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[] Box,Jenkins

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ANN
ANN

Archive of SID

LMS

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$$X_P = x_0, x_1, \dots, x_{n-1}$$

$$T_P = t_0, t_1, \dots, t_{m-1}$$

m n

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$$y_{Pj} = f \left[\sum_{i=0}^{n-1} w_i x_i \right]$$

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$$O_{Pj} = f(net) = \text{Sig}(net) = \frac{1}{1 + e^{-net}}$$

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$$0 < f(net) < 1$$

$$w_{ij}(t+1) = w_{ij}(t) + \eta \delta_{Pj} O_{Pj}$$

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i

$w_{ij}(t)$

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net

δ_{Pj}

η

t

j

$$f'(net) = f(net)(1 - f(net)) = O_{Pj}(1 - O_{Pj})$$

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j

p

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$$\delta_{Pj} = O_{Pj}(1 - O_{Pj})(t_{Pj} - O_{Pj})$$

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$$\delta_{Pj} = O_{Pj}(1 - O_{Pj}) \sum_k \delta_{Pk} w_{jk}$$

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MinMax

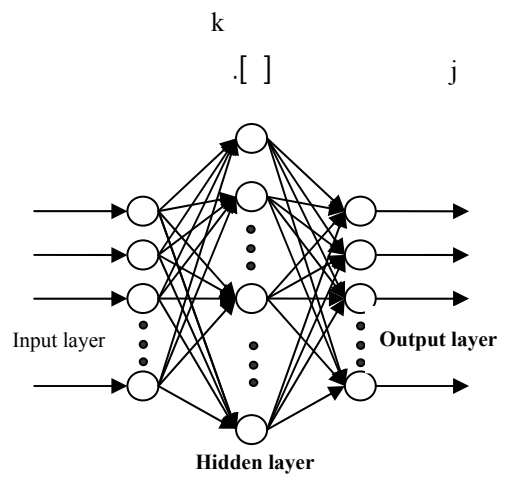
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$$P_n = \frac{P - P_{\min}}{P_{\max} - P_{\min}}$$

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P_n P P_{\max} P_{\min}



$$P = P_n(P_{\max} - P_{\min}) + P_{\min}$$

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$$MRE(\%) = \frac{1}{N} \sum_{i=1}^N \frac{|Forecast_i - Actual_i|}{Actual_i} \times 100$$

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$$MSE = \frac{1}{N} \sum_{i=1}^N (Actual_i - Forecast_i)^2$$

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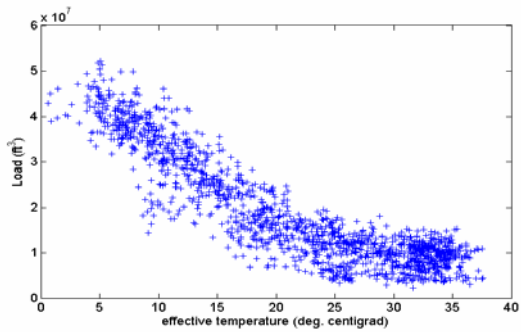
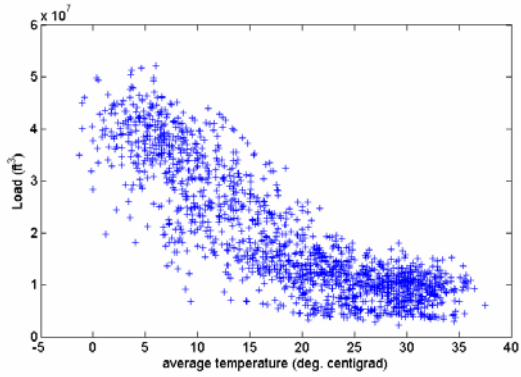
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$$T_{eff_i} = 0.8 \times T_{eff_{i-1}} + 0.05 \times T_{min_i} + 0.15 \times T_{max_i} \quad ()$$

$$T_{eff_{i-1}} \quad T_{eff_i} \quad T_{min_i} \quad T_{max_i}$$

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ARC

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MSE

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$$\text{Monthly } T_{eff} = \frac{1}{r} \sum_{i=1}^r T_{eff_i}$$

