Polished title

OrVisZM3P: Bridging MetaTrader's (MT5) MetaQuotes Language's (MQL5) API with ZeroMQ for Real-Time Microsecond Bid/Ask Orderflow Data Extraction and Visualization Across Rust, Go, C++, Python, Java, C#, and NodeJS

Or — orderflows in bid/ask form
Vis – Visualization after microsecond extraction
Z - means ZeroMQ binding to bridge between the MQL5 API to another programing languages
M - means MetaTrader's (MT5) MetaQuotes Language's (MQL5)
3 - three combination (eg. rust + zmq + mql5)
P - the programming languages (Rust, Go, C++, Python, Java, C#, and NodeJS)

Authors

Albeos, Rembrant Oyangoren
Independent Researcher

Draft. Overview Title

Binding MT5's MQL5's API: Exploiting Real-time Microsecond live trading data from MetaTrader (MT5) using ZeroMQ bound to MetaQuotes (MQL5) Expert Advisor, bridging 3 combinations to programming languages of either such as Rust, Go, C++, Python, Java, C#, NodeJS to extract and visualize developing Bid/Ask Orderflows in an external UI chart application.

MT5Flow

Exploiting Real-time Microsecond Bid/Ask Orderflows data from MetaTrader 5 Using Rust, ZeroMQ, and MetaQuotes Language (MQL5)

At the time of writing, there is no publicly known approach using Rust, ZeroMQ, and MetaQuotes Language (MQL5) combination to exploit real-time microsecond bid/ask orderflows data from MetaTrader 5, before this implementation. This study will show a new approach to extract and visualize the developing microsecond bid/ask formation with a low-latency phase. We used MT5's API to fetch real-time live trading data, bound to ZeroMQ & Expert Advisor MQL5 integration, and Rust as an external processor to generate fast-phase developing bid-ask orderflow visualization through a simple chart.

At the time of writing, it's really hard to find benchmark research papers since no one is interested in binding MT5's API using a ZMQ bridge to other programming languages such as Rust, Go, C++, and Python (creating a combination of 3). We search across the internet using 9 AI leading platforms, namely Grok, Gemini, Claude, ChatGPT, MSCopilot, Perplexity, Baidu

(Ernie Bot), DeepSeek, and Qwen (1, 2, 3, 4, 5, 6, 7, 8, 9). Some of the AI's responses end up hallucinating, suggesting a combination of 2, and not the strictly 3, but later been clarified and confirmed that there are no public projects yet to implement before this. We also searched across four scholarly libraries, such as Arxiv, Google Scholar, SSRN, and Baidu 学术 (10, 11, 12, 13). The lack of literature suggests that this study's approach (specifically using MT5's MQL5 API to fetch live-trading datafeed from its connected Broker) is bound to ZMQ, bringing the other programming languages are not that popular and not well explored.

Detailed ZMQ (The DLLs require that you have the latest Visual C++ runtime (2015).) binding to MQL - https://github.com/dingmaotu/mql-zmq (14)
ZMQ binding to Rust - https://github.com/zeromq/zmq.rs (15)
ZMQ binding between MQL and JavaScript - https://github.com/EricSchles/bindings-mql4-5 (16)

We used this repository to train (be-aware) locally our Gemini Pro inside Google Antigravity to analyze and have a benchmark of what has been proven to work so far. This approach is similar to training LLMs using open-source repositories to generate source code. Such as Proposes *RepoMark*, a framework to audit whether a code repository has been used in training a code large language model, addressing transparency and license compliance concerns in training on open-source projects (17). Investigates whether a given model has *actually used* specific code from public repositories in its training data via membership inference, providing methods for detecting code inclusion (18). By being mindful of regulatory concerns (19) and following practices (20). With that being said, Gemini Pro already has access to the internet.

