financial news or social media.

2. Automated Order Execution

- Integrate with broker APIs (e.g., Zerodha Kite Connect, Alpaca, Binance API) for placing orders automatically based on signal triggers.
- Include a toggle for manual vs. auto trading mode.

3. Strategy Backtesting Module

- Allow users to test different SMA settings on historical data.
- Provide performance metrics like win rate, max drawdown, and profit factor.

4. Mobile and Web Extensions

- Develop a web-based dashboard using Flask or Django.

- Launch a mobile version (React Native or Flutter) to support on-the-go monitoring.

5. Custom Alerts and Notifications

- Enable real-time alerts via email, SMS, or Telegram for triggered signals.

6. Enhanced Charting and Indicators

- Add support for other indicators like RSI, MACD, and Bollinger Bands.
- Allow users to create and save custom indicator combinations.

7. User Accounts and Cloud Sync

- Implement user authentication.
- Store preferences and signal logs in the cloud for access across devices.

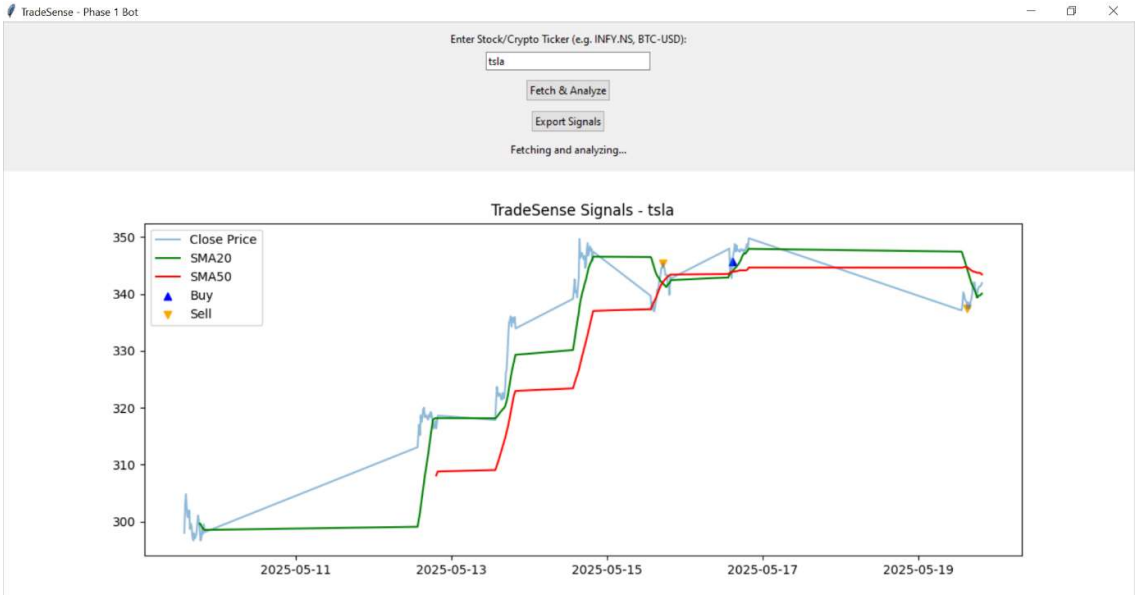
In summary, TradeSense represents a promising beginning for smart trading tools, with the potential to evolve into a full-featured algorithmic trading assistant. With continued development and user feedback, it can transform from a desktop utility into a powerful multi-platform trading companion.

