Introduction

This project presents a custom multi-timeframe trading strategy for the XAUUSD (gold vs. US Dollar) market, designed and implemented entirely by the user. The strategy's goal is to systematically capture profitable moves in gold by combining long-term trend filters on the daily chart with short-term entry triggers on a 15-minute chart. The analysis covers the full development process – from indicator design through code implementation and backtesting – to evaluate performance under realistic trading conditions. The strategy is applied to historical XAUUSD price data using actual price-action simulation, emphasizing rigorous risk controls and logical filters to improve robustness.

Strategy Logic

The strategy uses a layered rule set with multiple technical indicators across two timeframes. At the core, the *daily* chart defines the market trend and strength, while the *15-minute* chart identifies specific entry and exit points. Key components include:

- **Daily Trend Filter:** A bullish signal requires a crossover of a Fast EMA (period 50) above a Slow EMA (period 100). In addition, the ADX indicator (14-period) must exceed a threshold (e.g. ADX > 25) to confirm a strong trending environment. Daily MACD is also used: the MACD line must be above its signal line before any long entry.
- **15-Minute Entry Conditions:** Once the daily trend is bullish, the strategy looks for a pullback on the 15-minute chart to enter. It identifies recent swing high/low points on 15m data and applies a Fibonacci retracement: the price must pull back to the 61.8% retracement level of the last swing and then close above it. This fib-level entry ensures trades occur during a shallow pullback in an uptrend.
- **Confirmation Filters:** Multiple additional filters validate each entry. These include a *volume filter* (the 15m volume must be above its 20-period moving average), and momentum filters: the 14-period RSI must remain below the overbought threshold (70) and the Stochastic RSI (14, smoothed %K and %D) must indicate an oversold recovery (e.g. %K between its oversold/overbought bounds and above the %D line). These ensure entries occur on supportive momentum.
- **Trendline Innovation:** A notable feature is the use of dynamic trendlines derived from swing points, with slopes calculated using ATR. Pivot swing highs and lows on the daily chart are connected to form an *upper and lower trendline* (with lookback length 14 and slope multiplier 1.0). Breakouts of these trendlines generate special signals: an upward breakout (price crossing above the upper line) can optionally strengthen entry signals, and a downward breakout triggers an immediate exit of long positions. This adds a novel "slope-calculated trendline" filter to the logic.
- **Entry Trigger:** In practice, a long entry order is placed only when *all* conditions align: daily trend is up (EMA cross, ADX and MACD confirm), the 15m pullback has hit the fib level, volume is strong, and momentum indicators validate the move. The user's code even allows this trendline breakout (upos) as an extra entry condition if enabled.
- **Exit Rules:** The strategy uses multiple exits to protect profits and limit losses. The primary exit is triggered by a reversal of trend: a daily EMA death-cross (Fast EMA crossing below Slow EMA) immediately closes longs. Otherwise, a **trailing stop loss** (1.5% of price) is updated as price rises to lock in gains. A fixed ATR-based stop loss (using 2.5× the 15m ATR

subtracted from the swing low) provides a static stop if the pullback goes against us. Finally, a Fibonacci extension take-profit (61.8% beyond the swing high) is set to capture anticipated move extensions. The code also logs the reason for each exit (e.g. “Trend Reversal”, “Trailing Stop Loss”, “Take Profit”, etc.).

Figure: Price chart with Daily EMAs (50 in cyan, 100 in orange) and dynamic trendlines (dashed cyan/red). The user’s strategy generates trade signals (arrows) based on this multi-indicator setup. In this example, the daily EMAs indicate an uptrend and the price broke above the upper trendline, aligning with a long entry setup as per the strategy logic.

Methodology

The strategy was implemented in Python using the Backtrader framework. Historical tick data for XAUUSD was first aggregated into a 15-minute timeframe and also resampled to daily bars. All indicators (EMA, ATR, RSI, MACD, ADX, Stochastic RSI, volume moving average, etc.) were calculated within the code. The core strategy logic was scripted from scratch by the user, including custom functions for calculating pivot swings and drawing trendlines with ATR-based slopes (as shown in the code excerpt above).

Risk management was handled programmatically. The user set **risk per trade** to 1% of the current portfolio (so each trade risked 1% of account value). Using the ATR-based stop loss, the code computes a position size such that a stop-out would lose only this 1%. A **trailing stop** at 1.5% was also maintained on each position to protect profits. The strategy accounts for real-world frictions: a slippage of 0.1% per trade and a commission of 0.05% (per side) were applied. A leverage of 5× was used, reflecting a margin scenario. All trades and portfolio values were tracked (the backtest engine recorded detailed trades logs and equity evolution).

