CRISTAL, Control of Remotely Interfaced Systems using Touch-based Actions in Living spaces.

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1. INTRODUCTION

The amount of digital appliances and media found in domestic environments has risen drastically over the last decade, for example, digital TVs, DVD and Blu-ray players, digital picture frames, digital gaming systems, electronically moveable window blinds, and robotic vacuum cleaners. As these devices become more compatible to Internet and wireless networking (e.g. Internet-ready TVs, streaming digital picture frames, and WiFi gaming systems, such as Nintendo's Wii and Sony's Playstation) and as networking and WiFi home infrastructures become more prevalent, new opportunities arise for developing centralized control of these myriad devices and media into so called "Universal remote controls". However, many remote controls lack intuitive interfaces for mapping control functions to the device intended being controlled. This often results in trial and error button pressing, or experimentation with graphical user interface (GUI) controls, before a user achieves their intended action.

To address this issue, CRISTAL (Control of Remotely Interfaced Systems using Touch-based Actions in Living spaces) was developed. CRISTAL simplifies the control of our digital devices in and around the living room. The system provides a novel experience for controlling devices in a home environment by enabling users to directly interact with those devices on a live video image of their living room using multi-touch gestures on a digital tabletop.

2. CRISTAL

CRISTAL consists of an interactive multi-touch surface and a camera, mounted in the ceiling of the living room capturing the entire living room. The interactive surface is integrated into the coffee table and extends its functionality. The display itself is only activated on demand and still can be used as a normal coffee table. When activated, the interactive surface shows the live camera feed. To control the devices in the living room, users can directly manipulate them by touching the corresponding video-image (cf. [2]). Depending on the controlled device different types of input are possible. A sliding gesture over a floor lamp, for example, modifies the brightness of light source. On the other hand, a similar gesture across the floor in front of a robotic vacuum cleaner defines a path for it to follow. To watch a movie, a user can select a movie from a digital movie collection invoked directly on the table surface and drag it onto the TV in the video image. The live video image displayed on the table gives continuous real-time feedback to the user.

Currently, the user can control the following objects in the living room:

- Light sources: can turn on/off and dim light sources, and
- set a global lighting color (i.e. set a warm/cold light and all light sources are adjusted accordingly).
- Audio: control of volume.
- TV/Projector/Music Player: can choose movies or music and control CD and movie playback.
- Digital picture frame: can select a physical photo album in the video image and drag it onto the picture frame.
- Robotic vacuum cleaner: can control the movement and position of a wireless vacuum cleaner [1].

Summarizing, the interface allows a more natural and intuitive interaction experience.

REFERENCES

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