

The Application of the Analytic Hierarchy Process and a New Correlation Algorithm to Urban Construction and Supervision Using Multi-Source Government Data in Tianjin

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This section presents the comparison matrices of five correlation factors among four approval items in two different construction projects. The comparison matrices have no quantitative description of degree of correlation in section 1 while they have in section 2.

Section 1

Construction project A

Pre-post Relationship Spatial intersection Project name

$$\begin{bmatrix} 1 & 1/2 & 1 & 1 \\ 2 & 1 & 2 & 2 \\ 1 & 1/2 & 1 & 1 \\ 1 & 1/2 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 1/3 & 1/3 \\ 1/3 & 1 & 1/5 & 1/5 \\ 3 & 5 & 1 & 1 \\ 3 & 5 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 1/4 & 1/2 \\ 1/2 & 1 & 1/5 & 1/3 \\ 4 & 5 & 1 & 3 \\ 2 & 3 & 1/3 & 1 \end{bmatrix}$$

Project unit Location description

$$\begin{bmatrix} 1 & 1/5 & 1 & 1 \\ 5 & 1 & 5 & 5 \\ 1 & 1/5 & 1 & 1 \\ 1 & 1/5 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1/2 & 1 & 2 \\ 2 & 1 & 2 & 3 \\ 1 & 1/2 & 1 & 2 \\ 1/2 & 1/3 & 1/2 & 1 \end{bmatrix}$$

Construction project B

Pre-post Relationship Spatial intersection Project name

$$\begin{bmatrix} 1 & 1 & 3 & 2 \\ 1 & 1 & 3 & 2 \\ 1/3 & 1/3 & 1 & 1/2 \\ 1/2 & 1/2 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1/8 & 1 & 1/8 \\ 8 & 1 & 8 & 1 \\ 1 & 1/8 & 1 & 1/8 \\ 8 & 1 & 8 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1/4 & 2 & 2 \\ 4 & 1 & 5 & 5 \\ 1/2 & 1/5 & 1 & 1 \\ 1/2 & 1/5 & 1 & 1 \end{bmatrix}$$

Project unit Location description

$$\begin{bmatrix} 1 & 1 & 5 & 5 \\ 1 & 1 & 5 & 5 \\ 1/5 & 1/5 & 1 & 1 \\ 1/5 & 1/5 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1/2 & 4 & 3 \\ 2 & 1 & 5 & 4 \\ 1/4 & 1/5 & 1 & 1/2 \\ 1/3 & 1/4 & 2 & 1 \end{bmatrix}$$

Section 2

Construction project A

Pre-post Relationship	Spatial intersection	Project name
$\begin{bmatrix} 1^{(1)} & 1/2^{(1.5)} & 1^{(1)} & 1^{(1)} \\ 2 & 1^{(1.5)} & 2 & 2 \\ 1 & 1/2^{(1.5)} & 1^{(1)} & 1^{(1)} \\ 1 & 1/2^{(1.5)} & 1 & 1^{(1)} \end{bmatrix}$	$\begin{bmatrix} 1^{(2)} & 3 & 1/3^{(3)} & 1/3^{(3)} \\ 1/3^{(2)} & 1^{(1)} & 1/5^{(3)} & 1/5^{(3)} \\ 3 & 5 & 1^{(3)} & 1^{(3)} \\ 3 & 5 & 1 & 1^{(3)} \end{bmatrix}$	$\begin{bmatrix} 1^{(1.5)} & 2 & 1/4^{(3)} & 1/2^{(2)} \\ 1/2^{(1.5)} & 1^{(1)} & 1/5^{(3)} & 1/3^{(2)} \\ 4 & 5 & 1^{(3)} & 3 \\ 2 & 3 & 1/3^{(3)} & 1^{(2)} \end{bmatrix}$

Project unit	Location description
$\begin{bmatrix} 1^{(1)} & 1/5^{(3)} & 1^{(1)} & 1^{(1)} \\ 5 & 1^{(3)} & 5 & 5 \\ 1 & 1/5^{(3)} & 1^{(1)} & 1^{(1)} \\ 1 & 1/5^{(3)} & 1 & 1^{(1)} \end{bmatrix}$	$\begin{bmatrix} 1^{(2)} & 1/2^{(2.5)} & 1 & 2 \\ 2 & 1^{(2.5)} & 2 & 3 \\ 1^{(2)} & 1/2^{(2.5)} & 1^{(2)} & 2 \\ 1/2^{(2)} & 1/3^{(2.5)} & 1/2^{(2)} & 1^{(1.5)} \end{bmatrix}$

Construction project B

Pre-post Relationship	Spatial intersection	Project name
$\begin{bmatrix} 1^{(2)} & 1^{(2)} & 3 & 2 \\ 1 & 1^{(2)} & 3 & 2 \\ 1/3^{(2)} & 1/3^{(2)} & 1^{(1)} & 1/2^{(1.5)} \\ 1/2^{(2)} & 1/2^{(2)} & 2 & 1^{(1.5)} \end{bmatrix}$	$\begin{bmatrix} 1^{(1)} & 1/8^{(4.5)} & 1^{(1)} & 1/8^{(4.5)} \\ 8 & 1^{(4.5)} & 8 & 1 \\ 1 & 1/8^{(4.5)} & 1^{(1)} & 1/8^{(4.5)} \\ 8 & 1^{(4.5)} & 8 & 1^{(4.5)} \end{bmatrix}$	$\begin{bmatrix} 1^{(1.5)} & 1/4^{(3)} & 2 & 2 \\ 4 & 1^{(3)} & 5 & 5 \\ 1/2^{(1.5)} & 1/5^{(3)} & 1^{(1)} & 1^{(1)} \\ 1/2^{(1.5)} & 1/5^{(3)} & 1 & 1^{(1)} \end{bmatrix}$

Project unit	Location description
$\begin{bmatrix} 1^{(3)} & 1^{(3)} & 5 & 5 \\ 1 & 1^{(3)} & 5 & 5 \\ 1/5^{(3)} & 1/5^{(3)} & 1^{(1)} & 1^{(1)} \\ 1/5^{(3)} & 1/5^{(3)} & 1 & 1^{(1)} \end{bmatrix}$	$\begin{bmatrix} 1^{(2.5)} & 1/2^{(3)} & 4 & 3 \\ 2 & 1^{(3)} & 5 & 4 \\ 1/4^{(2.5)} & 1/5^{(3)} & 1^{(1)} & 1/2^{(1.5)} \\ 1/3^{(2.5)} & 1/4^{(3)} & 2 & 1^{(1.5)} \end{bmatrix}$