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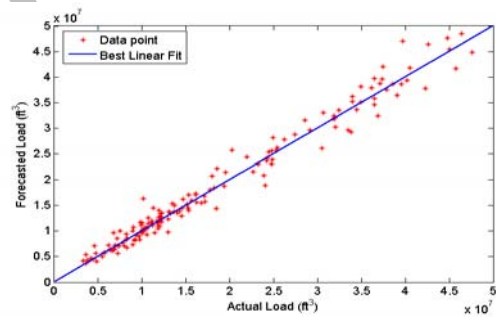
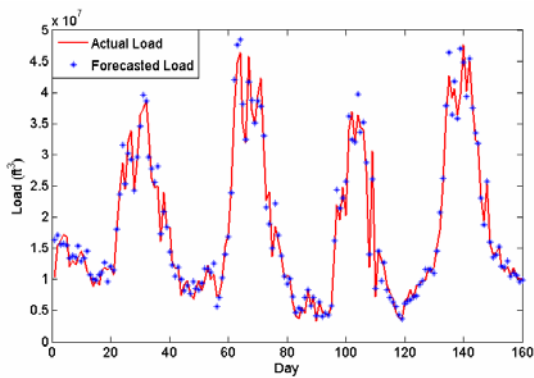
T_{eff_i}

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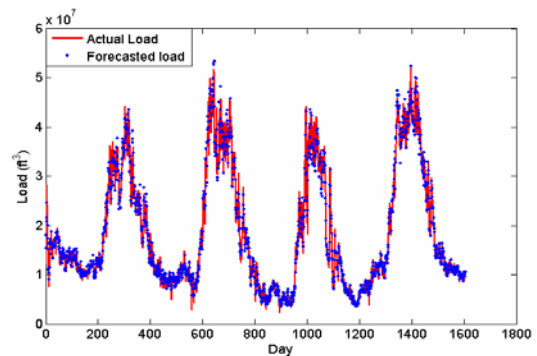
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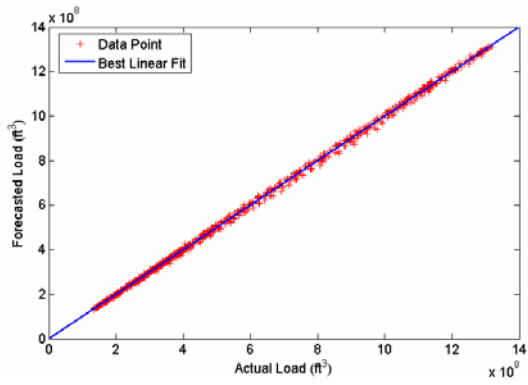
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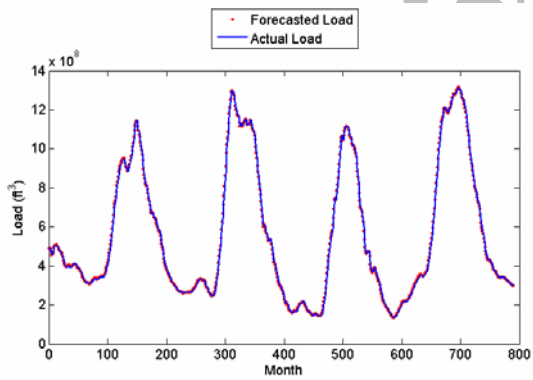
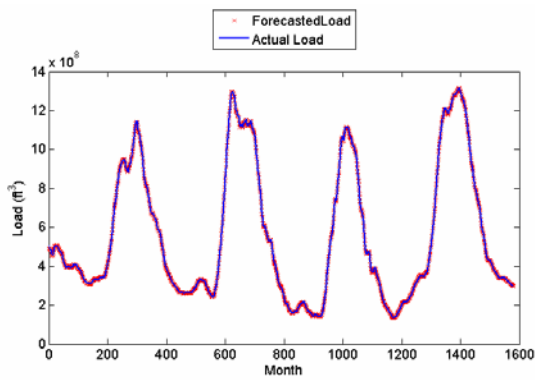
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MSE

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- : Actual_i
- : Forecast_i
- : Monthly Teff
- : net
- p : O_{pj}
- : P
- : P_n
- p : P_{max}
- p : P_{min}
- : Sig
- i : t_i {
- : t
- : t_{pj}
- : T_{min}
- : T_{max}
- : T_{eff} %
- : T_p
- t j i : W_{ij}(t)
- i : x_i { - - }
- : X_p
- j p : y_{pj}
- : η
- j p : δ_{pj}

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- 1 - ANN (Artificial Neural Network)
- 2 - Back Propagation
- 3 - Logistic
- 4 - LMS (Least Mean Square)
- 5 - Multilayer Perceptron
- 6 - Multilayer Feedforward Neural Network
- 7 - Validation Set
- 8 - Normalization
- 9 - Unnormalization
- 10 - MRE (Mean Relative Error)
- 11 - MSE (Mean Square Error)
- 12 - Sigmoid Transfer Function
- 13 - Purline Transfer Function
- 14 - Training Cycle
- 15 - Pearson