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(R<sup>2</sup>)

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( )

( ) (ANN<sup>1</sup>)

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(. ( ) ) ( )

ANN ( )

/ ) / (

(Bowden, et al 2005)

(Cannas, et al 2006)

ANN

Liu, et al

(Karaca, F., Özkaya, B. 2006 ) (Chi, et al, 2005)(2002)

(Sahoo, et al. 2006

(WNN<sup>2</sup>)

Haykin, 1999 Maier ANN

(Sheng, & Li., 2004)

(&, Dandy. 2000 (Shujiang, & Henry. 2007)

ANN

)

(. (WT<sup>3</sup>) ANN

WNN

ANN

Cybenko, G.1989,Hornik, et al., 1989, Zhang,

(et al. 1998

(Zhang, et al. 1998)

Coulibaly,

(et al., 2000)

)

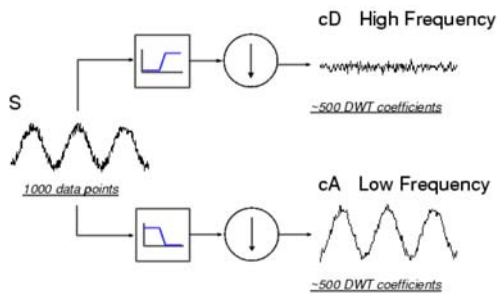
Maier &, Dandy. ANN (

(2000)

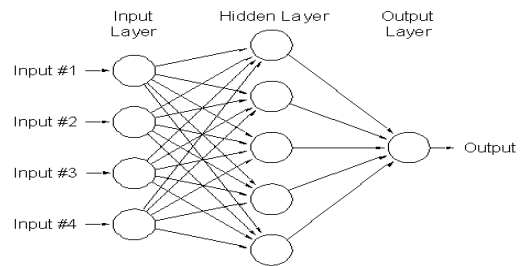
( )

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Feed forward

( )

(S+P(4,4))

(Calder bank, et al. 1997)

$R^2$  : (RMSE<sup>16</sup>) (MAE<sup>15</sup>)  
 (AARE<sup>17</sup>)

$R^2$

‡ (Jain, & Indurthy, 2003)(TS<sup>18</sup>)

(Jain, & Ormsbee, 2004

x% TS<sub>x</sub>

(ARE<sup>19</sup>)

x% TS

$$TS_x = \frac{Y_x}{n} \times 100$$

( )

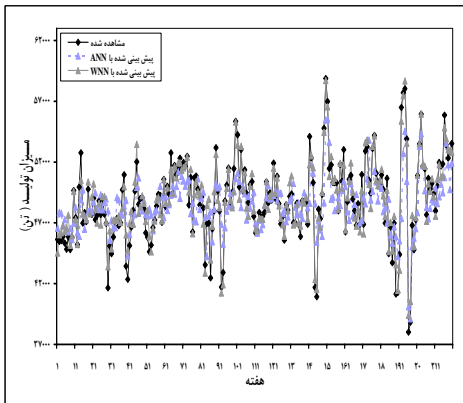
$$C(\text{Scale}, \text{Position}) = \int_{-\infty}^{+\infty} f(t) \psi(\text{Scale}, \text{Position}) dt \quad ( )$$

$$CWT_s^{\psi}(a, b) = \frac{1}{\sqrt{|a|}} \int_{-\infty}^{+\infty} s(t) \psi_{a,b}^*(t) dt \quad ( )$$

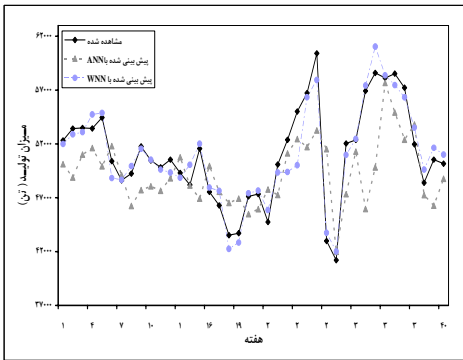
a                  b                  a

\*                                  b ( )

(t) S (t)



( )  
WNN ANN



( )  
WNN ANN

WNN ANN

( )

ANN ARE ( )

WNN

ANN

/

WNN

WNN

$Y_x$   
(n)  
x%  
( )  
Rajurkar, ( )  
(et al. 2004)

$$N = 0.8 \times \frac{(X_i - MIN_{X_i})}{(MAX_{X_i} - MIN_{X_i})} + 0.1 \quad ( )$$

$$MAX_{X_i} \quad MIN_{X_i} \quad i \quad X_i ( )$$

N i

/ /

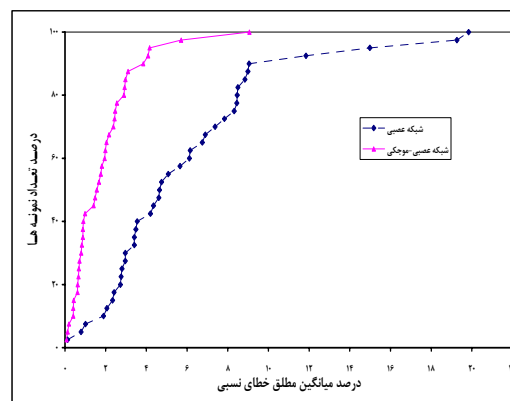
( )  
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( )

(S+P(4,4))

WNN ANN

	ANN	WNN	ANN	WNN
RMSE	/	/	/	/
MAE	/	/	/	/
AARE	/ %	/ %	/ %	/ %
R <sup>2</sup>	0.51	0.94	0.4	0.91

- 1- Artificial Neural Networks
- 2- Wavelet-Neural Network
- 3- Wavelet Transform
- 4- Wavelet
- 5- Non-Stationary
- 6- Continence Wavelet Transform
- 7- Discrete Wavelet Transform
- 8- Scale
- 9- Translation
- 10- Mother Wavelet
- 11- Scales & Positions
- 12- Approximations
- 13- Details
- 14- Haar Wavelet
- 15- Mean Absolute Error
- 16- Root Mean Square Error
- 17- Average Absolute Relative Error
- 18- Threshold Statistic
- 19- Absolute Relative Error
- 20- Ant wavelet



:( )

WNN ANN

( )

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