

# A Mathematical Model to Describe Sense Ecosystems and Seven Senses

Salmani D<sup>1\*</sup>, Khaneghah EM<sup>2</sup>, Salmani A<sup>1</sup> and Nobari S<sup>1</sup>

<sup>1</sup>School of Management, University of Tehran, Tehran, Iran

<sup>2</sup>Center of High Performance Computing for Parallel and Distributed Processing, Calabria, Italy

## Abstract

The notion of sense is one of the scopes in which two anthroposophy notions of Reductionism and System Thinking have tangible and objective appearance that with growth and sublimation, the sense of using both contents is proposed as a necessity. The systematic view is used to understand the sense in lower layers according to view of reductionism in meaningful layers. In this article a mathematical pattern for describing the Ecosystem of the emotions is used with redefining the human emotion communications and interactions for recognition and perception of environment and defining the definition of functional distortion in the time of activity emotions. The function of human emotions ecosystem is rational of this content that if an interaction distortion or dynamic distortion happens in the process of answering to emotions, there is a need to end this process. In this a mathematical pattern based time description for happening the dynamic distortion and interaction distortion is proposed.

**Keywords:** Seventh sense; Human emotions ecosystem; Emotional dynamic; Interaction distortion; Global emotional activity

## Introduction

The notion of human sense and its recognition have been one of the human's fundamental challenges during various centuries [1-4]. Although recognition of this notion is as old as human age, the nature and quality of its function and role in human evolution and development and also its dimensional nature and the most important of all, the final and ultimate goal of sense existence in human have been included in different philosophical scopes such as neurology, psychology, cognitive science, management and, in 21<sup>st</sup> century, interdisciplinary fields such as creation of macro scale management systems [5-9]. What has been noted during human written history relies on this basis that human being has 5 intrinsic senses which make human perceptual forces. Although some of these five intrinsic and main human senses are mutual between human and animal, the existence of specific features regarding each sense makes the definition of human as a system which can comprehend their environment based on their own five main senses [10-12]. The notion of sense is a scope in which the two anthroposophy notions of reductionism and system thinking have tangible and objective appearance [13-16]. In other words, different science scopes, in spite of having intuition notions in common, frequently use Reductionism or System Thinking procedure for recognizing the notion of sense and their intended results due to the nature of science and specific scopes of science. Using Reductionism patterns leads to discussing and explaining the features of each sense, effectiveness and impressiveness on each feature by other features, analysis of necessary features and the role of features in reaching their goal and also features' interactions with each other regarding any specific sense, and consequently in higher levels, features' communication and interaction regarding different senses. On the other hand, in System Thinking patterns, the focus is on cognitive systems in which the sense is defined. In this approach, the system of individual life can be considered as a reference system regarding five intrinsic senses and the role of each element (sense) in reaching the final and ultimate goal of individual life system can be investigated [17,18]. Without entering the details of functional nature of sense and using common patterns of reductionism for recognizing sense nature and the interaction between senses, we can explain the subject, through a systematic approach, that sense is the subsystems under a tree system which makes the living system able to continue its life or reach a constant state. Such an approach results

in decision making on internal interactions of features with each other or with other features and also interactions between the elements of final and ultimate goals of life systems and the features of any sense regarding the nature, function and pattern dominant on human feelings, without entering the details of features [1,19,20]. The actual functional appearance of such a pattern can be seen in recognition of sixth sense in human. Sixth sense cannot be comprehended based on reductionism pattern and by using inductive recognition. It may only be understood when a comprehensive system can be considered as the life system. Then, deductions and conclusions are drawn without entering the details of its functional elements and only depending on system thinking pattern regarding the existence nature of such a sense in human. Although using system thinking pattern is an appropriate instrument for recognition of nature, function and space dominant on human sense and its role in living system space, using it will bring some new challenges in human sense cognition scope. Looking back to patterns used by human during prolonged centuries for human sense recognition (except for particular cases regarding sixth sense), we will understand that, taking into account the lack of an exact space regarding sense nature, pattern used by human for recognizing the existence nature of sense has been based on intuition [21].

