

Random Forest Regressor (Weather TMP_C) — Model Evaluation Report

Generated: 2025-10-25 12:20

Target variable: TMP_C

1. Executive Summary

This report documents the performance of **Random Forest Regressor (Weather TMP_C)** trained to predict TMP_C.

Key performance indicators on the evaluation split:

- RMSE: 3.2329279001831592
- MAE: 2.333279119117583
- R²: 0.9338139117834048

Lower RMSE / MAE means the model is closer to the true values.

An R² near 1.0 means the model explains most of the variation in the target.

2. Metrics Summary

Below is the table of performance metrics:

rmse	mae	r2
3.23293	2.33328	0.933814

3. Feature Importance

feature	importance
DEW_C	0.58643
LATITUDE	0.174782
month	0.0951031
CIG_HEIGHT_M	0.0451922
SLP_hPa	0.0339863
hour	0.0219859
LONGITUDE	0.0213332
VIS_DIST_M	0.00935961
ELEVATION	0.00865258
WND_SPD_MS	0.00142607

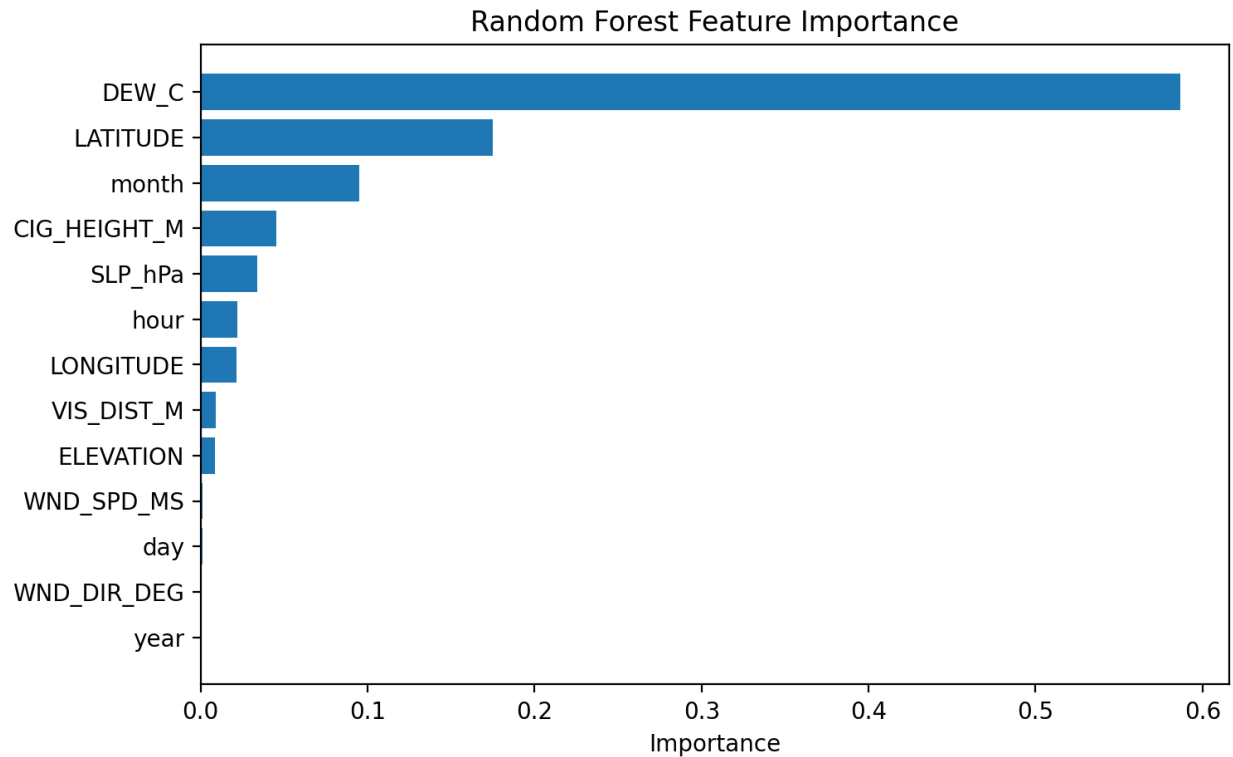


Figure 1: Feature Importance

4. Predictions vs Actual

Sample predictions:

