

Project-Level Embodied Carbon Prediction Across Building Design Stages Using a Machine Learning Framework

Zihang Wang ¹, Ling Zhang ^{1,*} and Mengmeng Pu ²

¹ College of Civil Engineering and Architecture, Zhejiang University, Hangzhou 310058, China; 22512156@zju.edu.cn

² Zhejiang Senxin Low-Carbon Technology Co., Ltd., Hangzhou 310058, China; 19816876865@163.com

* Correspondence: zlcivil@zju.edu.cn

S1. Hyperparameters of machine learning models.

Table S1. Main hyperparameters of machine learning models.

No.	Model	Hyperparameter	Optimized value	
			Schematic Design Stage	Construction drawing design stage
1	LR	—	—	—
2	KNN	n_neighbors	5	3
3	SVR	C	6.3476	7.6804
		epsilon	0.1717	0.1753
		gamma	0.0113	0.0057
4	RF	n_estimators	477	615
		max_depth	6	17
		max_features	0.6	0.5
5	ET	n_estimators	545	272
		max_depth	10	6
		max_features	0.7	0.8
6	GB	n_estimators	145	139
		learning_rate	0.0331	0.0504
		max_depth	2	3
7	XGB	n_estimators	421	211
		max_depth	5	4
		learning_rate	0.0522	0.0217
8	LGBM	n_estimators	191	249
		learning_rate	0.0345	0.0395
		num_leaves	15	33
9	CatBoost	iterations	455	514
		depth	3	4
		learning_rate	0.0314	0.0424
		l2_leaf_reg	5.3192	3.9194