Entering 21<sup>st</sup> century and by creation of system distortion notions, the ecosystems of human sense were affected as well [21-23]. The notion of system distortion of 21<sup>st</sup> century is a notion beyond that of unpredictable events defined in 20<sup>th</sup> century systems. The creation of ecosystem notion (a set of systems communicating each other in which the notion known as overall action is created) leads to bringing up a new notion under the title of system distortion which its nature is distinct from that of 20<sup>th</sup> century named as unknown conditions and

**\*Corresponding author:** Salmani D, School of Management, University of Tehran, Tehran, Iran, Tel: +98 21 8800 3575; E-mail: [salmani@ut.ac.ir](mailto:salmani@ut.ac.ir), [article\\_salmani@yahoo.com](mailto:article_salmani@yahoo.com)

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unpredictable events [24,25]. Defining human sense ecosystem and using system thinking pattern makes it possible that an interaction nature of senses in a circle, known as global actions be defined, based on a functional pattern, without entering various details of sense in specific science majors; Make decisions according to the nature of global actions circle regarding what this circle needs for self-completion and contacting what is known as human emotional distortions (or the lost puzzle of human emotions) in order to reach the final and ultimate goal of general living system.

If this matter can be discussed and described based on a mathematical pattern, it can be used as a cognitive framework of human emotions. The present distortions in human emotions can be extracted using system thinking pattern. In addition, new spaces can be defined if it would be possible to define an appropriate ecosystem for substantial function of human emotions.

In this article, it is first tried to discuss the generator space of sense according to system thinking pattern and further the effective spaces (effective and being affected) on emotion space will be discussed based on generator space of emotion. During the time of defining the pattern that is on emotion, structural and notion communications and interactions of generator space of emotion and ecosystem, existence of the other generator space on the set of human emotions called the space of seventh sense [26-28] is proposed as a space of logical communication and interaction between the spaces of creator of the human emotions ecosystem in order to perform the global activities. The main challenge of this article is Management of global activities, emotions in ecosystem based on mathematical framework that is able to control and manage the global activity distortion during the occurring and able to manage the global activity based on distortion nature. This article has been analysis according to the view of the experts and scientists of behavior modeling in the framework of mathematical equations.

### The Mathematical Reference of Human Emotions

During previous centuries, using Reductionism pattern has been the dominant pattern on sense recognition. It was due to the nature of sciences which were in the process of recognizing the notion of sense and human emotion sets. What we need in these sciences is dividing each sense into some fundamental elements, discussing and describing the unique and specific features of each fundamental element in specific science scopes and extracting interactions and communications between senses, if needed for correct recognition of fundamental elements (not sense in its general meaning). On the other hand, even when we use system thinking pattern for sense recognition, the focus is on the recognition of functional nature and the necessity of each sense. In other words, any human sense (including five intrinsic senses and the sense producing human mental imagination regarding the environment and the system it is located in and sixth sense as the sense beyond material forms and as temporal motivating sense) is discussed abstractly as a sense in specific and unique spaces. For this purpose, we need to consider the ideal state of interactions, communications, and creation of response and control systems between all sense dimensions (including known and unknown ones) for reaching the ultimate and final goal of human life comprehensive system. We call this ideal state, major configuration of human sense and at first, we assume that the creator of human sense system makes it possible for human kind to reach the ultimate and final goal of human life comprehensive system, in a particular combination of interaction, communication, developing response and control structures between all senses, We call such a situation, major and ideal configuration of human sense. Equation shows how the overall outline of main sense configuration:

### Main sense configuration

$$\begin{aligned} & \text{Mapping} \lim_{\substack{\rightarrow \text{Time and location} \\ \rightarrow \text{Stable}}} (\text{Human life comprehensive})_{\text{Space}} \\ & \text{Mapping} \rightarrow \text{Time and location}^{\text{Lim}} \rightarrow \text{Stable} (\text{Human life Comprehensive system})_{\text{space}} \end{aligned} \quad (1)$$

As you see in Eq. (1), an ideal configuration of human senses to ultimate goal space of human life comprehensive system is a mapping of all sense's space (including known and unknown) which is itself an N-dimensional space, each dimension of which consists of M elements to the generator space of final and ultimate goal of human life comprehensive system; A unique space and developed in each person based on their ideas, aims, outlooks and school. During ideal mapping, time and location are in equilibrium as two adverbial factors generator of ultimate and final goal in human life comprehensive system. Eq. (1) includes following important points each of which is considered as a main principle in this article.

