Smart Home Space Design

Abstract: The resident buildings in the 21st century can be characterized with two distinctive paradigms. Smart home means that high technological, user-friendly, good qualitative living environment. The smart home creates variable living area by a user's requirements. It can be a prediction of digital lifestyle in the user's future. Smart home suggests harmony with sensitivity and also user-friendly, not just space for network or digital instrument, to cope with users' situation. Therefore finding solutions for the future living area is the purpose of this study as making it intelligently and sufficiently.

1. Introduction
A change of the architectural paradigm as we are living in 21 century, so called high technology and information age, demands also changes in many area of the society. These kind of changes will lead to user-friendly and high technology-information trend in our future living area. Smart home means that high technological, user-friendly, good qualitative living environment. Technologies that have been developed up to now represents designing of future housing as model houses related certain companies. The architectural technology of smart home for normal housing is mostly applied to the most essentialist technology for the high income family house or old house to improve the housing function of living area. The smart home creates variable living area by a user's requirements. It can be a prediction of digital technology in the future. It suggests corresponding smart home that is harmony with user's sensitivity and also user-friendly, not just space for network or digital instrument, to cope with the situation. Therefore finding solutions for the future living area is the purpose of this study as making it intelligently and sufficiently.

2. Smart Home
2.1 Definition
It could be defined that Smart Home is a residential space and system for corresponding to residents as an intelligent space combining a state-of-the-art engineering and information network for the physically existing residential components.

Table 1. Change of Smart Home

| Information | Automation | Intelligent |

2.2 Research Tendency
In Europe and America since 1980's, they attained noticeable results in the development of automation system and devices, and environmen-friendly architectural components, which continued the subsequent development in various fields to improve security, monitoring system, residential convenience, pleasantness and even entertainment. Then in 1990's, an early intelligent home adding informational function to home automation has been activated which has been under development by experimental houses. The housing industry worked for the related technological development but still needs more proficiency and progress to follow them.

3. Changes of a residential space
3.1 Changes of IT and Home Network
It is true that changes of social circumstances, these of living styles, these of housing technology and these of digital technology and IT made our residential style changed significantly. Automated residential life, pursuit for high performance and informationalization led household informationalization, which is developing toward integrated and complex networking with bidirectional interaction by wire and wireless telecommunication. Therefore, it gives a clue that soon we achieve the actual home network supportable to remotely work, educate, diagnose and administrate.

3.2 Changes of a residential space in Life Style
Life style of people, as our income level and intellectual level increase and economy is developed rapidly, are concerned about residential environment, increasing the attention on residential space either. For instances, we could easily see illegal alternation of a residential space or removal tendency. A space should be planned by positively utilizing variable components corresponding to the life styles of diverse residents.

4. Application Technology
4.1 Home Networking
To lead the stage of home automation to an intelligent residential culture with various systems linked, higher than the former in view of the current residential culture, it would require several technological supports. It should be based on sensors to detect residents' personnel information and interfaces to provide such information while all spaces and information should be always connected on net.
### Development Direction and Application Device

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<tr>
<td>Home Network</td>
<td>Information, Complex</td>
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<tr>
<td>Intelligent Sensor</td>
<td>High Technology, Connection</td>
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<tr>
<td>Human Interface</td>
<td>Communication, Simplicity</td>
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<td>Integration Space</td>
<td>Variability, Activity, Integration</td>
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<tr>
<td>Eco-Friendly</td>
<td>Saving of Energy</td>
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#### 4.2 Intelligent Sensor

Looking at houses using a system to detect external changes and respond to them, we could see that they use environment friendly components appropriately. As such mechanisms close or open walls and windows according to weather changes and provide various skins and information, it would satisfy tenants’ emotional desires and overcome the physical limits with the intellectually spatial changes.

#### 4.3 Human Interface

Interfaces between man and objects are not limited but shall play a role as an integrated interface containing walls, doors windows and spaces. A system to collect information of resident as following image is actively under development. It is therefore expected that a space itself would be an integrated interface.

#### 4.4 Spatial variability and integrity

The system seems to be a device to move walls, a cabinet door or a door to be hidden in a drawer; it must be a wall and door in itself. It is a method to form a space to be flexible and exchangeable by using a wall to be moved on a fixed hinge and transforming a spatial proportion. Since an intellectual environment itself accept user's emotional desires and service them without movement, it may require an integrated and multifunctional space, not a limited space.

#### 4.5 Environment friendly

An environmental friendly matter is a direction of our society as well as architecture. For a short-term, patterns of inefficient energy consumption in each household shall be controlled by high tech facilities and recyclable architectural materials shall be used. For a long-term, by using systems considering structure to increase building life, remodeling and remodeling, it shall be able to continue to improve the performances of an aged house and reduce the total energy consumption.

#### 5. Conclusion

In this study five concepts and components such as home network, intelligent sensor, human interface, spatial variability and integrity and environmental friendly orientation are suggested as smart technology application to smart home space design by anticipating the changes of residential space in the future and a plan for intelligent residential space which can be expressed in an actual physical space design.

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