Machine Learning Ensemble Model Results

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👉 **Ensemble Combination:** Huber Regression (40%) + AdaBoost (40%) + ElasticNet (20%)

Huber Regression (40% weight) - A linear model that handles outliers well (like market crashes)

AdaBoost (40% weight) - A boosting algorithm that learns from mistakes and focuses on hard-to-predict cases

ElasticNet (20% weight) - A linear model that automatically selects the most important features

How the Combination Works:

Final Prediction = 0.4 × Huber_Prediction + 0.4 × AdaBoost_Prediction + 0.2 × ElasticNet_Prediction

Rank	Hedge_Fund	R2_Avg	Hit_Rate_Avg	IC_Avg	Breakdown_Rate	Score
1	HF3_HFRI4EHV	68.7%	85.0%	89.0%	0.0%	0.708
2	HF2_HFRI4ELS	62.9%	83.2%	86.7%	2.2%	0.673
3	HF1_HFRI4FWC	49.4%	79.2%	81.6%	4.3%	0.594
4	HF4_HFRI4ED	37.4%	77.2%	75.2%	4.3%	0.527

👉 **Ensemble Combination:** Huber Regression (50%) + Gradient Boosting (30%) + ElasticNet (20%)

Huber Regression (50% weight) - A linear model that handles outliers well (like market crashes)

Gradient Boosting (30% weight) - A sequential learning algorithm that builds models step-by-step, correcting previous errors

ElasticNet (20% weight) - A linear model that automatically selects the most important features

How the Combination Works:

Final Prediction = 0.5 × Huber_Prediction + 0.3 × Gradient_Boosting_Prediction + 0.2 × ElasticNet_Prediction

Rank	Hedge_Fund	R2_Avg	Hit_Rate_Avg	IC_Avg	Breakdown_Rate	Score
1	HF3_HFRI4EHV	64.4%	83.0%	87.9%	0.0%	0.683
2	HF2_HFRI4ELS	58.4%	82.4%	85.3%	4.3%	0.647
3	HF1_HFRI4FWC	45.9%	78.5%	81.6%	6.5%	0.576
4	HF4_HFRI4ED	35.0%	77.1%	75.6%	4.3%	0.518

👉 **Ensemble Combination:** Huber Regression (40%) + LightGBM (40%) + Lasso (20%)

Huber Regression (40% weight) - A linear model that handles outliers well (like market crashes)

LightGBM (40% weight) - A fast gradient boosting algorithm that efficiently learns complex patterns from data

Lasso (20% weight) - A linear model that automatically selects the most important features by eliminating irrelevant ones

How the Combination Works:

Final Prediction = 0.4 × Huber_Prediction + 0.4 × LightGBM_Prediction + 0.2 × Lasso_Prediction

Rank	Hedge_Fund	R2_Avg	Hit_Rate_Avg	IC_Avg	Breakdown_Rate	Score
1	HF3_HFRI4EHV	65.6%	84.7%	88.7%	0.0%	0.694
2	HF2_HFRI4ELS	60.8%	83.4%	86.5%	2.2%	0.666
3	HF1_HFRI4FWC	50.5%	80.4%	82.3%	4.3%	0.602
4	HF4_HFRI4ED	34.2%	78.1%	74.2%	4.3%	0.515

👉 **Ensemble Combination:** Huber Regression (40%) + Random Forest (40%) + Ridge (20%)

Huber Regression (40% weight) - A linear model that handles outliers well (like market crashes)

Random Forest (40% weight) - An ensemble of decision trees that captures non-linear patterns and reduces

overfitting Ridge (20% weight) - A linear model that prevents overfitting by applying penalty to large coefficients

How the Combination Works:

Final Prediction = 0.4 × Huber_Prediction + 0.4 × Random_Forest_Prediction + 0.2 × Ridge_Prediction

Rank	Hedge_Fund	R2_Avg	Hit_Rate_Avg	IC_Avg	Breakdown_Rate	Score
1	HF3_HFRI4EHV	67.0%	84.7%	88.7%	0.0%	0.699
2	HF2_HFRI4ELS	60.6%	83.4%	86.1%	2.2%	0.662
3	HF1_HFRI4FWC	47.1%	79.9%	82.0%	6.5%	0.586
4	HF4_HFRI4ED	36.2%	77.0%	75.7%	4.3%	0.523

👉 **Ensemble Combination:** Huber Regression (50%) + XGBoost (30%) + ElasticNet (20%)

Huber Regression (50% weight) - A linear model that handles outliers well (like market crashes)

XGBoost (30% weight) - A powerful gradient boosting algorithm that excels at finding complex patterns in financial time series data

ElasticNet (20% weight) - A linear model that automatically selects the most important features by combining L1 and L2 regularization

How the Combination Works:

Final Prediction = 0.5 × Huber_Prediction + 0.3 × XGBoost_Prediction + 0.2 × ElasticNet_Prediction

Rank	Hedge_Fund	R2_Avg	Hit_Rate_Avg	IC_Avg	Breakdown_Rate	Score
1	HF3_HFRI4EHV	65.9%	84.3%	88.7%	0.0%	0.694
2	HF2_HFRI4ELS	60.7%	83.2%	86.4%	2.2%	0.663
3	HF1_HFRI4FWC	48.1%	79.8%	82.1%	6.5%	0.589
4	HF4_HFRI4ED	34.0%	77.5%	74.8%	4.3%	0.514