Delegating the visual interface between a Tablet and a TV

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ABSTRACT
The introduction and wide adoption of small and powerful mobile computers, such as smart phones and tablets, has raised the opportunity of employing them into multi-device scenarios and blending the distinction between input and output devices. In particular, the partnership between a personal device and a shared one provides two possible output screens. Then, one significant research issue is to balance the visual interface between two devices with advanced output abilities. Do the devices compete or cooperate for the attention and the benefit of the user? Most notably, how multi-device interaction is appreciated in multi-user scenarios? Previous research has raised and considered the above research issues and questions for dual screen set-ups in the work environment. In our research, we are exploring multi-device user interface configurations in the context of a leisure environment and for entertainment applications. Our objective is to provide interaction possibilities that are more than the sum of the parts.

Categories and Subject Descriptors
H.5.1 Multimedia Information Systems, H.5.2 User Interfaces

General Terms
Design, Experimentation, Human Factors.

Keywords
Tablet, TV, interaction, design, evaluation

1. INTRODUCTION
The majority of contemporary user interface systems consider a clear distinction between the input and the output devices. Indeed, the user interface systems in desktop computers, TVs, telephones, have usually distinguished between the input and the output devices. Smart phones and tablets are devices that don't consider this distinction. In particular, the remote control has been the most common way to interact with iTV. However, the popularity of mobile computers such as smart phones and tablets allow us to leverage the established way of interaction. A second screen could give the user more information and the possibility to interact controlling, enriching or sharing the content (Cesar et al. 2009). In this work, we examine three alternative scenarios for controlling the content in a dual screen set-up and explore the respective evaluation methods.

The majority of previous research in dual-screen set-ups has been focused on the effects of increased screen real-estate, which has been considered as a quantitative parameter in performing several user tasks. Indeed, several studies have been performed in a work-setting, which lends itself to performance measurements as efficiency. On the other hand, there are few research efforts in leisure environments that have considered the qualitative effects of secondary screens. The general research area is characterized by the partnership between a personal device and shared screen one. Then, one significant research issue is to balance the visual interface system between two devices with output abilities.

2. EXPERIMENTAL DESIGN
We have developed a flexible experimental set-up, which we plan to employ in several user evaluations. The latter are focused on the actual user behavior in the face of important parameters, such as attention, engagement, and enjoyment. The main objective in the evaluation of a dual-screen TV set-up is the measurement of actual user behavior rather than just user attitude. For this purpose, we are measuring user attention and engagement with TV content. In contrast to measurements of efficient and effective task completion, which are common in work settings, we are focusing on measurements of user involvement with the TV content, which are common in a leisure setting. Moreover, we are working on measurements that consider the main of benefit of TV, which can be summarized as "a significant shared experience" within smaller or larger social circles, and regardless of the actual or perceived quality of the content.

In summary, we are motivated by the introduction and wide adoption of small and powerful mobile computers, such as smart phones and tablets. The latter has raised the opportunity of employing them into multi-device scenarios and blending the distinction between input and output. In particular, we are addressing the following research questions: Do the advanced visual interfaces compete or cooperate for the attention and the benefit of the user? Most notably, how coupled-display visual interfaces are appreciated in multi-user scenarios? It is expected that the case study of TV users and TV content could provide complementary evidence for the design of coupled display interfaces in general.

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