

# Application of Kinect Technology in the Design of Interactive Products for Chinese Senior Citizens

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**Abstract.** In this study, it is hoped to propose communicative pattern based on Chinese “Filial Piety” that is more intuitive and interactive and to propose the criteria for innovative technology product design to benefit senior citizens and their family members. An interactive product design: *Grass Tone interactive flowerpot*, which using Kinect as input device is proposed.

**Keywords:** Filial Piety, Kinect technology, interactive design, product design.

## 1 Introduction

Aging society is becoming a global social issue now and Taiwan is no exception. “Filial Piety” is the most prominent characteristics in the Chinese culture. Xiao, Chun-Chung (2002) mentioned that, in certain perspective, the traditional Chinese culture is a culture of Filial Piety. The traditional Chinese society is one built upon it. This concept of being filial is so widely accepted in the Chinese culture that it is even influencing Taiwan’s society regardless of various changes to the family structure. It is a widely adopted practice for children to take good care of their parents.

## 2 Problem and Objective

According to existing literature, the elderly is the focus of current studies on the issues with aging society or technology products developed for their welfare. Very few mainly address the issues of interaction between the elderly and their family members. This study therefore intends to begin with the above mentioned issue which arises from the change to the family structure due to the aging society.

This study aims to propose a more intuitive interaction communication model based on Chinese Filial Piety culture, and a guide in creating technologies that may bring benefits to the elderly and family members. Finally the life of the elderly in the future will be simulated in various scenarios, with product concept designed for the interaction between the elderly and their children based on Chinese Filial Piety culture.

### 3 Concept of Filial Piety

The main purpose of the traditional Filial Piety is summarized through related studies on classical Chinese scriptures and stories, from which the communication model for the elderly and their children is derived through the understanding of this culture.

The inspiration for the product design comes from well-known poems and classical Chinese literature regarding Filial Piety:

*Make the hearts of parents glad, without violating their wishes; make sound and sights pleasant to their ears and eyes, and make their living places comfortable. -*  
 -- “孝子之養老也，樂其心不違其志，樂其耳目，安其寢處。”

Based on this concept, design guidelines for the product design as below:

- Product which enable children to accompany elderly for his/her interest leisure activities (communication)
- Product which can integrate with the behavior of daily life (interaction)
- Product which related to body gesture and music (interaction)
- Health care and daily care (communication)

### 4 Design Prototype: *Grass Tone* Interactive Flowerpot Design

The product for interaction and communication between the elderly and their children was designed based on the concept Filial Piety. The technologies are covered and provided for by physical interactive devices with more intuitive input model today. Kinect is the design platform.

#### Scenario:

It is expected to capture the movements of the elderly with physical movement input technology Kinect while they are doing gardening and exercising (Figure 1). The movements are then transformed into musical rhythm which expresses their moods,



Fig. 1. Kinect capture the movements of the elderly while exercising

weather, or conditions of the plant. The interactive flowerpot will react and interact (caring and gardening also stimulate senses of hearing and sight) to please the elderly while doing gardening. During interaction, the transformed rhythm, image, or text is sent to their children via cell phone or email. This allows the children to feel what their parents feel when doing gardening and to show their care and concern. Though they are separated by long distance, children can still plant with their parents as if they are nearby.

**Interactive Elements with Chinese Culture:**

Grass Tone is an interactive flowerpot design for elderly, which engage elderly to do gardening and exercising to reach their healthcare and family communication. The interactive elements of this design derived from Chinese culture:

In the ancient times, Chinese people had profound knowledge of the relationship between music and emotion and body organs, which is known as the theory of the five notes (do, re, mi, so, la)“五音”, five elements (metal, wood, water, fire and earth) “五行, and five zang-organs (liver, heart, spleen, lung, kidney) “五臟”. These theories are interrelated as figure 2.

表一、五味、五色、五音及五行與人體五臟相對應表<sup>3</sup>

自然界 Nature					5 elements 五行	人體 Body					
flavors 五味	colors 五色	notes 五音	weather 氣候	season 季節		position 方位	organs 臟	features 腑	五官	五體	五志
酸	青	宮 do	風	春	東	木	肝 liver	膽	眼	筋	怒
苦	赤	商 re	暑	夏	南	火	心 heart	小腸	舌	脈	喜
甘	黃	角 mi	濕	長夏	中	土	脾 spleen	胃	口	肉	思
辛	白	徵 so	燥	秋	西	金	肺 lung	大腸	鼻	皮毛	悲
鹹	黑	羽 la	寒	冬	北	水	腎 kidney	膀胱	耳	骨	恐

Fig. 2. Relationship between music, emotion and body organs

Figure 3.shows the relationship between interactive elements of flowerpot design. First, flowerpots sense the weather condition as input data, and play the corresponding music. Elderly follow the music rhythm and does related exercise. Kinect capture the body movement and gestures, and then trigger the watering system and LED light on the flowerpots. Data of the weather condition and body movement capture by Kinect will send via internet to the children side after parents finish their exercise (figure 4).

