

## ***New Approach for Modeling and Planning Team Activities in Space-Time***

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### ***ABSTRACT***

Humans are social creatures who interact with others in doing their activities. The social activities occur in space and time. Therefore, a proper model of human activities must consider the two dimensions of space and time simultaneously. This paper attempts to model human activities in spatio-temporal domain to improve the efficiency of group activities. For this purpose, Hagerstrand theory is evaluated and extended for managing human team activities in space and time. The suggested model can be implemented in a Geospatial Information System and helps resolving multidimensional problem in their proper environment. To assess the proposed model, activities of two teams: life-detection and collapse lifting in two forms of normal and simulation were assessed. The proposed strategy improved the activities by a factor of 18.83.

### ***KEYWORDS***

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Spatio-Temporal modeling, Group activities, Hagerstrand theory, Geospatial Information System.

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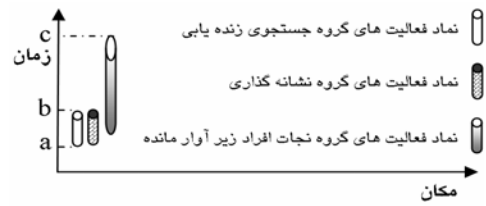
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(Space Time Prism)

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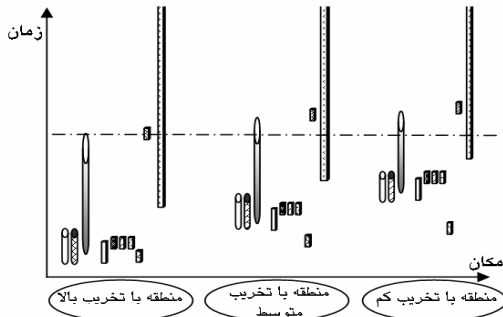
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t  
[a,b]

J(t)

( )

$\bar{J}$

$$\bar{J} = \frac{1}{b-a} \int_a^b J(t) dt$$

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J(t)

$\bar{J}$

$J(t) = n$

n

$F(t) = t(t)$

J(t)

n J(t)

J(t)

$F(t) = t(t) + t(t)$

J(t)

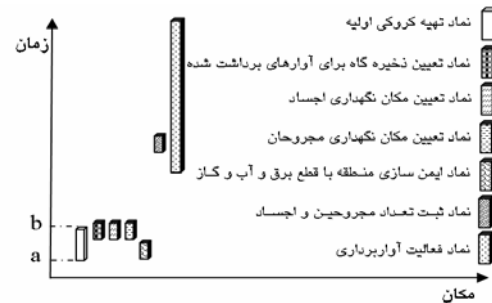
[ t + t + ... + t<sub>n</sub> ]

$F_{max} = t + t + ... + t_n$

( ) [ F<sub>max</sub> ]

$$\bar{J} = \frac{1}{F_{max}} \{ nt_{[1]} + (n-1)t_{[2]} + \dots + 2t_{[n-1]} + t_{[n]} \}$$

( )



( ) :

a

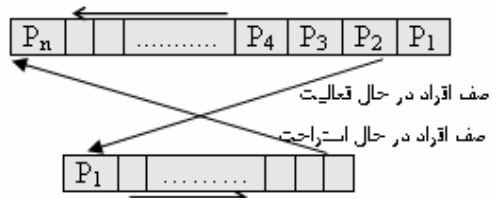
b



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$J(t)$

$$\bar{J} = A / F_{\max}$$



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