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چکیده

(PLF)

PLF

(FFNN)

PLF

واژه‌های کلیدی:

مقدمه

Archive of SID

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(AI)

(ANNs)

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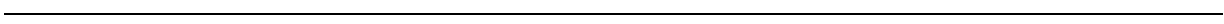
FFNN SOM

Archive of SID

تحليل داده‌ها

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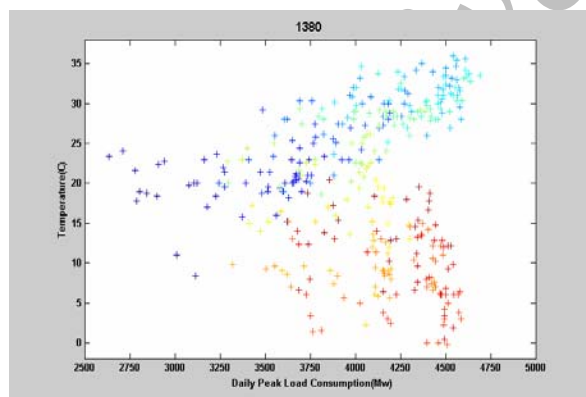
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تأثیر عوامل آب و هوایی بر الگوی مصرف بار

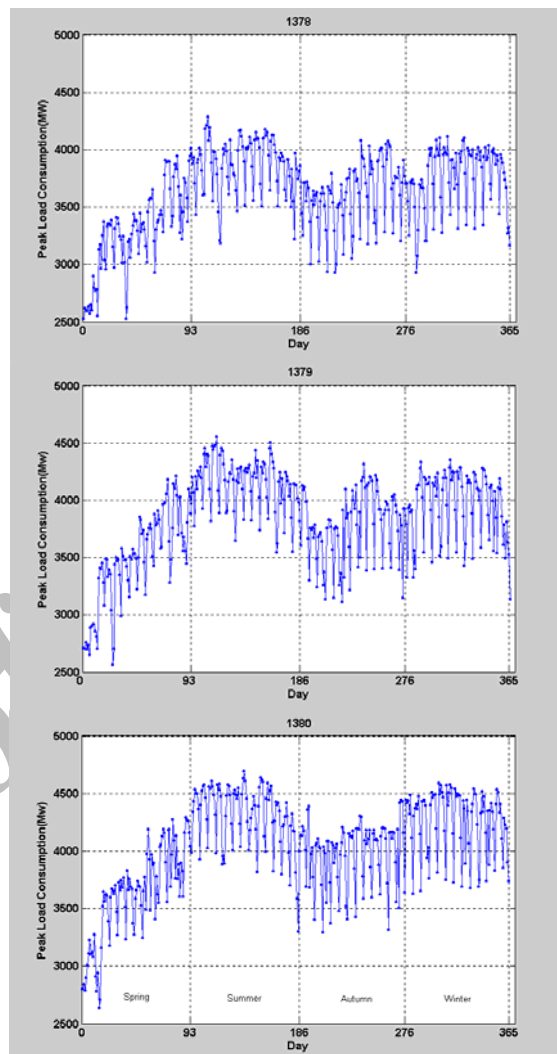
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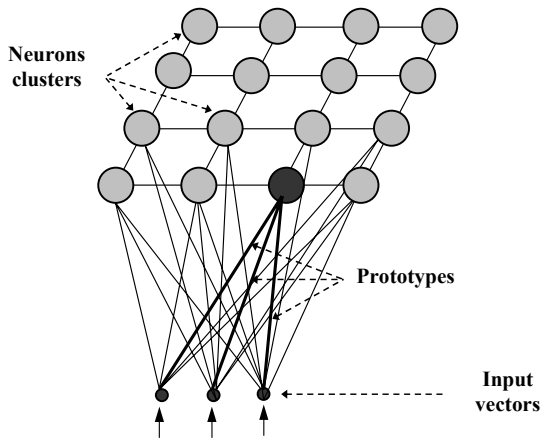


شکل ۲: رابطه بین پیک بار روزانه و دمای هوا در سال ۱۳۸۰.