DATE	year	month	day	hour	TMP_C	prediction
2024-09-09T12:00:00.000Z	2024	9	9	12	28	24.4123
2024-08-25T22:00:00.000Z	2024	8	25	22	22.5	26.2063
2024-11-23T05:51:00.000Z	2024	11	23	5	21.7	20.7739
2024-03-25T06:53:00.000Z	2024	3	25	6	8.3	8.85306
2024-03-05T12:00:00.000Z	2024	3	5	12	-7	-5.44982
2024-05-20T07:52:00.000Z	2024	5	20	7	16.7	20.9249
2024-12-21T00:00:00.000Z	2024	12	21	0	24.8	27.2128
2024-06-25T14:56:00.000Z	2024	6	25	14	25.6	26.8469
2024-12-13T14:54:00.000Z	2024	12	13	14	-3.9	-3.31615
2024-08-27T19:51:00.000Z	2024	8	27	19	30.6	29.4327
2024-08-10T15:00:00.000Z	2024	8	10	15	20.7	19.2885
2024-04-11T00:51:00.000Z	2024	4	11	0	6.1	9.92051
2024-08-09T06:00:00.000Z	2024	8	9	6	32.8	27.7461
2024-11-22T08:00:00.000Z	2024	11	22	8	0.2	1.38283
2024-09-03T15:00:00.000Z	2024	9	3	15	29.9	28.1804

5. Error Diagnostics / Training Behaviour

6. Key Takeaways

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- RMSE and MAE quantify average prediction error (lower is better).
- R^2 shows how much variance in TMP_C is explained.
- Feature importance highlights which inputs drive predictions.

