

# LGBM Parameter Selection Report - 西条

Prefecture code	38
Station code	38206050
Station name	西条
Target item	Ox(ppm)
Model	LGBMRegressor
Number of features used	140
Train samples	18002
Validation samples	4501
Parameter Grid n_estimators	[390, 400, 410]
Parameter Grid max_depth	[10, 11, 12]
Parameter Grid num_leaves	[30, 31, 32]
Parameter Grid learning_rate	[0.05, 0.06, 0.07]
Parameter Grid min_child_samples	[4, 5, 6]
Parameter Grid subsample	[0.0, 0.01, 0.02]
Parameter Grid colsample_bytree	[0.9, 1.0]
Best Parameter colsample_bytree	1.0
Best Parameter learning_rate	0.05
Best Parameter max_depth	12
Best Parameter min_child_samples	6
Best Parameter n_estimators	410
Best Parameter num_leaves	32
Best Parameter subsample	0.01
R <sup>2</sup>	0.955110277498572
MAE	0.031109918436371158
RMSE	0.04496810850065947
Residuals Prob(Q)	5.759755479410861e-12
Residuals skew	-0.158
Residuals kurtosis	4.129

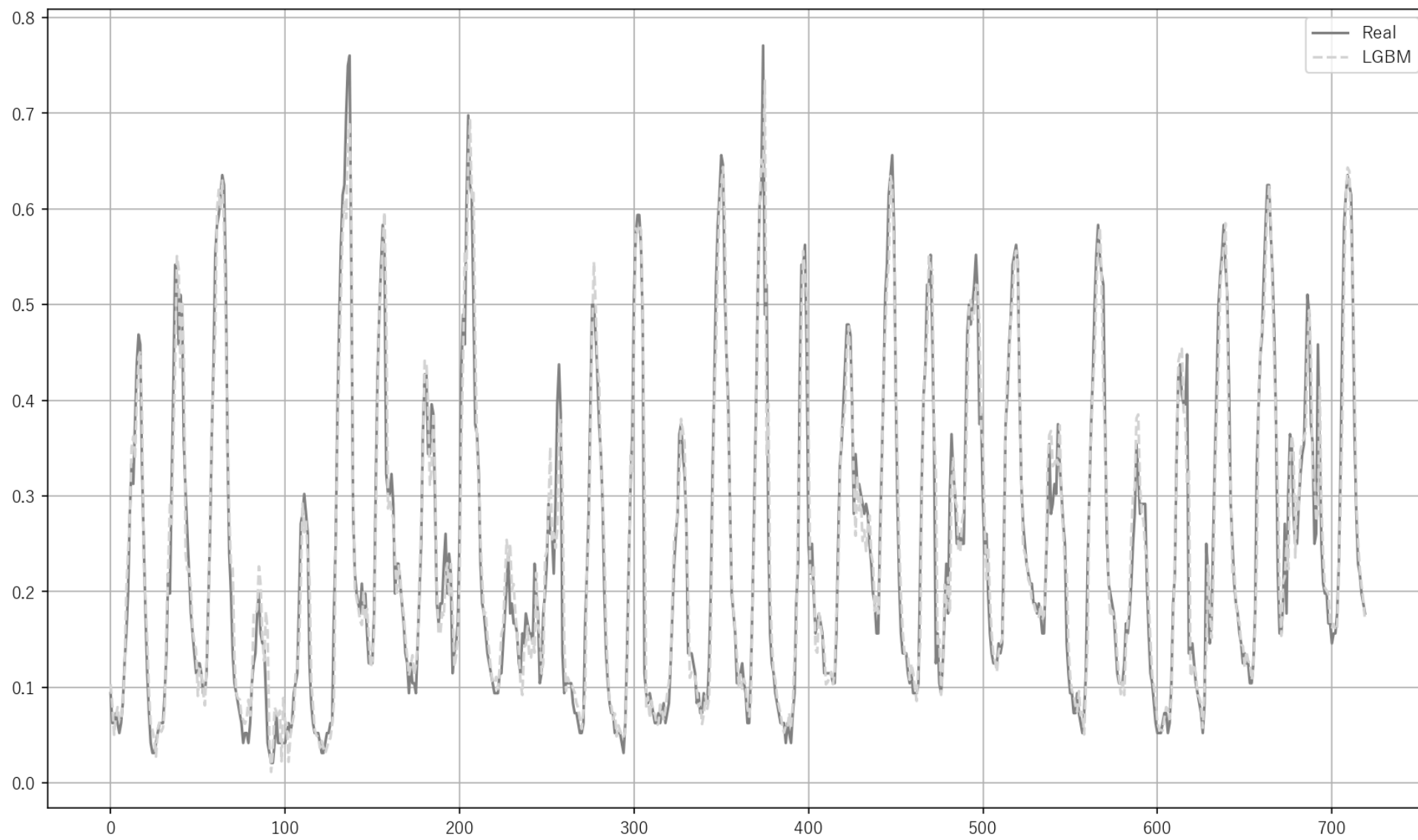
## Features used for prediction

NO(ppm)	NO2(ppm)	U	V	Ox(ppm)_lag1
Ox(ppm)_lag2	Ox(ppm)_lag3	Ox(ppm)_lag4	Ox(ppm)_lag5	Ox(ppm)_lag6
Ox(ppm)_lag7	Ox(ppm)_lag8	Ox(ppm)_lag9	Ox(ppm)_lag10	Ox(ppm)_lag11
Ox(ppm)_lag12	Ox(ppm)_lag13	Ox(ppm)_lag14	Ox(ppm)_lag15	Ox(ppm)_lag16
Ox(ppm)_lag17	Ox(ppm)_lag18	Ox(ppm)_lag19	Ox(ppm)_lag20	Ox(ppm)_lag21