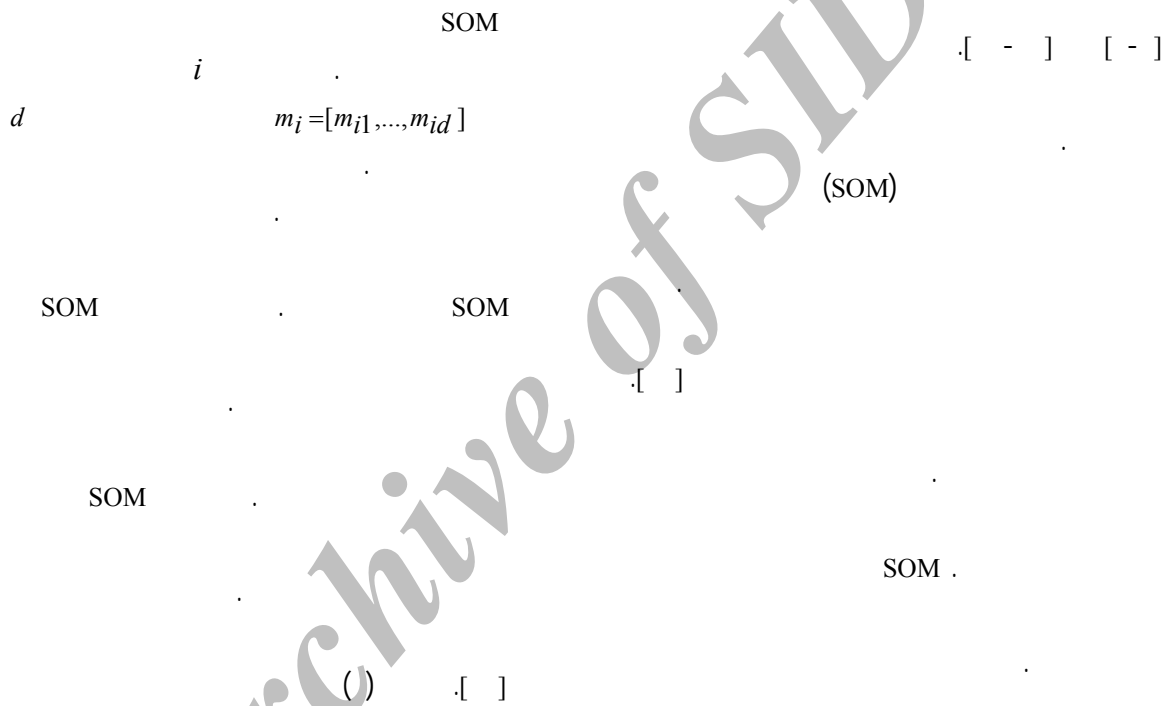
شکل ۱: سری زمانی پیک بار الکتریکی روزانه..

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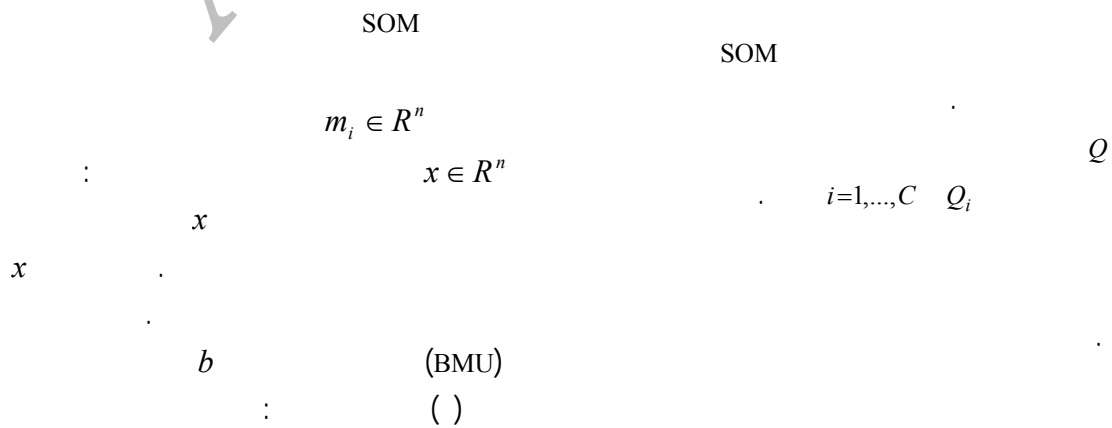


شکل ۳: نقشه خودسازمانده.