1) This equation is only and only definable by the creator of human system. The existence of time and location transfer in the range system of function 1 makes it necessary for the creator to be free of time and location in order to define Eq. (1) for any existing element in human life comprehensive system

2) As shown in ideal configuration, the space of scope is dependent on an N-dimensional space consisting of K subspaces and each subspace can consist of M elements. There is no rendering necessity that M amount be equal in all subspaces. For the sake of simplicity, it is supposed in this article that M is the biggest number between M1 and M2 and in the case of a space lack value regarding an element and the element is not defined in it, the value NULL is used for representing that element in space.

3) The mapping between domain and range of function 1 is a mapping from M\*N\*K three dimensional space to a one dimensional and single space in the time when the two adverbial notions of function's range space (time and location) are in their stable state.

The above mapping is a Non-Euclidean mapping, because in worst situation, due to consideration of two time and location spaces as adverbial spaces of function range, the mapping function is itself a four dimensional mapping between two spaces of 3-dimension and one space of one-dimension that its numerical figures cannot be performed based on algebra and fundamental geometric drawings.

On the other hand, it is important to bear in mind that the above mapping is an execution time mapping. In each moment of human life, the system of human sense space tries to reach the ultimate and final goal of human life comprehensive system; since life continuation possibility is one of the subspaces generator of ultimate goal space in human life comprehensive system space. Therefore, the accuracy of establishing Eq. (1) should be evaluated in each moment t=tE of human life system. So, the nature of Eq.

Eq. (1) is an execution time equation. What is known as a challenge to establish Eq. (1) can be discussed in both domain and range scope of function which its nature is an execution time events' nature.

Regarding the domain of function 1, it should be noted that between both spaces of Sensej and Sensei,  $i <> j$ , Eq. (2) can be used for defining interactions, communications and control and response structures.

$$\neq j \text{ Then } \sum_i^{j=1} (\text{page}_{\text{Space}^{(i,j)}}) | \exists \text{Global}_{\text{Work}} | \in \text{page}_{\text{Space}^{(i,j)}} \text{ and } p \in \text{Global}_{\text{Space}} \ni \text{page}_{\text{Space}^{(i,j)}} \&\&$$

$$\begin{aligned}
 \text{Relation page}_{\text{Space}^{(i,j)}} &= \text{Global}_{\text{work}} \left| \text{Globa}_{\text{work}^a} \int \text{Space}_{\text{Generator}(\text{Time, Location, Local}_{\text{Sense}})^{k,k}} \right| \\
 &\left( \text{Global}_{\text{Work}}^{\text{Response}} \left( \text{Initial}_{\text{Sense}}^{\text{Time, Location}} \right) \&\& \left( \text{Initial}_{\text{Sense}}^{\text{Time, Location}} \left| \forall \text{Sense}_{\text{Control Sense}}^{\text{Time, Location}} \right. \right) \right) \quad (2)
 \end{aligned}$$

Eq. (2) is very complex in the real world and consists of interactions and communications of sense space  $i$  and  $j$  to each other and all other middle spaces. Although human mind is able to compute Eq. (2) subconsciously, its computation based on common patterns of mathematics is a real complex and difficult task. The most important submission of Eq. (2) is in middle spaces and the way of interaction between these spaces and  $i$  and  $j$  spaces when its geometric form is a Non-Euclidean irregular dependent on the time and location of irregular formation. Therefore, formation of interaction and communications based on time function and also the dependence of irregular geometry of function 2 to time and location lead to some distortions in domain of function 1 based on Eq. (2) in a way that during some times of system life, the mapping of Eq. (1) is not possible.

In this article, we bring up these distortions, dependent on time and location resulting from interactions and communications and also formation of new communication elements, under the title of dynamic and interaction distortions.

Considering the range of function 1, the ultimate and final goal of human life comprehensive system in a unique space is independent of time and location. So, separating time and location dimensions from above space leads to definition of the range of function 1. Now, if we have a time and location function in the form of no.3, the definition of range will be violated.

