Quiz 1 - Introduction to Systematic Trading Strategy with Machine Learning Algorithms

1. Name *

   _____

2. Email *

   _____

Labeling Methods

---

3. In fixed-time horizon labeling, why is using a fixed threshold τ for all samples problematic?

   1 point

$$y_i = \begin{cases} -1 & \text{if } r_{t_{i,0},t_{i,0}+h} < -\tau \\ 0 & \text{if } |r_{t_{i,0},t_{i,0}+h}| \leq \tau \\ 1 & \text{if } r_{t_{i,0},t_{i,0}+h} > \tau \end{cases} \quad \text{with} \quad r_{t_{i,0},t_{i,0}+h} = \frac{p_{t_{i,0}+h}}{p_{t_{i,0}}} - 1$$

Mark only one oval.

- ◯ It ignores changes in volatility across regimes
- ◯ It creates label imbalance
- ◯ It introduces data leakage

4. In the triple barrier method, when is a trade labeled as −1?   1 point

Mark only one oval.

○ The trade hits the profit-taking barrier

○ The trade reaches the time-out horizon without hitting any barrier

○ The trade hits the stop-loss barrier

5. What is the key advantage of triple barrier labeling over fixed-time horizon   1 point
labeling?

Mark only one oval.
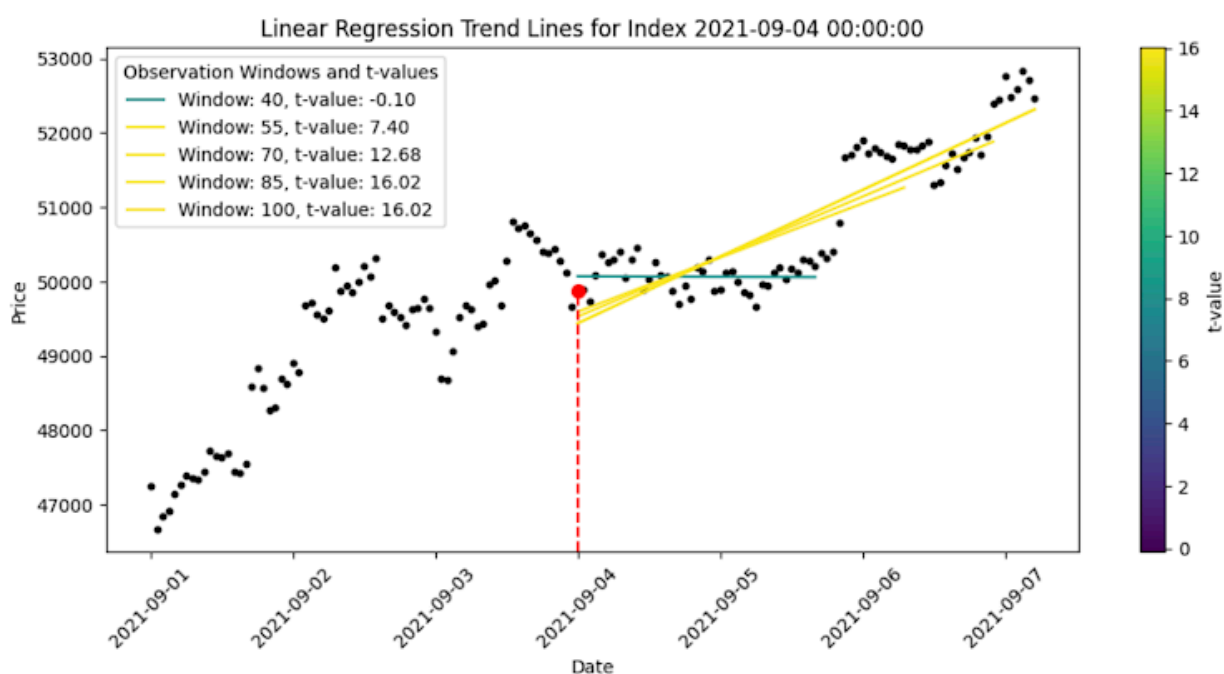
○ It doesn't require asset prices

○ It captures path-dependence and risk management

○ It avoids overlapping samples

6. Trend scanning performs regression over a forward-looking window. What statistic does it use to determine if a trend exists?

Mark only one oval.

◯ R^2 of the fit

◯ Standard deviation of returns

◯ t-statistic of the slope

7. In the figure below, several linear regression trend lines are fitted starting from September 4, 2021, using different forward-looking windows. Each window corresponds to a different t-statistic of the slope. Based on the trend scanning method, which observation window will be selected as the most informative?