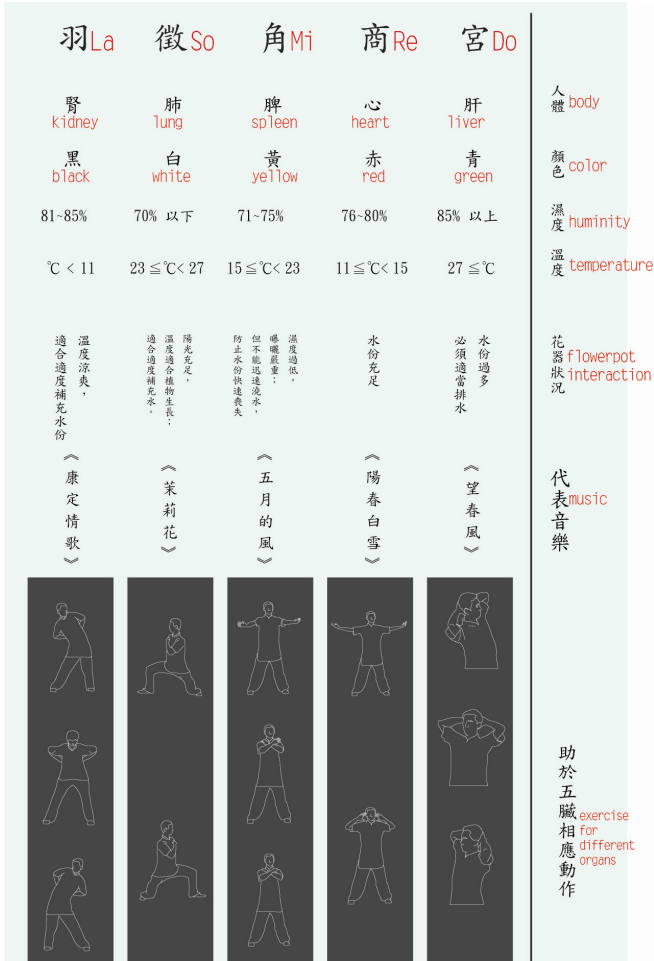


Fig. 3. Relationship between interactive elements

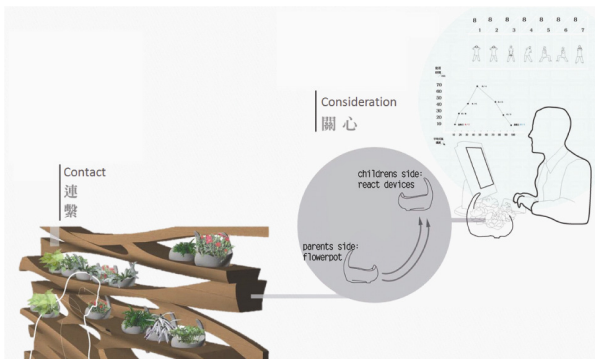


Fig. 4. Grass Tone interactive flowerpots act as communication devices

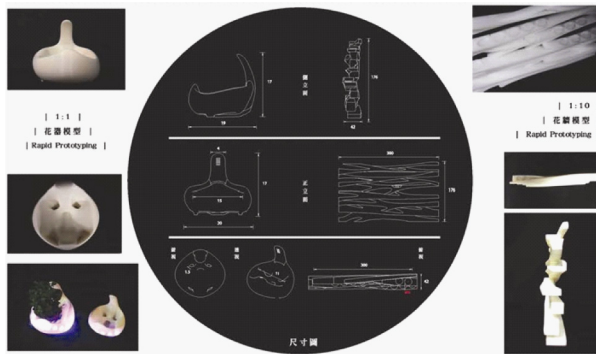


Fig. 5. Grass Tone interactive flowerpots prototype models

## 5 Conclusion

Through carrying out concept design and producing design prototype, the design guides for technology products combining the merit of Filial Piety in Chinese culture and suitable for the elderly to interact with their family members are therefore concluded as follows:

1. The application of the technology products for the elderly must fit in their daily life, leisure activities or interests.
2. The technology product for the elderly must be very intuitive and simple in operation, and can be used by user without additional training.
3. The added values of the technology products for the elderly must be taken into consideration so as to please the elderly and meet their mental and physical needs.
4. Communication should happen naturally and easily, but not compellingly so the children may be more motivated to express their concerns for their parents and perform their filial duty.
5. If the elderly may feel the concerns from their family members through the product, they will be less resistant to using it.