Eqs. (1) and (2) represent a new kind of system notions. It is shown in these equations that sense system is not based on a single system but it is a set of systems which, according to function 2, have mutual interactions, communications and control and response structures for executing an (or some) actions. Generally, these sets of systems are called ecosystems in which constituent systems of ecosystem are reaching Eq. (1) based on Eq. (2). On the other hand, if the two factors of time and location are considered as independent variables in an ecosystem, Eq. (2) is written in the form of Eq. (3) and Eq. (1) will be in the form of Eq. (4).

$$\begin{aligned}
 \forall_{i,j,i} \neq j \text{ then} \\
 \therefore \sum_{\text{Location}_{\text{end}}}^{\text{Location}_{\text{end}}} \left( \int_{\text{Time}_{\text{start}}}^{\text{Time}_{\text{end}}} \sum_i^{j \neq i} (\exists \text{Global}_{\text{work}} \left| \in \text{page}_{\text{Space}(i,j)} \text{ and } P \in \text{Global}_{\text{Space}} \right) \&\& \right) \\
 \int_{\text{Time}_{\text{Start}}}^{\text{Time}_{\text{End}}} \left( \sum_{\text{Location}_{\text{End}}}^{\text{Location}_{\text{end}}} (\text{Relation page}_{\text{Space}^{(i,j)}}) \right) \\
 \equiv \text{Global}_{\text{Work}} \left| \text{Global}_{\text{Work}^a} \int (\text{space}_{\text{Generator}(\text{Time, Location, Local})} \text{Sense}_{\text{time-limitation}}^{\text{biary}}) \right| \\
 \int_{\text{Time}_{\text{Start}}}^{\text{Time}_{\text{End}}} \left( \sum_{\text{Location}_{\text{End}}}^{\text{Location}_{\text{end}}} \left( \text{Initial}_{\text{Sense}}^{\text{Time, Location}} \right) \&\& \text{global}_{\text{work}}^{\text{Control}} \left( \forall \text{Sense}_{\text{Control Sense, Time Limitation}}^{\text{Time, Location}} \right) \right) \quad (3)
 \end{aligned}$$

Eq. (3) is an expansion of Eq. (2) based on two independent variables of time and location as major parameters of changing ecosystem to Exascale system. In Eq. (4), the first part, developing a common space between the two senses  $i$  and  $j$ , changes from an algebraic constant, non-Euclidean space to a temporal continuous and locational discrete space. The reason is the highly effective nature of time on interactional space between two  $i$  and  $j$  senses. During formation of interactional and communicational spaces between the two senses, time factor has higher impressiveness and effectiveness relative to interaction page formation location. Therefore, integral is prior to addition. On the other side,

page space changes from a non-Euclidean space, extractable form Latin square, to a non-Euclidean space with two time and location factors. Regarding response and control structure (dynamic distortion), we see two integral and sum processor present in Eq. (4) contrary to Eq. (2). In these two structures, addition is prior to integral due to high dependence of structure to formation location in sense ecosystem. Moreover, interaction space between two  $i$  and  $j$  senses for developing a control and response structure changes from a non-Euclidean space to a non-Euclidean space dependent on time and location. The two notions of limit and time and location conditions are taken into account as major factors of developing dynamic and interaction distortions. Eq. (4) is an extension of Eq. (1) in ecosystem.

$$\begin{aligned}
 \forall \text{Global}_{\text{Activity}_i}, 1 \leq i \leq 7 : i \in \{ \text{list of active progress} \} \text{ then } \Omega_i \\
 = \int_{t=\text{start}}^{t=\text{end}} \left( \lim_{t \rightarrow \text{stable}_{\text{time}}} (\text{Sense}_{\text{Space}_1}, \dots, \text{Sense}_{\text{Space}_M})^{N^{\text{th}}} \right) \\
 = \int_{t=\text{start}}^{t=\text{end}} \left[ \text{Activity}_i \text{ in } \text{Sense}_{\text{Space}_1} \otimes \dots \otimes \int_{t=\text{start}}^{t=\text{end}} \text{Activity}_i \text{ in } \text{Sense}_{\text{Space}_M} \right]_{\text{min time acceptance}}^{\text{max time acceptance}} \quad (4)
 \end{aligned}$$

In Eq. (3), contrary to Eq. (1), the domain of function goes out of a domain of space sets by developing ecosystem and changes to an N-dimensional space each consisting of M time and location elements and on the other hand each N space is itself describable based on time and location. This matter makes the  $N^*M^*K$  non-Euclidean space of referent ecosystem change into a movable non-Euclidean space in time and location dimension which is generally a set of discrete time and location points being in process of developing a convergent temporal and locational series to equilibrium state. The range of function 5 is a continuous movable space of time and location contrary to function 1. The continuity of this non-Euclidean space results from the fact that the ultimate and final goal of life comprehensive system is a determined and specific goal which can be defined in  $\infty$  and each temporal moment of the whole system is continuously moving to infinity.