Ox(ppm)_lag22	Ox(ppm)_lag23	NO(ppm)_lag1	NO(ppm)_lag2	NO(ppm)_lag3
NO(ppm)_lag4	NO(ppm)_lag5	NO(ppm)_lag6	NO(ppm)_lag7	NO(ppm)_lag8
NO(ppm)_lag9	NO(ppm)_lag10	NO(ppm)_lag11	NO(ppm)_lag12	NO(ppm)_lag13
NO(ppm)_lag14	NO(ppm)_lag15	NO(ppm)_lag16	NO(ppm)_lag17	NO(ppm)_lag18
NO(ppm)_lag19	NO(ppm)_lag20	NO(ppm)_lag21	NO(ppm)_lag22	NO(ppm)_lag23
NO2(ppm)_lag1	NO2(ppm)_lag2	NO2(ppm)_lag3	NO2(ppm)_lag4	NO2(ppm)_lag5
NO2(ppm)_lag6	NO2(ppm)_lag7	NO2(ppm)_lag8	NO2(ppm)_lag9	NO2(ppm)_lag10
NO2(ppm)_lag11	NO2(ppm)_lag12	NO2(ppm)_lag13	NO2(ppm)_lag14	NO2(ppm)_lag15
NO2(ppm)_lag16	NO2(ppm)_lag17	NO2(ppm)_lag18	NO2(ppm)_lag19	NO2(ppm)_lag20
NO2(ppm)_lag21	NO2(ppm)_lag22	NO2(ppm)_lag23	U_lag1	U_lag2
U_lag3	U_lag4	U_lag5	U_lag6	U_lag7
U_lag8	U_lag9	U_lag10	U_lag11	U_lag12
U_lag13	U_lag14	U_lag15	U_lag16	U_lag17
U_lag18	U_lag19	U_lag20	U_lag21	U_lag22
U_lag23	V_lag1	V_lag2	V_lag3	V_lag4
V_lag5	V_lag6	V_lag7	V_lag8	V_lag9
V_lag10	V_lag11	V_lag12	V_lag13	V_lag14
V_lag15	V_lag16	V_lag17	V_lag18	V_lag19
V_lag20	V_lag21	V_lag22	V_lag23	Ox(ppm)_roll_mean_3
Ox(ppm)_roll_std_6	NO(ppm)_roll_mean_3	NO(ppm)_roll_std_6	NO2(ppm)_roll_mean_3	NO2(ppm)_roll_std_6
U_roll_mean_3	U_roll_std_6	V_roll_mean_3	V_roll_std_6	Ox(ppm)_diff_1
Ox(ppm)_diff_2	Ox(ppm)_diff_3	NO(ppm)_diff_3	NO2(ppm)_diff_3	U_diff_3
V_diff_3	hour_sin	hour_cos	dayofweek	is_weekend

