

## Abstract

In the conceptual stage of design, various design media are used to aid designers. However, switching among media is time-consuming and may interrupt design thinking. Research has been done to develop new media that comprise different media (Gross, 1996; Van Dijk, 1995; Hiroaki, 1998; Piper, 2002; Anderson, 2000; Igarashi, 1999; Jung, 2002). However, new media still can't completely replace traditional media such as sketches and manually made models. This research aims not to create a new medium but a platform that let designers to combine ideas while using different design media. By using AR (augmented reality), the system developed in this research integrates 2D visual feedbacks of various design media. It is also designed to be extendable to integrate more new media. Three steps are done to achieve the goal. First, an extendable platform is constructed to contain data from various media. Second, traditional sketches, manually made models and digital models are combined into the system. Also, a digital medium is developed and added into the system to demonstrate the extensibility of the system. Last, a demonstration of the system is made. With this system, Designers can continue to use design media that they are familiar with, and the features of the media are enhanced by sharing visual feedbacks with other media. Moreover, the system provides more visual feedbacks, which makes a difference to the results. In summary, this research shows a way to use AR in CAAD by integrating visual feedbacks of different media.

## 摘要

許多不同的媒材在建築設計的初期構想階段都被拿來輔助設計者。然而，切換不同媒材的過程不但耗費時間，而且可能會中斷設計思考。已經有許多的研究對改善這些媒材之間的關係做出改善 (Gross, 1996; Van Dijk, 1995; Hiroaki, 1998; Piper, 2002; Anderson, 2000; Igarashi, 1999; Jung, 2002)。然而，這些新的媒材仍然不能完全取代像是素描以及手工模型這樣的傳統媒材。本研究的目標並不是創造出一個新的媒材，而是建構一個能夠讓設計者結合在使用不同媒材設計時產生的想法的平台。藉由使用擴增實境，本研究所建立的系統將多種媒材的二維視覺回饋作結合。此系統也被設計為可延展以結合更多新的媒材。本研究經由三個步驟來建立這個系統。首先，一個具有延展性的平台被建立；此平台被設計為可以容納來自不同媒材的資訊。第二，傳統速寫草圖、手工模型、數位模型被結合進入系統中。並且，本研究發展一個數位媒材並將之加入系統中來測試系統的延展性。最後，本研究示範了此系統在設計過程中的參與。使用本系統，設計者使用的仍然是他們所熟悉的媒材，而這些媒材卻藉由共享彼此的資訊而被加強。而由於設計者在設計過程中接受到更多的訊息，而這些刺激對設計最後的結果可能造成改善。本研究展現了在建築設計上使用擴增實境的一個方法。