Eqs. (3) and (4) represent a notable point about ecosystem: if we look at the integrals and sums defined in equations 3 and 4, we will understand that contrary to Eqs. (1) and (2), they have higher and lower limits. The reason goes back to the notion known as global actions. There is no necessity for developing a global action in an ecosystem and we can just use the nature of ecosystem interaction and communication description. This is while the nature of formation is based on the notion of global actions in ecosystem and it develops a new instance of its reference ecosystem for each global action which has its own dynamic and interaction distortions.

In this case, according to the possibility of any dynamic and interaction distortions, the ecosystem changes to an ecosystem to be able to manage the ecosystem based on the management framework for contacting distortions, so that:

- (1) Not to violate the substantial structure of constituent spaces;
- (2) To help global action be executed without any need of change;
- (3) To let any kind of change in constituent spaces have the capability of applying in performance time in a way that ecosystem structure not be disintegrated; and
- (4) To have the structure of ecosystem not need a pivotal element for controlling and managing a global action.

### Ecosystem of Emotions and Seventh Sense

According to the defined things based on Eqs. (3) and (4) in the second part, the possibility of occurrence of dynamical and interaction

distortion natures, changes the sense system to an ecosystem of emotions. In defined ecosystem opposite of reference system, because of the Eq number 5 as an ideal function of configuration of human emotions space, there is need to define communications between systems (systems which are the constituent of ecosystem) and open vulnerability of Eq number 5 for using the management pattern for facing to dynamical and interaction distortions.

$$\text{if } \left( \begin{array}{c} \left( \text{Sense}_{\text{Exascale Domain}} \right) \\ \sum_{t,l=\text{start}}^{t,l=\text{epmlete}} \lim_{t,l \rightarrow \text{stable state}} \left( \text{Sense}_{1\text{Space}}, \dots, \text{Sense}_{k\text{Space}} \right)_{M,t,l}^{N^{\text{th}}} \\ \left( \text{Sense}_{\text{exascale Range}} \right) \\ \int_{\text{Time and location} \rightarrow \text{Stable}} \lim_{\text{(human life Comprehensive system)}_{\text{Space}}} \end{array} \right) \xrightarrow{\text{Mapping}}$$

and

( $\mathfrak{S}$ ) means Scalinity and ( $\mathfrak{R}$ ) Means Openness then

$$\left( \text{Sense}_{\text{Exascale domain}}, \text{Sense}_{\text{Exascale Range}}, \mathfrak{S}, \mathfrak{R} \right) \quad (6)$$

In ecosystem because of existence of basic system and the movement of domain space of function number 5 during time and place, in management pattern, such ecosystems, each executive element (in a system which is constituent of ecosystem) makes decision independently and performs its activities with using the information of its local neighbors (or existed neighbors in logical neighbor systems) if it needs the global information. In such an ecosystem, one local activity is being created somehow the performing element not being able to answer the global activity, therefore it uses Eq number 5 for transforming local activity to global activity.

When an emotional activity is changing from local condition to global condition, so the performing element is trying to transfer the global emotional activity to other performing element based on management pattern that has relative advantages in answering to the request which that could not be answered by performing element. If performing element of the neighbor is not capable of performing, the cycle of transferring is continuing until process of answering to the emotional request ending in ecosystem level and this answering cycle to the request in ecosystem level called global activity. But the important thing is the reason of creation of such a request about activity I.

Paying attention to this content is necessary that checking the nature of global emotional activity actually is recognition of this content that how can global emotional activity be answered by seventh sense.

In this article, definition pattern of comprehensive condition for ecosystem is being used in order to checking the global emotional activity. The most important advantage of using the comprehensive condition pattern for checking the ecosystem is defining the stable condition in ecosystem and defining the nature of global emotional activity in stable condition. This due Eq 4 is proposed in the form of Eq 6. Symbol  $\Omega$  is used as global activity in Eq 6.