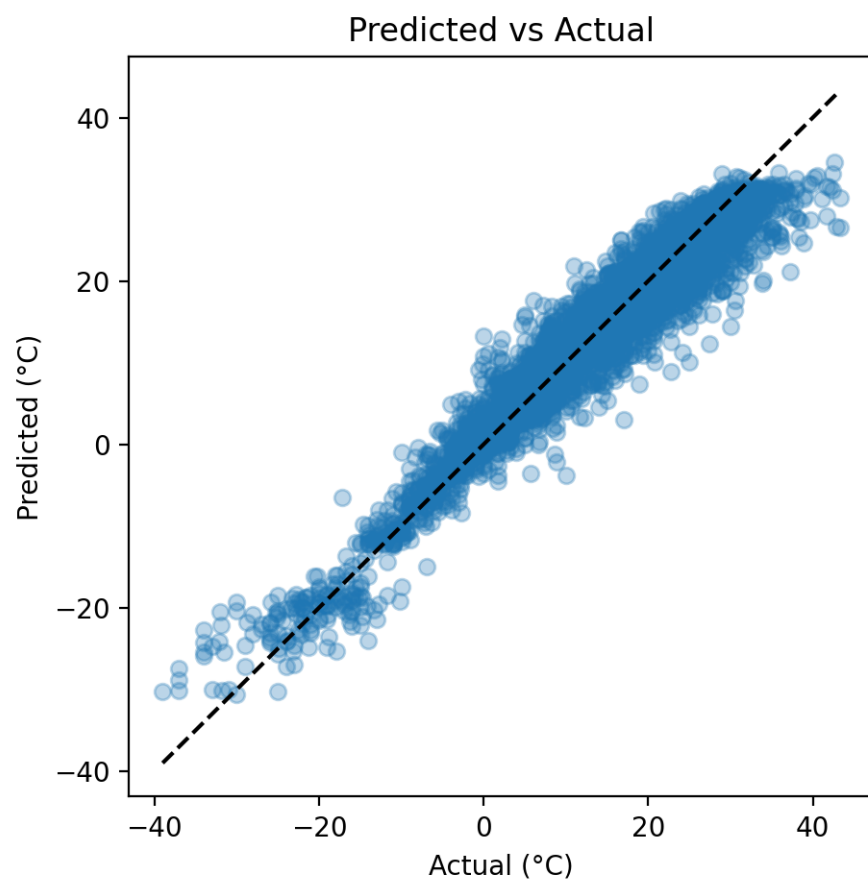


Figure 2: Predicted vs Actual

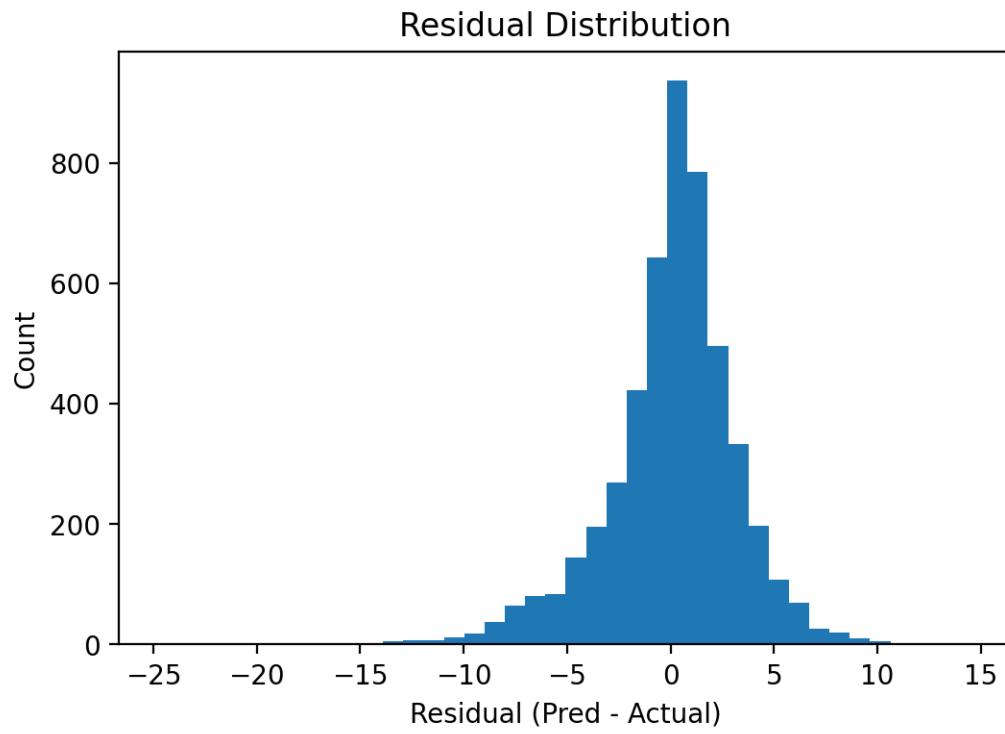


Figure 3: Residual Distribution

