Research on the Smart Home Healthcare, using Smart Technology Systems

- Focused on the bathroom space -

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Abstract: This study purposes the healthcare by defining smart technology and researching the current change of people’s need for well-being in the bathroom space. In future, it is necessary to develop the bathroom of varied purpose. With increasing interest in healthcare smart healthcare will be the major issues at smart home design, the study of the design a bathroom and figure out architectural relations how Smart Technology is applied in bathroom space and realizes a remote healthcare.

Key Word: Smart Technology, Bathroom, Healthcare

1. Introduction

1.1 Backgrounds and Purpose of the Study

The modern society is an era to pursue the quality of life, and the demands on environment-friendly and health-friendly aspects also in dwelling environment are increasing along with increasing interest for wellbeing. The uniform housing design provided up to the present has lost its competitiveness, and the concept on the housing is changing by the development of IT (Information Technology) like ubiquitous computing or home networking. With diversifying demands for dwellers and the change of various life cycles, the methods for wellbeing housing can be found by developing convenient housing environments. In particular, health check system, health care for the aged and weak, and environmental system for air quality improvement are being applied, and a bathroom is being recognized as a dwelling space for healthcare among the spaces for supporting a variety of life styles of dwellers, such as super high speed communications and home automation, security and entertainment. In this regard, the purpose of this study is to present the design factors of a bathroom for healthcare space by applying Smart Technology systems in a bathroom space.

1.2 Methods and Contents of the Study

Recently, due to the change in living styles and improvement in the living standard of modern people, the function of a bathroom, among housing spaces, is increasingly being emphasized not only as physiology and hygienics but also as a space for leisure and healthcare function. Accordingly, this study is trying to find the methods for appropriate bathroom design by deriving applicable items that the smart technology systems can be used as a space for the healthcare of a bathroom, based upon study on literature, Internet web search, previous studies, and study materials of foreign related research institutes.

The method of the study is to look into the concept change of a bathroom as a healthcare space, first through literatures. Second, fully understand the Smart Technology system of bathroom space for the healthcare space among dwelling spaces. Third, we propose the healthcare application methods in a bathroom through the design examples using the Smart Technology systems in a bathroom space.

2. Smart Technology systems for Bathroom HealthCare

2.1 Concept of Smart Bathroom

The intelligent bathroom is composed of 4 bio sensors like thermometer, blood pressure gauge, electrocardiograph and blood sugar gauge, and an electronic scope that enables remote diagnosis, along with preparing for healthcare systems through network in a bathroom space with the application of the Smart Technology-based technology and home network-based technology.

2.2 Smart Home HealthCare

The smart home healthcare system consists of test equipment that continuously measures the health status of a patient in a household, and a network and server equipment that remotely transmits detected information that enables the status of a patient to be monitored in a hospital by a doctor. As the test equipment used for healthcare must minimize inconvenience without limiting the activity of a patient and also must be able to continuously check the health condition of a human body, it is used as a healthcare equipment by attaching many detecting devices used in a daily life to it.

<table>
<thead>
<tr>
<th>Network Healthcare systems</th>
<th>Biological Measurement New Technology Research Center (BMT-CRC), Medical College of Seoul National University</th>
<th>Samsung Advanced Institute of Technology, Biotechnology, Medical Information, LG, Hospital</th>
<th>Ebar, Telecom, EU, UnCare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Device</td>
<td>Telemed</td>
<td>Isaliro</td>
<td>LG</td>
</tr>
<tr>
<td></td>
<td>- Integrated health monitoring device for healthcare</td>
<td>- Super light-weight stress measuring device</td>
<td>- Health blood sugar phone</td>
</tr>
<tr>
<td>Sensing</td>
<td>Seongnam University - Seoul Techno</td>
<td>LG, Samsung, Haemgen, KIST, Postech, National University</td>
<td>KISD</td>
</tr>
<tr>
<td></td>
<td>- Measure blood sugar in the body through a microwave sensor</td>
<td>- Oesacpe, Receptor biotech</td>
<td>- No blood-taking automatic blood major gauge (KISB)</td>
</tr>
</tbody>
</table>

Table 1: The instance which is used from domestic
<table>
<thead>
<tr>
<th>Classification</th>
<th>Market Status</th>
<th>Major Studies</th>
<th>Service Status</th>
<th>System</th>
<th>Progress Status</th>
<th>Misc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>- Grow by targeting IT, communication and medical related companies as main customers - Leaked the 1st position in medical informatization field</td>
<td>Elite care + Outfield</td>
<td>Old peoples home management</td>
<td>Sensor</td>
<td>National-level medical informatization</td>
<td>Aware Home, Smart Medical Home, PID</td>
</tr>
<tr>
<td>JAPAN</td>
<td>Implement welfare &amp; healthcare project &amp; U-healthcare market development for the aged society</td>
<td>Golden Plan (1989)</td>
<td>Homecare, IT</td>
<td>Healthcare</td>
<td>Active policy of the government &amp; advanced companies participation</td>
<td>(Hitachi)</td>
</tr>
<tr>
<td>RU (Belgium)</td>
<td>Related basic studies on the EU level</td>
<td>Mobile Health Project</td>
<td>Mobile Healthcare</td>
<td>e-HEALTH (BTHES)</td>
<td>On a social welfare level</td>
<td>Information for Health (SNH)</td>
</tr>
<tr>
<td>KOREA</td>
<td>The initial phase of U-Health service market development</td>
<td>Home network &amp; Healthcare</td>
<td>Remote Control Medical</td>
<td>IT</td>
<td>Governmental promotion policy</td>
<td>LG CNS, IDS, HP</td>
</tr>
</tbody>
</table>

Table 2. Health care research instance

2.3 Necessity of Smart Technology Systems in Bathroom Space

With the development of home automation and home network systems, the Smart Technology systems have greatly developed. As a result, the expectation is increasing on Smart Home(Intelligent home) that can integrate all functions requested in a limited space. In order for various functions dwellers want to be always employed in a bathroom, and to interact with dwellers, as oxygen that they cannot be aware of it while existing near to them, the ubiquitous computing environment—in other words, Smart Technology system environment—must be introduced. Hence, we have accurately grasped the current research status of each country for the healthcare using the Smart Technology systems and clearly understood the factors applicable in a bathroom as a healthcare space according to the progressions of the studies.

3. Smart Technology Systems Applicable in Bathroom Space

3.1 Composition of Intelligent Bathroom

Looking into the service and application design factors that can be applied in a bathroom space, the system is configured so that the measured data of an individual dweller is saved in a home server and can be connected to an external interface through the network. The consultation with a medical expert is carried out through a living information terminal in a bathroom based on the measured data. The data like weight, body fat and blood sugar of an individual dweller, measured manually or automatically, is used not only for becoming an objective of self-control but also for working out healthcare and health planning. The services on food habit, individual health and exercise amount are provided with the cooking data service and etc. In order to materialize home networking, the factors such as infra network, home server, and middlewares for informational household electronic appliance are needed. The infra network is materialized with many technologies including external access technology, home networking technology and home gateway technology, and it make a home networking along with a home server and middlewares for informational household electronic appliances.

4. Conclusion and the Next Research Subject

The related Smart Technology system deployed at smart homes is being materialized centering on housing space, and with the changes in life styles, the bathroom space is changing in its concept not only as a physiology space but also as a healthcare space. This change must be verified in its performance centering on dwellers in its applicability aspects, and at the same time, the bathroom design for healthcare space should be progressed in a way that enhance the performance of these technologies.

5. Reference

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