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| **Module** | **Description** | **Input** | **Output** | **Progress** |
| Data Pipeline | 1. MT5 2. SQLite 3. Raw data 4. Transformed data 5. Trade models 6. Trade history |  |  |  |
| Trading rule | Feed price data and generate buy / sell signal for one asset.  Rules:   1. EWMAC (trend following) 2. Channel breakout (trend following) 3. Up filter (momentum) 4. Down filter (momentum) 5. N-day return (momentum) 6. Bollinger band (mean reversion) 7. Skew premium (distribution) 8. Kurt reversal (reversal) | Price data | Trading rule raw signal  Buy / Sell signal  Trading rule performance | Done |
| Trading rule combining | Clustering trading rules and feed into a model to generate a combined rule.  Procedure:   1. Clustering 2. Logistic Regression / Naïve Bayes / Random Forest | Trading rule raw signal,  Buy / Sell signal | Buy / Sell signal | Done |
| Trading rule evaluation | Filter-out undesirable trading rules.  Requirements:   1. Positive net-cost PF 2. Speed vs SR 3. Not robust | Price data,  Buy / Sell signal | Trading rule performance,  Trading rule subsets |  |
| Features | Feed price data and generate metalabelling features.  Features:   1. Trading rule raw signal 2. Regression slope (trend strength) 3. Regression R-squared (trend strength) 4. ADX (trend strength) 5. Volatility (market regime) 6. Skewness (market regime) – TBD 7. Kurtosis (market regime) – TBD 8. Performances of trading rules (market regime) 9. RSI (reversal) 10. Regression line divergence (reversal) 11. VIX (sentiment) 12. News (sentiment) | Price data,  Trading rule performance,  Buy / Sell signal | Features |  |
| Labeler | Perform back-tests and label the trades with triple barriers (TP, SL, HD).  Possible label:   1. Sign of the return   Possible settings:   1. TP = sqrt(lookback) \* vol 2. SL = TP / 2 3. HD = lookback | Buy / Sell signal, TP,  SL,  HD (holding days) | Label |  |
| Matalabel model | Use a machine learning model to predict the winning probability of a trade.  Model:   1. Random forest (1000 tree, 3 depth) | Features,  Label,  Model parameters | Probability |  |
| Kelly sizing | TBD  (Instead: use a fix threshold to enter the trade) | Buy / Sell signal, Probability | Position weight |  |
| Hierarchical Risk Parity |  | Position weight, Capital,  Contract size | Absolute position |  |
| TP / SL tracker |  |  |  |  |

Cost threshold:

Turnover \* Commission + Spread/2 + Slippage < 50% Mean Return

50% Mean Return / Turnover > 0.00003 + Spread/2

50% Mean Return / Turnover – 0.00003 > Spread/2

Assumed 0.0001 Mean Return / Turnover:

Spread < 0.00007