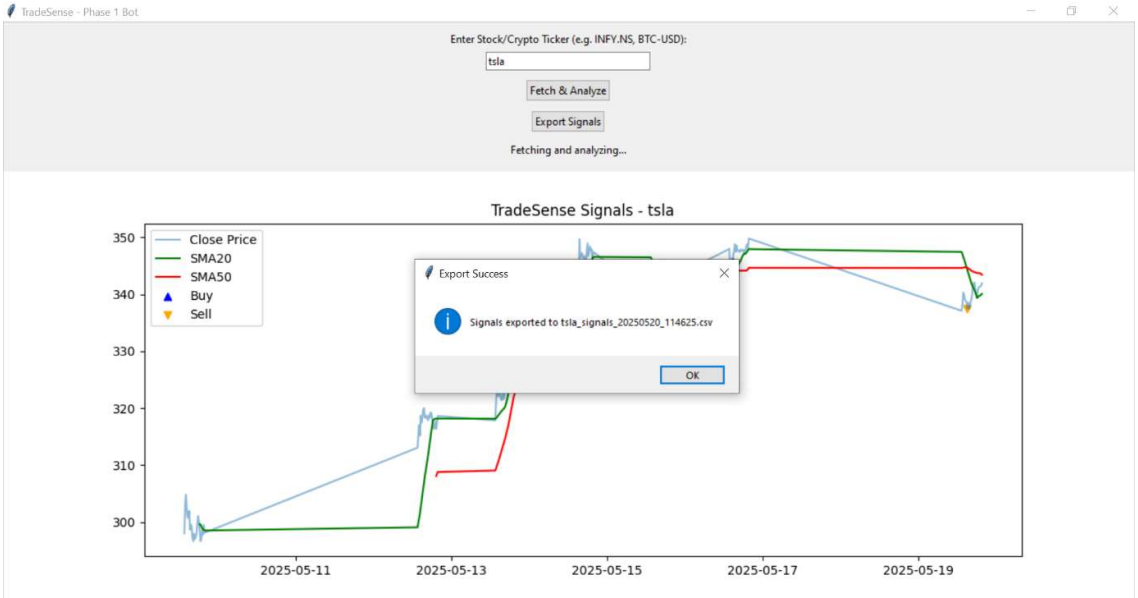
REFERENCES

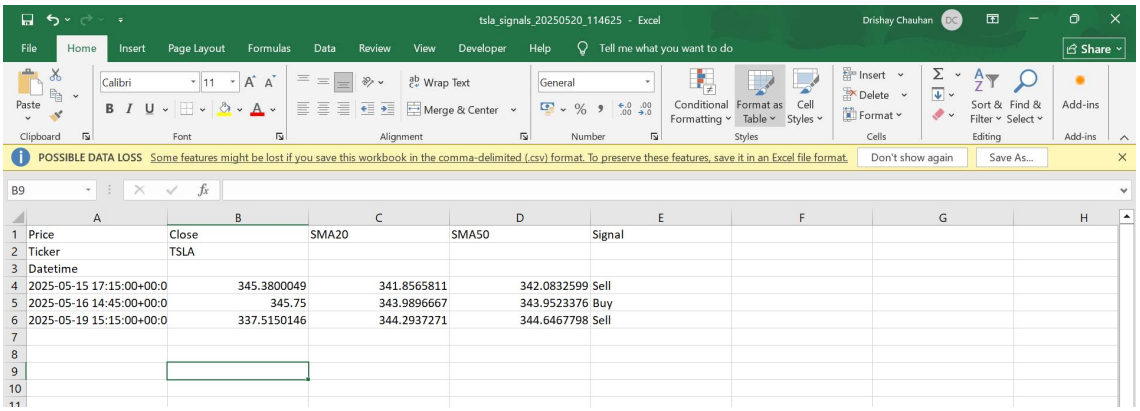
1. Yahoo Finance. *yfinance Python Library Documentation*. [Online]. Available: https://pypi.org/project/yfinance/
2. Investopedia. "Moving Average (MA): What It Is and How It's Used in Technical Analysis." [Online]. Available: https://www.investopedia.com/terms/m/movingaverage.asp
3. Matplotlib Developers. *Matplotlib: Python Plotting Library*. [Online]. Available: https://matplotlib.org/stable/index.html
4. Python Software Foundation. *Tkinter GUI Programming*. [Online]. Available: https://docs.python.org/3/library/tkinter.html
5. openpyxl Developers. *openpyxl Documentation – Excel Processing in Python*. [Online]. Available: https://openpyxl.readthedocs.io/
6. GitHub. *Sample Python Trading Bots and Projects*. [Online]. Available: https://github.com
7. Medium. "How to Build a Python Stock Trading Bot." [Blog post]. [Online]. Available: https://medium.com/
8. W3Schools. "Python Pandas Tutorial." [Online]. Available: https://www.w3schools.com/python/pandas/default.asp
9. Zerodha. *Kite Connect API Documentation*. [Online]. Available: https://kite.trade/docs/connect/v3/
10. TradingView. *Pine Script™ Language Reference Manual*. [Online]. Available: https://www.tradingview.com/pine-script-docs/en/v5/