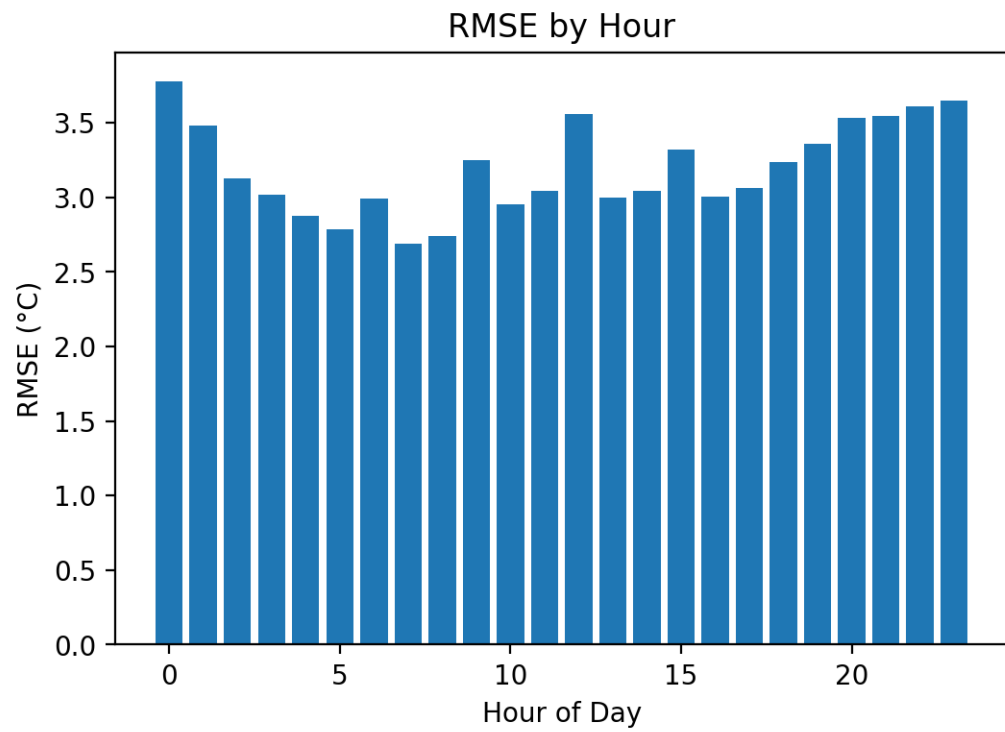


Figure 4: RMSE by Hour of Day

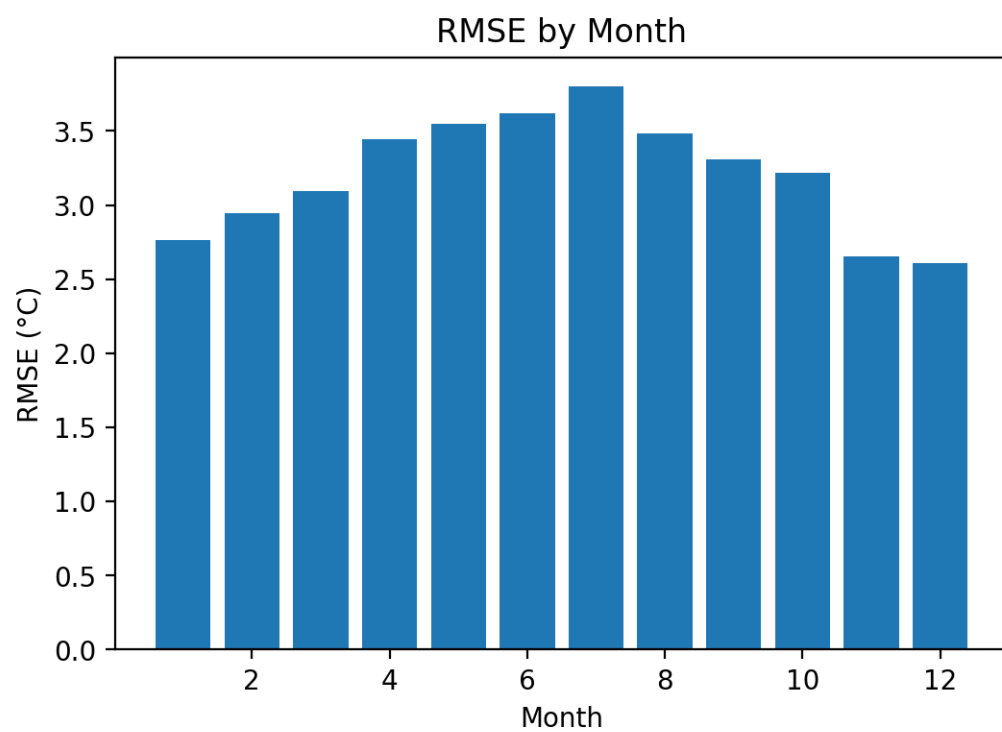


Figure 5: RMSE by Month