4.5　生活支援を想定したモバイルロボット

個人対応の移動ロボットとモバイル情報機器を用いた生活支援のための人間活動の仮想化技術の研究

Human activity virtualization for daily life support using a personal mobile robot and digital devices

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In the modern society, human activity support or assisted living technologies are useful to address various social needs such as personal assistant and elderly care. However, such technologies have not been accessible to average people in real home setting due to the expensive infrastructure requirement. This research study the solution with a system composed from affordable consumer devices – personal digital devices and low-cost mobile robot.

Most people in modern society live a busy life and spend most time away from home. Many of them stay away from home town living alone and leaving their family, especially the elderly, living on themselves. Help can be sought from professional or the society such as engaging nurse, nanny, maid or resorting to nursing home. On the psychological aspect, pets offer compensation for loneliness. These options may not be always available, affordable and may not be favorable or pleasant experience to all concerned people. Alternatively, technologies can be deployed to provide solutions to support the needed people. Predominantly, smart living environment and assistant robot are being widely studied to support human daily life. However, smart living environment is expensive, obtrusive that it requires modification to existing home environment, unintuitive or may appear a ghostly environment and intrusive to privacy. Robot on the other hand can be more comfortable to interact with as compared to the feeling of interacting with empty space in smart living environment. Researchers in personal and social robots have shown that interaction with robot can be pleasant given appropriate behaviors to the robot. That being said, assistant robot at current state is expensive for average persons. Assistant robot research has been focused on task execution such as to handle house chores, which are dynamic and highly challenging for current state-of-the-art technologies.

Moving beyond a single premises, people living in large cities are highly mobile and spend significant amount of time commuting.　In this context, a rather "mobile" support system will prove to be useful. Nowadays, people in modern society spend considerable amount of time interacting with digital devices such as personal computer and smartphone. Smartphones come with handful of sensors including motion and location sensors. Through prolonged period of interaction with smartphone, the smartphone inevitably "knows" a lot about the activities of a user. In addition, digital devices can provide assistance such as reminder, organise information and navigation. While digital devices such as smartphone, can remind a person to take medicine, for example, it cannot perceive and confirm such action has been completed. Further, people interact with different devices at different places, e.g. home, office or while commuting. Cooperation between different devices will be required to better understand and support human daily activities.

This research to create an affordable and natural human daily activity support system using personal devices and robotic technology. The initial focus of this research addresses the ability of the system in understanding human activities. In any system designed to support human activities, be it a smart living environment or assistant robot, understanding of human activities is a fundamental requirement. The proposed system is composed from the existing personal devices of any user and a low-cost mobile robot to provide the monitoring and surveillance functions of a smart environment, while within a premises, without the requirement of expensive infrastructure. Cooperation between the devices virtualise or digitise user's activities, which in turn will be used to provide personalised support to the person.