خوشه‌بندی با شبکه نقشه خودسازمانده



الگوریتم SOM



$$\|x - m_b\| = \min\{\|x - m_i\|\} \quad (1)$$

BMU

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: () i

$$m_i(t+1) = m_i(t) + \alpha(t)h_{bi}(t)(x(t) - m_i(t)), \quad (2)$$

() t

SOM

$$0 < \alpha(t) < 1$$

$$\frac{1}{C} \sum_{j=1}^C \max_{l \neq j} \left\{ \frac{S_c(Q_j) + S_c(Q_l)}{d_{ce}(Q_j, Q_l)} \right\} \quad (3)$$

()

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$h_{bi}(t)$

[]

$$\frac{S_c(Q_j)}{d_{ce}(Q_j, Q_l)}$$

نحوه خوشه‌بندی و نرمالسازی داده‌های ورودی

$$h_{bi}(t) = \exp\left(-\frac{\|r_i - r_b\|^2}{2\sigma^2(t)}\right), \quad (4)$$

i b

$$r_b \in R^2 \quad r_i \in R^2$$

$\sigma(t)$

SOM

\sqrt{N}

N

SOM

[]

()

$$E = \sum_{i=1}^N \sum_{j=1}^C h_{bi} \|x_i - m_j\|^2 \quad (5)$$

$h_{bi}(t)$

C

x_i

BMU

b

j

)

SOM ()

(

$$y_{new} = \frac{y_{old} - mean}{std}, \quad (6)$$

y_{new}

y_{old}

std $mean$

پیش‌بینی با شبکه عصبی پیشخوراند

FFNN (FFNN)

$$a^2 = f^2(W^2 f^1(W^1 p + b^1) + b^2) \quad ()$$

$f^1 f^2$

$W^1 W^2$

p

$b^1 b^2$

داده‌های ورودی

پیش‌پردازش داده‌ها

الگوریتمهای آموزش شبکه

					%
(OSS)			(KMO)	- -	
	(BFGS)	- - -			
(RP)		(LM)	-	PCA	[]
	[]				

- الگوریتم پس انتشار خطای ارتجاعی

تعداد لایه‌ها، نرون‌ها و توابع تبدیل

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- الگوریتم برویدن-فلچر-گلدفارب-شانو(BFGS)

- الگوریتم لونبرگ-مارکوارت

$$X_{k+1} = X_k - A_k^{-1} \cdot g_k$$

()

$$H = J^T * J$$

J

$$g = J^T * e$$

e

« () »

$$X_{k+1} = X_k - [J^T J + \mu I]^{-1} J^T e$$

()

μ

BFGS

μ

n

$n^2 * n^2$

()

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- الگوریتم شبه نیوتنی تقاطع یک مرحله‌ای

OSS

RP

LM

BFGS

«

»

(MAPE)

MAPE

()

)

(

جدول ۳: مقایسه نتایج بدست آمده از سه مدل پیش بینی.

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MAPE (

(MSE)

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SOM

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MAPE

MAPE

$$MAPE = \frac{1}{M} \sum_{i=1}^M \frac{|actual(i) - forecast(i)|}{actual(i)} * 100\% \quad ()$$

$$actual(i) \quad M$$

$$i \quad forecast(i) \quad i$$

نتایج پیش بینی

OSS, BFGS, LM, RP

نتیجه گیری

BFGS, LM, RP
PCA

OSS,

جدول ۴: مقایسه نتایج کلی بدست آمده از چهار مدل پیش بینی.

				MAPE

تقدیر و تشکر

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واژه‌های انگلیسی به ترتیب استفاده در متن

- 1 - Artificial Intelligence
- 2 - Artificial Neural Networks
- 3 - Self-Organizing Map
- 4 - Feed forward
- 5 - Quasi-Newton
- 6 - Gray
- 7 - Steepest Descent
- 8 - Levenberg-Marquardt
- 9 - Broyden-Fletcher-Goldfarb-Shanno
- 10 - One Step Secant
- 11 - Deterministic Annealing
- 12 - Map Units
- 13 - Best Matching Unit
- 14 - Neighborhood Kernel
- 15 - Davies-Bouldin Index
- 16 - Spherical Clusters
- 17 - Random Order Incremental Training
- 18 - Lag
- 19 - Principal Component Analysis
- 20 - Rotated Component Matrix
- 21 - Kaiser-Meyer-Olkin Measure of Sampling Adequacy
- 22 - Mean Absolute Percentage Error
- 23 - Mean of Square Error