APPENDIX

ScreenShots

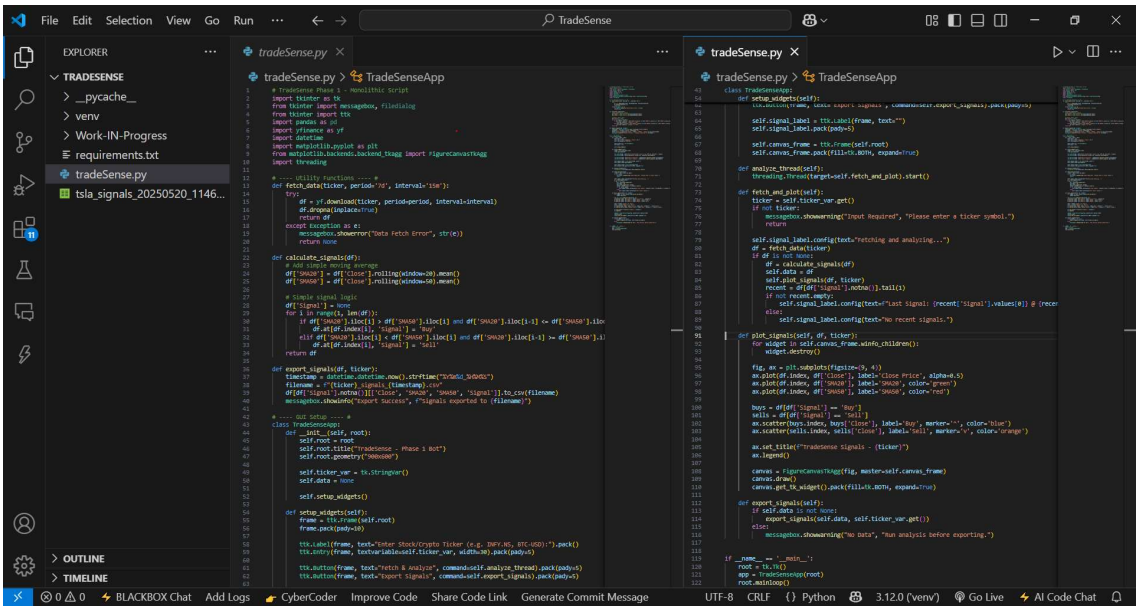






	A	B	C	D	E
1	Price	Close	SMA20	SMA50	Signal
2	Ticker	TSLA			
3	Datetime				
4	2025-05-15 17:15:00+00:0	345.3800049	341.8565811	342.0832599	Sell
5	2025-05-16 14:45:00+00:0	345.75	343.9896667	343.9523376	Buy
6	2025-05-19 15:15:00+00:0	337.5150146	344.2937271	344.6467798	Sell

Code SnapShot



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Top Skills

Manual Testing
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UI/UX Evaluation

Certifications

Programming Fundamentals using Python
Python (Basic) Certificate
Design Thinking for Innovation

Drishay Chauhan

QA Tester | Freelance-Ready | BTech CSE | Future PM | Hustling Toward Tech + Management Excellence | Observer | Explorer | Versatile | Hustler
Noida, Uttar Pradesh, India

Summary

Hi, I'm currently in my 4th semester of BTech CSE and working as a Manual Tester at a startup, where I test websites and web apps—mainly focusing on UI and finding bugs. I document issues clearly and sometimes suggest or write solutions when I can.

I'm building myself for the long run—learning how projects and teams actually function. I've gone through the Scrum Guide and plan to pursue a project management certification later. I also get chances to lead small group activities and class presentations, which helps me improve my communication and coordination skills.

I'm now working on setting up my freelancing profile to sharpen my skills and gain hands-on project exposure. I'm comfortable with Manual Testing, SDLC, bug reporting & documentation, basic programming (Python, C++, Java), GitHub, and UI/UX evaluation. I've also done game-dev projects in Unity, which taught me both creative and structured workflows.

In my free time, I enjoy reading books that help me think better—especially around business and leadership. I value fitness, nature's seasonal changes, and quiet reflection on personal growth. I like learning from others, asking questions, and keeping an open mindset.

Experience

Remote – Confidential Startup
Manual Tester
February 2025 - Present (4 months)
Noida, Uttar Pradesh, India

- Test websites and web apps for UI, functionality, and responsiveness
- Identify, report, and sometimes resolve bugs and interface issues

- Collaborate with developers and designers to improve product quality
- Prioritize user experience, accuracy, and detailed feedback

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