Project 1. Idea Proposal

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TEAM 1
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1. Subject application

Smart Chandelier - Color every moment

2. Application summary

With the development of IoT technology, a house is being reborn as a smart residential space that provides suitable services to residents beyond the meaning of space. The door-lock recognizes the user's location and opens the door remotely without going in front of it, the smart plug determines waste/standby power to reduce the electricity bill, and the voice recognition technology makes it possible to use IoT devices with voice from a distance. To further accelerate this change, we present an <u>innovative lighting system with IoT technology</u>. We selected a lighting system because it would be most efficient to provide additional services and environments to users through the sense of sight, which is the most sensitive of the five senses and collects the most information. In addition, interest in space design has recently increased, and the trend of using interior lighting in various ways to make the space stand out is spreading. Even in the same space with the same furniture arrangement, different atmospheres can be created depending on the lighting, so interior lighting has a great influence not only on practicality but also on the mood and comfort of living and working spaces.

However, it is not easy to change the installed lighting every time just to change the atmosphere. In addition, lighting is greatly influenced by various factors such as location, direction, intensity, and color as well as lamp design, so there is a limit to existing products in designing lighting suitable for various situations. Therefore, we intend to <u>provide appropriate lighting based on the user's situation and surrounding environment data through the 'Smart Chandelier'</u>, and to satisfy the users' needs.

A. Target Domain
   HOUSE_AND_HOME, LIFESTYLE

B. Expected users

The target users can be divided into <u>two groups</u>.

<u>The first group is people who use the same place for many purposes as needed.</u> A gym is an example of such a place. Various fitness programs, such as pilates and spinning, sometimes necessitate adjusting exercise intensity, and such programs frequently alternate in the same space. In that sense, health trainers may properly change lighting moods (e.g., bright lighting or cozy lighting) depending on the exercise program, even in the same room, to improve the exercise effect.

<u>The second group is people who require their own distinct personal spaces.</u> Along with the shift to a contact-less society (also known as "untact society"), users of this type have grown even more since the COVID-19 pandemic; the meaning of the living space has been expanded from a simple sleeping area to a complex cultural space including work, education, and rest. As the residential space has become a diversified and expanded space, if people can change lightning through "smart chandeliers," they can induce optimal concentrations and comforts depending on the situations (e.g., leisure activities and work environments).

C. Description

Existing lightings only purpose limited functions such as brightness control. However, Smart Chandelier offers an appropriate lighting exactly adapting to the user's needs. According to the data gained from 4 types of sensors, it controls color and brightness to make a beautiful pattern. It enables the user to maintain a proper light anytime. <u>The data collected by the system is classified to two types, user data and environment data.</u>

<u>First, sound data is user data.</u> This is sensed in order to consider the sound of the area to the lighting. The sound actually affects the atmosphere a lot, and the lighting will more properly reflect the mood. It makes the user more comfortable when it's quiet, and will barely light when your small conversation is caught.

<u>Second, inform data is user data, which is offered from the user manually.</u> Smart Chandelier becomes more accurately with understanding the user's intention and plan. Once the user set a special date, then it offers a special lighting deserving to the day. Comfortable lights every morning for meditations, and sporty lights afternoon for fitness time. Furthermore, users would get more special experiences on Christmas and the birthday.

<u>Third, environment data refers to all data from light sensors, temperature sensors, humidity sensors, and cameras.</u> The color will be selected differently on different temperature, humidity, and even the amount of movement. When there is a lot movements inside, it may select a lively color to light. After, all the movements have stopped and people are taking a rest, it would offer a calm atmosphere. Of course the users can control it manually whenever they mind it.

3. Functional issues

No.	Functional issues description
01	The Smart Chandelier supports all colors.
02	The Smart Chandelier can adjust brightness and saturation.
03	The Smart Chandelier can be managed automatically.
04	The automatic management system can be turned on/off by the user.
05	Manual management by the user also should be possible.
06	In the manual management system, there is a recommendation function.
07	In the manual management system, there is a time reservation function.
08	In the manual management system, there is a time repetition function.
09	All sensors can be turned on/off by the user.
10	All operations could be performed through a single web application.

4. Non-functional issues

No.	Category	Non-functional issues description
01	Security	The situation in which device security is weak should be considered.
02	Security	Sensor data should not be exposed as much as possible.
03	Security	User registration is only possible near the device.
04	Quality	The maximum number of users are limited to around ten.
05	Quality	We consider it to be used in a space less or equal than 100 pyeong.
06	Performance	The time for sensor data to appear as lighting should be real-time.