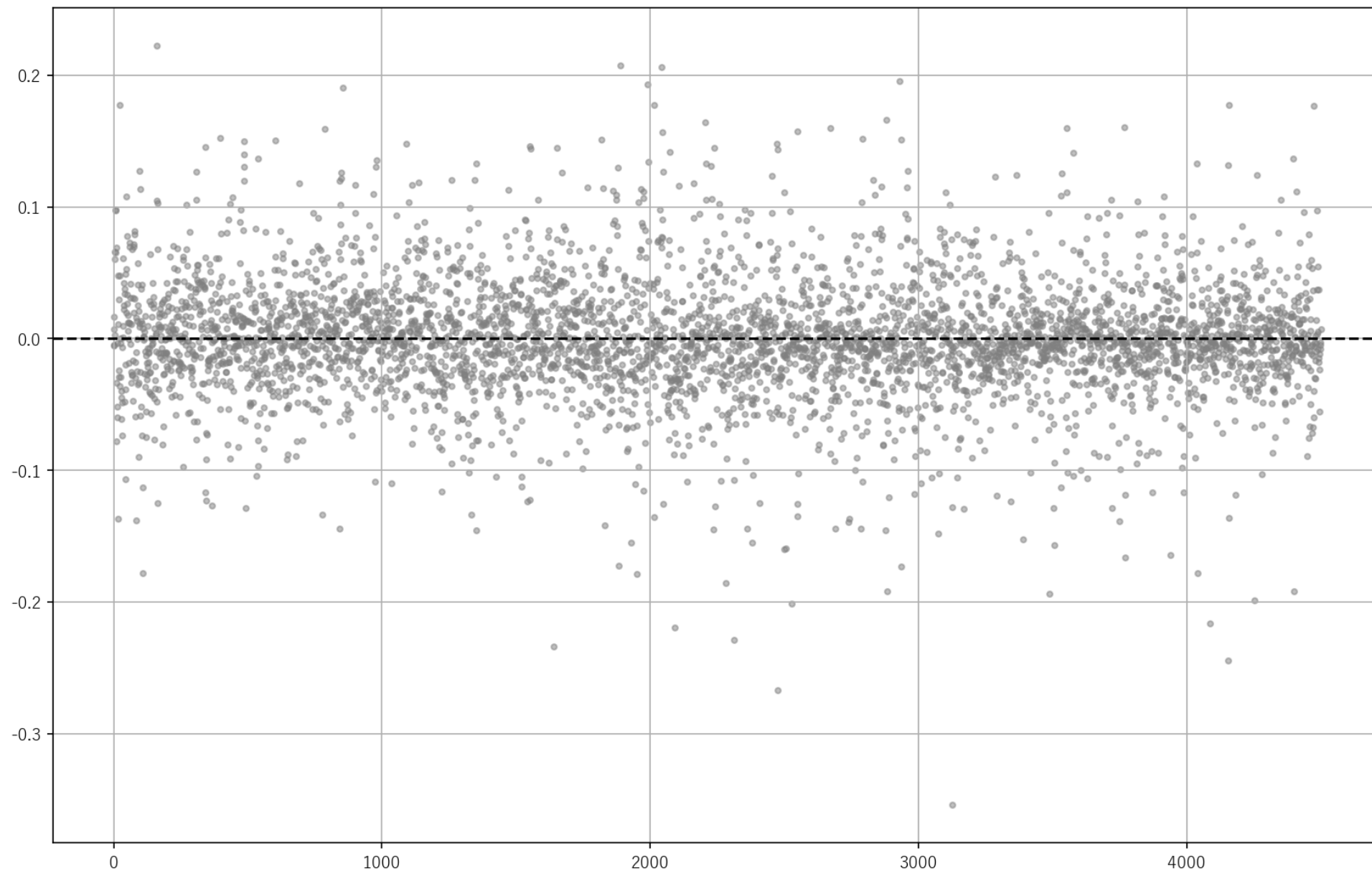
## Model accuracy

Target	R <sup>2</sup>	MAE	RMSE
Ox(ppm)	0.9551	0.0311	0.0450

