

Data Sources

Empirical Steady-State Thermal Comfort Study Datasets

ASHRAE Global Thermal Comfort DB II

Chinese Thermal Comfort Dataset

Weather Files

4 Weather Files
USA_NY_New.York
USA_AZ_Davis-Monthan
COL_Bogota
SWE_Stockholm

FIN_Helsinki
USA_IL_Chicago
AUS_NSW.Sydney
JPN_Tokyo
USA_PA_Pittsburgh
USA_CO_Aurora-Buckley

For
Training

PMV/TSV Predictor

Analytical Model

PMV

Trained Machine-Learning/ Deep Learning Models

LightGBM

PINN-VAE

Input

Modes Tested

Direct Control

Baseline Setpoint
(reference)

PMV-based Setpoint
(pmv)

LightGBM-based Setpoint
(lightgbm)

PINN-VAE-based Setpoint
(pv)

Grid-Search Control

PMV-based Boundary-Optimized Setpoint
(pmv-o)

LightGBM-based Boundary-Optimized Setpoint
(lightgbm-o)

PINN-VAE-based Boundary-Optimized Setpoint
(pv-o)

Tsk-incorporated Boundary-Optimized Setpoint
(pv-tsk-strck/pv-tsk-loose)

+Tsk

Input/
Output

Outputs

Energy Usage Comparison

Thermal Comfort Stats

Runtime Analysis

PMV Grid-Search Optimization Results

Outputs

EnergyPlus Simulation
via synergym API



4 Weather Files for Modes Comparison
6 Additional Weather Files for PMV Grid-Search Comparison Input