XAUUSD Automated Trading Bot: Project Report

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Abstract

This report presents the design, implementation, and performance of an automated XAUUSD trading bot developed for MetaTrader5 (MT5). The system employs multi-timeframe technical analysis and strict order flow rules, achieving a 65% accuracy for buy trades in real account testing. Custom prompts drive feature extraction and signal generation, ensuring high-probability trades. The bot operates sequentially, integrating robust risk management and error handling for reliable performance.

1 Introduction

The XAUUSD Trading Bot is an automated system designed to trade gold (XAUUSD) on the MetaTrader5 platform. Developed by Muhammad Abdullah (344) and Muhammad Ahmad (338), the bot leverages advanced technical analysis across multiple timeframes (D1, H4, H1, M30, M15, M5) and language model-driven decision-making to generate buy signals with a 65% win rate, validated through real account testing. This report outlines the system's architecture, prompt engineering, execution flow, and performance metrics.

2 System Architecture

The bot operates sequentially, ensuring a structured pipeline for data retrieval, analysis, and trade execution. Key components include:

- **MetaTrader5 Integration**: Retrieves XAUUSD price data and executes trades.
- **Technical Indicators**: RSI, EMAs (20, 50, 200), and ATR for market analysis.
- **LangChain with ChatGroq**: Processes custom prompts for feature extraction and signal generation.
- **Multi-Timeframe Analysis**: Aligns trends across D1 to M5 for confluence.

2.1 Sequential Execution Flow

The bot follows a sequential workflow:

1. Initialize MT5 and fetch XAUUSD data for all timeframes.
2. Calculate technical indicators (RSI, EMAs, ATR).
3. Format data for language model input.
4. Extract technical features using the feature prompt.
5. Generate trading signals using the signal prompt.
6. Output results and wait 30 minutes before the next cycle.

Error handling ensures MT5 shutdown on failures, with retries every 60 seconds.

3 Prompt Engineering

The bot uses two meticulously designed prompts to drive its analysis and trading decisions.

3.1 Feature Extraction Prompt

The feature prompt directs the language model to perform comprehensive multi-timeframe analysis, identifying:

- Market structure and dominant trends across D1 to M5.
- Key support/resistance levels and supply/demand zones.
- Order blocks, Fair Value Gaps (FVGs), and liquidity zones.
- RSI, moving averages, and volume analysis.
- Scalping opportunities on M5 with precise entry timing.

The prompt prioritizes higher timeframe structure (D1, H4) for context while using M5 for entry precision.

3.2 Trading Signal Prompt

The signal prompt enforces strict order flow rules, requiring:

- Trend alignment across at least 4/5 timeframes.
- Confluence of order blocks and FVGs within $\pm 0.2\%$ price zones.
- Liquidity sweeps, Break of Structure (BOS), and RSI divergence.
- M5 candlestick pattern confirmation for scalping entries.
- Risk parameters: 1% max risk, 1.5x ATR stop loss, minimum 1:2 RR, spread < 35 points.

If any condition fails, a "NO TRADE" signal is returned with the specific violation.

4 Implementation Details

The bot is implemented in Python, utilizing:

- `MetaTrader5`: For market data and trade execution.
- `pandas`, `numpy`: For data processing and indicator calculations.
- `langchain-groq`: For LLM integration with the DeepSeek-R1 model.

4.1 Code Structure

The `XAUUSDTradingBot` class encapsulates the core functionality, with methods for:

- Initializing MT5 and the language model.
- Retrieving and processing market data.
- Calculating indicators and formatting data.
- Running feature extraction and signal generation.

4.2 Error Handling

The system includes robust error handling:

- Validates MT5 initialization and data retrieval.
- Ensures proper LLM response handling.
- Retries failed operations after 60 seconds.

5 Performance Evaluation

The bot was tested on a real account with a balance of 1789 cents. Key results include:

- **Buy Trade Accuracy**: 65% win rate, validated through real account testing.
- **Risk Management**: 1% max risk per trade, stop loss at 1.5x ATR, minimum 1:2 RR.
- **Spread Control**: Trades only when spread < 35 points.

The 65% accuracy reflects the effectiveness of multi-timeframe confluence and strict entry criteria.

6 Contributions

- **Muhammad Abdullah (344)**: Designed the system architecture, implemented MT5 integration, and developed the feature extraction prompt.
- **Muhammad Ahmad (338)**: Crafted the trading signal prompt, implemented indicator calculations, and conducted real account testing.

7 Conclusion

The XAUUSD Trading Bot, developed by Muhammad Abdullah (344) and Muhammad Ahmad (338), is a robust automated trading system achieving a 65% buy trade accuracy in real account testing. Its sequential execution, advanced prompt engineering, and strict risk management ensure reliable performance. Future enhancements could include adaptive risk parameters and additional technical indicators.

8 References

- MetaTrader5 Python Documentation: `https://www.mql5.com/en/docs/integration/python_metatrader5`
- LangChain Documentation: `https://python.langchain.com/docs/`