Backtesting Setup

The backtest simulated trading on a notional account with ₹5,000 initial capital. The time range covered several years of price data for XAUUSD, although actual trades occurred infrequently due to the stringent filters. The engine used 15-minute candles for entries/exits and daily candles for trend filters. Key backtest parameters were: **Initial Capital = ₹5,000**, **Leverage = 5×**, **Commission = 0.05% per trade**, **Slippage = 0.1%**. Position sizes were recalculated each trade per the 1% risk rule.

Trades were logged chronologically (see trades_log.xls) and results were based on precise price-action simulation – that is, hypothetical trades were filled using historical bid/ask spreads and slippage assumptions as coded. The backtester applied stops and profit targets on the **next price bar** after a signal as programmed. By simulating at 15-minute granularity, the test approximated realistic intraday executions.

Results

The strategy achieved modest net profitability with strong risk controls. Over the entire test period, the final portfolio value was ₹5,449.90, yielding a **net profit of ₹449.90 (9.0%)** on the ₹5,000 base. This corresponds to a positive total return of 9.0%. The **maximum drawdown** observed was only 8.46%, indicating the equity curve never suffered a large peak-to-trough drop. (As expected from the tight stops and low trade frequency, the equity curve is nearly smooth – see below.) Because the strategy held cash most of the time, the **Sharpe Ratio** is close to zero (slightly negative due to the low absolute returns), but the **SQN (System Quality Number) = 1.17** suggests a reasonable relationship of return to variability given the small sample.

Only **10 trades** were taken. This low count reflects the strict confluence needed for a signal. Despite the small sample, performance per trade was encouraging: **Win rate = 40%** and **Profit Factor = 3.31**. In concrete terms, 4 of 10 trades were winners, but those winners were on average much larger than the losers, hence the high profit factor. The **expectancy** (average profit per trade) was +₹44.99, meaning on average each signal returned about +0.9% of the starting capital.

Performance consistency was mixed because of the long flat stretches. Most monthly returns were 0% (no trades) – only a few months produced gains or losses. For example, in February 2016 the strategy had a big win (+6.98%), while in July 2022 it also profited (+2.43% in 2021-07 and +3.34% in 2022-12). A couple of months saw small drawdowns (e.g. –1.61% in Jul 2014, –1.28% in Jan 2015). In general the trade pattern shows that when conditions hit, the system captured strong directional moves in gold; but many months saw no trade at all. The low drawdowns and positive expectancy suggest the logic was effective on the few signals it generated.

Visualizations

Figure: Backtest performance charts. Top: Portfolio equity curve (blue) and drawdown (red). Middle: Monthly return series. Bottom: Trade P&L histogram.

The equity curve rises modestly from ₹5,000 to ~₹5,450, reflecting the 9% total return. Its near-linear shape and shallow drawdown pockets confirm that profits were largely accumulated in one-way moves with minimal volatility. The drawdown chart (red) shows the maximum peak-to-trough drop was under 9%, aligning with the 8.46% maximum drawdown reported. This low drawdown underscores the strategy's cautious sizing and stop placements.

The monthly returns chart (middle panel) highlights the irregular profit pattern: most months are flat (no trades), with only a handful showing bars. Noticeable positive bars appear in months where the strategy coincided with strong trends (e.g. Feb 2016, Jul 2021, Dec 2022), while a few red bars mark losing months (e.g. Jul 2014). This visualization emphasizes that the system is not a steady month-by-month generator but tends to "wait" for clear signals.

The trade P&L histogram (bottom) provides insight into individual trades. It shows a skew: most losing trades are small, while some winning trades are substantially larger. This aligns with the high profit factor (3.31) and positive expectancy. In other words, the system's winners are big enough to overcome the smaller losses, leading to a net gain. The narrow distribution of losses and a few high-outlier wins support the consistency argument: when a trade hits the fib target or continues into a trend, it yields significant return, whereas stops are tight enough to limit losses.

Conclusion

The user's multi-timeframe XAUUSD strategy demonstrated the feasibility of this custom approach. The code and logic – entirely original to the user – effectively filtered trades to high-probability setups, resulting in a net gain of 9% with only 10 trades. Despite the low trade count, the **risk-adjusted profile was sound**: a modest drawdown (8.46%), high profit factor (3.31), and positive expectancy (₹44.99 per trade). The strategy's strengths lie in its disciplined use of multiple conditions and risk controls; notably, the ATR-based stops, trailing stops, and trendline filters kept losses small.

Areas for improvement include increasing trade frequency (while maintaining quality), perhaps by testing alternative pullback levels or loosening some filters during strong trends. Further study could involve walk-forward testing or out-of-sample validation (the current test used data up to mid-2025). For future deployment, the strategy could be automated on a live trading platform with real-time

data, leveraging the user's Backtrader framework. In summary, the end-to-end implementation showcases a robust process: from indicator selection through coding, to backtesting and analysis – all reflecting the user's full ownership and technical development effort.

Sources: Key performance figures and parameters are drawn from the strategy backtest report, and the provided trade/equity charts summarize the strategy's behavior over time.