MetaTrader 5 (MT5)

MetaTrader 5 (MT5) is a multi-asset trading platform developed by MetaQuotes Software and launched in 2010. It is designed to facilitate trading in various markets, including Forex, stocks, futures, and CFDs. (21). It supports connecting to a regulated broker (22)

MetaQuotes Language 5 (MQL5) MQL5 Reference – How to use algorithmic/automated trading language for MetaTrader 5 (23)

MQL5 API Common APIs - MQL5 Programming for Traders (24)

Methodology
Combination of

A	Rust, ZeroMQ, and MQL5	RuZM
B	Go, ZeroMQ, and MQL5	GuZM
C	C++, ZeroMQ, and MQL5	C+ZM
D	Python, ZeroMQ, and MQL5	PyZM
E	Java, ZeroMQ, and MQL5	JaZM

F	C# , ZeroMQ, and MQL5	C#ZM
G	Node.js, ZeroMQ, and MQL5	NoZM

Make a software application for those combinations and make a simple bid/ask exploit. Download CSV files, run all software at once using the same ZMQ socket. Compare using a correlation matrix to see how well (in %) does the developing bid/ask formation correlate to each other.

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Too many API-access-database Projects

Both historical and recent practices fetch trading-data from various platforms to develop trading strategies. These platforms with accessible APIs are not designed for trading purposes but mainly to analyze portfolios and trading trends, namely *Yahoo Finance & Twitter*'s data is used for Long-Short Term Memory neural network (LSTM) modeled time series analysis (1), *Alpha Vantage* for Naive Bayes machine learning algorithm for predicting stock prices (2), *Finnhub* is used as part of a large-scale Financial News and Stock Price Integration Dataset (FNSPID) model for time series financial analysis (3), *Massive* (was Polygon.io) to aggregate news articles (4)*, IEX Cloud* to retrieve real-time stock data to predict stock prices (5), *SimFin's* balance sheet data for machine learning fundamental analysis to predict stock prices (6), *Quandl's* dataset as a part of alternative data and sentiment analysis (7). And consideration of the cryptocurrency side, namely *CoinGecko's* databases (8), *CryptoCompare's* datasets for real-time data architecture (9), *BraveNewCoin's* daily prices datasets for analysis of the entry and exit dynamics of the cryptocurrency market (10), *Twelve Data's* datasets for quantitative analysis for Stocks and Cryptocurrencies (11), *Messari's* datasets for style investing (12), Glassnode's dataset for Bitcoin price direction prediction using on-chain data and feature selection (13). Some of these platforms do offer forex-based datasets, which are also used for studies, such as

from *Yahoo Finance's* datasets for forecasting with feature-augmented multivariate LSTM models (14), *Alpha Vantage's* dataset for trend prediction using machine learning (15), Finnhub's API for

And many more platforms with API access for trading datasets. Although it is widely used for trading analysis and machine learning modeling, those platforms do not offer a trade-exectable APIs. Scholars are studying to create strategies, but they are not mainly for live deployment purposes, that is why we argue that thats the reason why there models may fail in live endironment since their datasets itself for modeling/practing doesnt have trade-exucutable API. If we

Financial Modeling without the aim to implement it on live environment sucks.

Trading with two completely different platforms, one connected with the dataset API and one with connected has trade-executin API, may cause mispriceing ot mis alignment of prices. It was forecast and perfectly fine to have a stoploss of 2R, but the broker had the ad ada dip a few ticks below what was in the chatting platform.

2 arguments: (1) They conduct model construction using datasets from platforms that don't have trade-executable API support, meaning they just model and never meant to make it implement on live. (2) Modeling using two completely different platforms, one is sfor charting and one for trade execution, may cause a misprice alignment that may lead to unfortunate losses even if run in real-time. Was modeled perfectly, but failed with a few ticks on live.

The great example of this is TradingView same assestr

by also implementing TN the model in live environment, yhen we must use platforms that offers both API for datasets and API for trade-exucution. For instance, Metatrader5 (MT5)

There are many scholarly studies besides what was mentioned above, with the use of platforms to access financial datasets to model their trading strategies, but the use of those platforms is almost irrelevant for 'live-trading', at least for lower timeframe trading (we are not specifically referring to HFTs trading). Its magnificent to design these machine learning based technologies but they often fail in live trading, simply because they analyze inside a dataset providers or chart platforms and if they place a trade from a completely different place, then there would be a mispricing alignment. Nnot only that,

Unlike Binance, which has an externally accessible API for trade execution, brokers such as vlavlalvalvllavlalvalvlav doesnt duppoert that kind of API. But Meratrader addressthge issue. Metra trader has limited use as its native language was MWLr built after cc++, as of now at the time of writing, MT5 API is not that popular in scholarly studies for rkerhk, some claimed that it's due to old-like version bit havent, this study will ima a unique application of exploiting data. Less popular is the use of the MetaTrader5 Python library for developing trading studies.