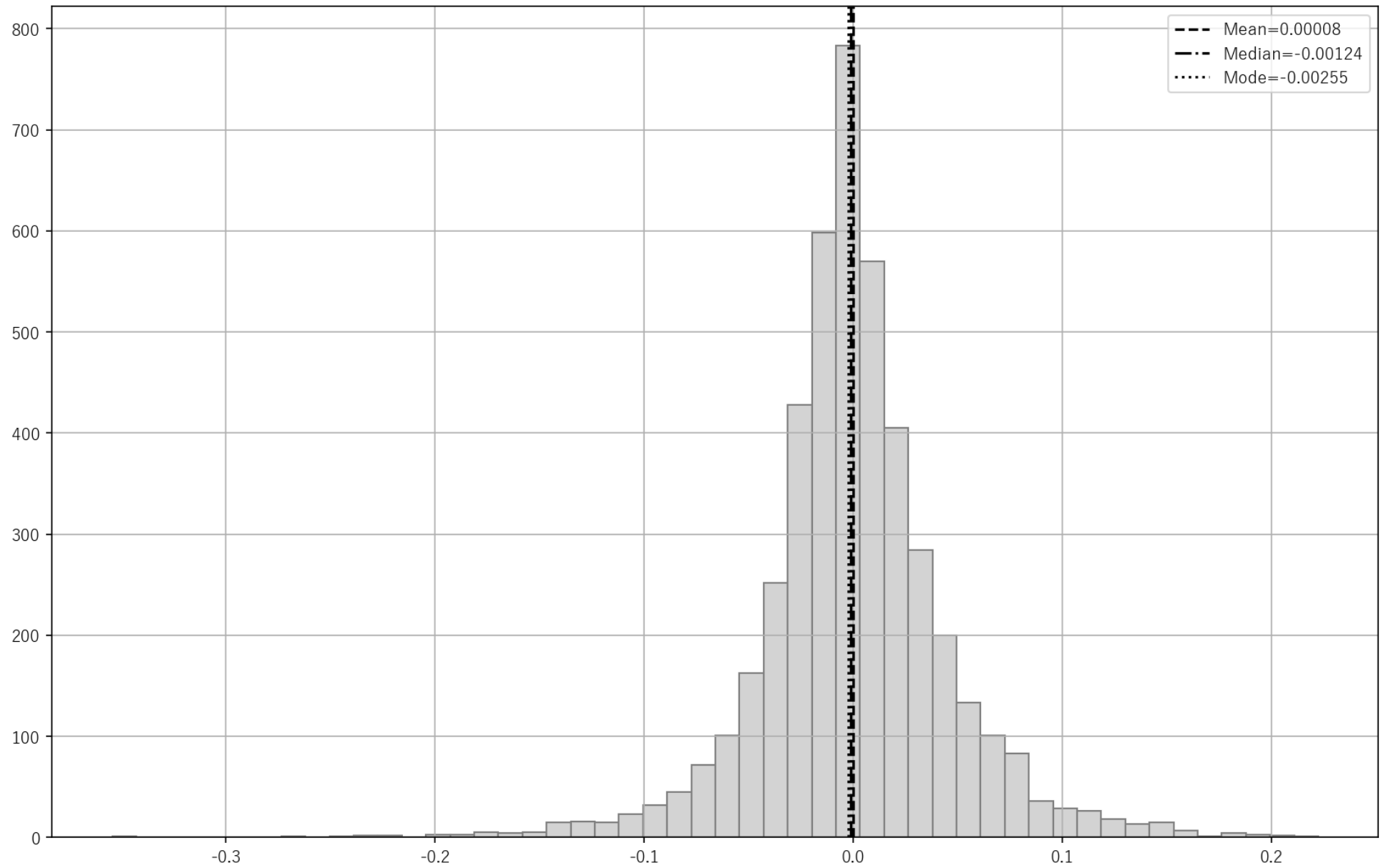
LGBM Regression  
 $R^2: 0.95511$



Residual Errors



Residuals Distribution



Top 20 Feature Importances (LGBM)