$$\forall \text{Global}_{\text{Activity } I} \because i \in \{\text{list of active progress}\} \text{ then } F = \int_{t=\text{start}}^{t=\text{end}} \left( \lim_{t \rightarrow \text{stable state}} \left( \text{sense}_{1\text{space}}, \dots, \text{sense}_{k\text{space}} \right)_{M^{\text{th}}} \right) = \int_{t=\text{start}}^{t=\text{end}} \left[ \int_{t=\text{start}}^{t=\text{end}} \text{Activity}_i \text{ in sense}_1 \text{ space } \emptyset \dots \emptyset \right]_{\substack{\text{max time acceptance} \\ \text{min time acceptance}}}$$

Eq 6 is showing the timing function of global activity of  $i$  in ecosystem. Eq 6 is the developed part of the domain of Eq 5 in terms of time variable of global activity of  $i$  in ecosystem. In Eq 6 activity of  $i$  could be created by each emotion of members of set {sense 1, ..., sense k}, so the starting point of  $i$  in ecosystem level can be one of the human emotions which is known or unknown (in this article 6 dimensions of the first set {sense 1, ..., sense k} known emotions and the seventh dimension that is appeared only in the case of dynamical and interaction distortion, called seventh sense space). Without entering and not being important that the global activity of  $i$  is created in which sense, the Eq 6 is trying to talk about the content that the needed time for performing the global activity of  $i$  is recognized from the performing time of global activity of  $i$  in any of human emotions space when the emotions space is in balance, and if we have M numbers of performing elements which are able to do a part (or whole part) of the global performing in emotional space of K independently.

On the other hand each emotional space is defined in N dimension form. This means that it is possible to describe the emotional space of K based on N numbers of the non-aligned vectors that each of these vectors characteristic space of K. In the other hand as Eq (6) be seen. The limit of up and limit of down are defined for the accepted time of performing of global actions of  $i$  in each space of K by existed performing element in the space of activity.

The major pattern of sense transfer (request) in this article is based on sense transfer pattern according to decentralized nature and is determined based on local information and also information of local executive neighbor elements by which the request must be responded. There are two important points regarding sense transfer pattern and global activity nature in Human sense ecosystems:

- The transfer pattern used in this article is based on information of local executive element and its rational neighbors.
- The pivot of human sense ecosystems is based on global activity notion. On the other hand, the executive element M in the space K is an element which has to execute a part (or all) of global activity so that the cycle of global activity is completed and human sense ecosystems reach their final and ultimate goal.

## Conclusion

- Using Reductionism pattern, we can present and describe the features of each sense, the nature of effectiveness and impressiveness on any feature by another feature, the analysis of feature necessity and the role of feature in reaching its goal and also the interaction of features with each other on a specific sense and consequently on interactions and communications between different senses.
- The pivot of System Thinking pattern is based on recognition of a system in which the sense is defined. From this perspective, generally, the individual life system can be considered as the reference system on 5 intrinsic senses and can also investigate the role of each element (sense) in reaching the final and ultimate goal of individual life system.
- The notion of distortion in systems has also affected human sense ecosystems. System distortion notion of 21<sup>th</sup> century is a notion beyond unpredictable events defined in 20<sup>th</sup> century systems. Forming the notion of ecosystem (a set of systems communicating each other in which the notion known as



overall action is created) leads to bringing up a new notion under the title of system distortion which its nature is distinct from that of 20<sup>th</sup> century named as unknown conditions and unpredictable events.

- The space generating sense is discussed and investigated based on System Thinking pattern and the effective (and impressive) spaces on sense space has been discussed based on sense generator space.
- Taking into account the ideal state of interactions, communications, development of control and response structure between all dimensions of sense (including known and unknown), we are in the way of reaching ultimate and final goal of human life comprehensive system. This ideal state is called main configuration of human sense and we primarily assume that the creator of human sense system (any existence which is the creator of this system and has entire control over the whole system), in a particular combination of interaction, communication, developing response and control structures between all senses, makes it possible for human kind to reach the ultimate and final goal of human life comprehensive system (any goal which is mentioned in introduction). We call such a situation, major and ideal configuration of human sense.
- Considering the change of nature and function in 21<sup>th</sup> century systems and also considering extensibility feature (in geographical, numerical and managerial dimension) and also considering the existence of interaction and dynamic distortion nature in this kind of systems and management transfer and system's fundamental and executive actions control from the time of design to the time of system execution, an ecosystem is called a macro scale.
- The most notable advantages of using general state pattern for Human sense ecosystems are definition of stable state in Human sense ecosystems and definition of global activity nature in stable state and temporal and locational transfer of Human sense ecosystems and the definition of global activity in unstable states.

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