Does not API-access-database Projects

Meanwhile, some brokers do not offer public external APIs for feature-modeling or algorithmic trading but only are accessible to private entities, such as Exness

[1] Baku, Azerbaijan. (2023). Predicting Financial Market Trends using Time Series Analysis and Natural Language Processing. https://arxiv.org/abs/2309.00136

[2] Kunal Raut, Pinak Kasture, Chetan Gosavi, Tanmay Deshpande. (2022). Stock Market Prediction using Alpha Vantage API and Machine Learning Algorithm. https://www.irjet.net/archives/V9/i5/IRJET-V9I5162.pdf

[3] Zihan Dong, Xinyu Fan. (2024). FNSPID: A Comprehensive Financial News Dataset in Time Series. https://arxiv.org/html/2402.06698v1

[4] Marian Pompiliu Cristescu , Dumitru Alexandru Mara,* , Raluca Andreea Nerișanu , Lia Cornelia Culda and Ionela Maniu. (2023). Analyzing the Impact of Financial News Sentiments on Stock Prices—A Wavelet Correlation. https://doi.org/10.3390/math11234830

[5] Anurag Gupta, Dr. Vishal Shrivastava, Dr. Akhil Pandey, Er. Ram Babu Buri. (2025). Real-Time Stock Market Data Analysis and Visualization Using Power BI. https://ijrpr.com/uploads/V6ISSUE5/IJRPR45525.pdf

[6] AkshayKhanapuri, NarayanaDarapaneni, AnweshReddyPaduri. (2024). Utilizing Fundamental Analysis to Predict Stock Prices. https://doi.org/10.4108/airo.5140

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[9] Adrian Barradas, Acela Tejeda-Gil, Rosa-María Cantón-Croda. (2022) Real-Time Big Data Architecture for Processing Cryptocurrency and Social Media Data: A Clustering Approach Based on k-Means. https://doi.org/10.3390/a15050140

[10] David Vidal-Tomás. (2021).The entry and exit dynamics of the cryptocurrency market. https://doi.org/10.1016/j.ribaf.2021.101504

[11] Akshat Sharma; Ashtha Goyal; Durgaprasad Gangodkar; Yogesh Lohumi. Quantitative Analysis for Stocks and Cryptocurrencies using Python. (2024) https://doi.org/10.1109/ICEECT61758.2024.10739272

[12] Fatima Abd Rabbo, Mustafa Disli. (2025). Style investing and return comovement in the cryptocurrency market. https://doi.org/10.1016/j.ribaf.2025.102949

[13] Ritwik Dubey, David Enke. (2025) Bitcoin price direction prediction using on-chain data and feature selection. https://doi.org/10.1016/j.mlwa.2025.100674

[14] Enhancing forex market forecasting with feature-augmented multivariate LSTM models using real-time data. (2025) https://doi.org/10.1016/j.knosys.2025.114500

There is no problem with using platforms that offer an API to access financial datasets, which give data for modeling trading strategies. On the other hand, if we were planning to elevate the modeling approach, then we would also consider making it compatible in a live environment. Simply by using one platform that offers both an API for dataset access and an API for trade-execution. One example of that is in Binance (1). Some studies are dedicated to designing both financial modeling and live implementation using Binance APIs, such as a pipeline using PostgreSQL for historical data storage, Redis for real-time caching of Binance WebSocket streams, and the Binance REST API for trade execution (2), a backtesting and portfolio optimization to live trading results on Binance Futures with a pipeline consists of universe selection, alpha backtesting, volatility aware portfolio optimization, and dynamic drawdown-based risk management (3), FinRL is an open-source deep reinforcement learning framework that acts as a full pipeline from strategy design to simulated trading and can interface with live trading APIs for execution (4), and more. Despite that, Binance does not offer traditional forex trading. Instead, it provides a crypto-oriented approach to forex through several

instruments. Binance allows trading in stablecoins such as USDT, BUSD, and USDC, which are pegged to the US dollar (5).

On the other hand, thee

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[5] BinanceUS. (2026). Listings on Binance.US | Supported crypto, networks, and trading pairs. https://support.binance.us/en/articles/9842915-listings-on-binance-us-supported-crypto-networks-and-trading-pairs