Linear Regression Trend Lines for Index 2021-09-04 00:00:00

Observation Windows and t-values
— Window: 40, t-value: -0.10
— Window: 55, t-value: 7.40
— Window: 70, t-value: 12.68
— Window: 85, t-value: 16.02
— Window: 100, t-value: 16.02

Mark only one oval.

◯ Window: 40

◯ Window: 70

◯ Window: 85

8. Given that the trend scanning method selects the window with the highest   1 point
   absolute t-statistic, what label will be assigned to the sample in the previous
   question ?

   Mark only one oval.

   ○ −1 (Downtrend)

   ○ 0 (No clear trend)

   ○ +1 (Uptrend)

Evaluation Metrics

9. What is the interpretation of AUC (Area Under ROC Curve) in binary   1 point
   classification?

   Mark only one oval.

   ○ Probability the model outputs calibrated probabilities

   ○ Probability a random positive is ranked above a random negative

   ○ Average value of true positives
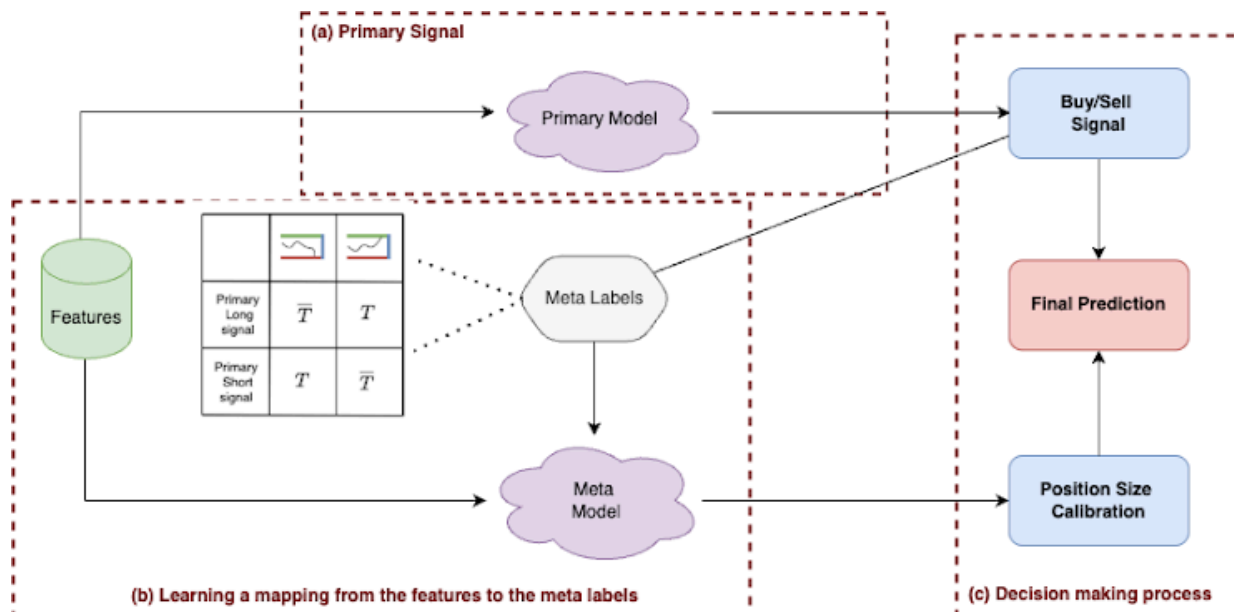
10. Which metric penalizes confident wrong predictions the most?   1 point

    Mark only one oval.

    ○ Accuracy

    ○ F1 Score

    ○ Log Loss

The Metamodel approach

11. In the Meta-Labeling framework depicted below, what is the main role of the Meta- 1 point
Model?

(a) Primary Signal

(b) Learning a mapping from the features to the meta labels

(c) Decision making process

Tick all that apply.

☐ To generate new buy/sell signals directly from raw features
☐ To predict whether the primary model's signal should be acted upon
☐ Rebalancing the portfolio across assets

12. A regime-related feature has high feature importance in the meta-model but 1 point
low importance in the primary model. How do you explain this?

Mark only one oval.

◯ The feature is noisy and should be removed from both models

◯ The meta-model is overfitting on features that are irrelevant for price prediction

◯ The feature is predictive of when the primary model performs well, but not of asset returns directly

Questions ?

13. Any comments or questions you'd like to share about this quiz or the lecture content?

_____

_____

_____

_____

_____