Stereo Vision for Augmented Reality System

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Augmented Reality (AR) is a growing area in virtual reality research. It is a combination of the real scene viewed by the user and a virtual scene generated by the computer that augments the scene with additional information. Moreover, the graphics change relatively with the user view to promote better reality.

There are two kinds of display technologies involved in AR. The first one is for generating virtual objects and overlaying them into the real scene. The second one is for blending the real scene and the graphics before displaying.

The goal of this research is to design and build an AR system that can establish an interaction between the virtual object and the real object in the real scene. The registration module and the scene generator are two important modules for this research. The registration module is used to combine video image with the graphic image created by the scene generator module. The scene generator module is used to pick up the position of the robot's end-effector and to generate graphics at the end-effector position. This module consists of three subsystems as shown in Fig.1

1. Robot subsystem. It is used as a testbed for moving virtual object.

2. Graphic subsystem. It is used to generate the virtual scene.

3. Vision subsystem. This subsystem applies a stereo vision for tracking a target's position and orientation. Therefore, the position for generating graphics is obtained such that we can establish a relation between the virtual object and the real object.

In conclusion, this research presents a prototype of the augmented reality which can be applied in the field of medical, engineering design, manufacturing, navigation system, and human skill transfer.
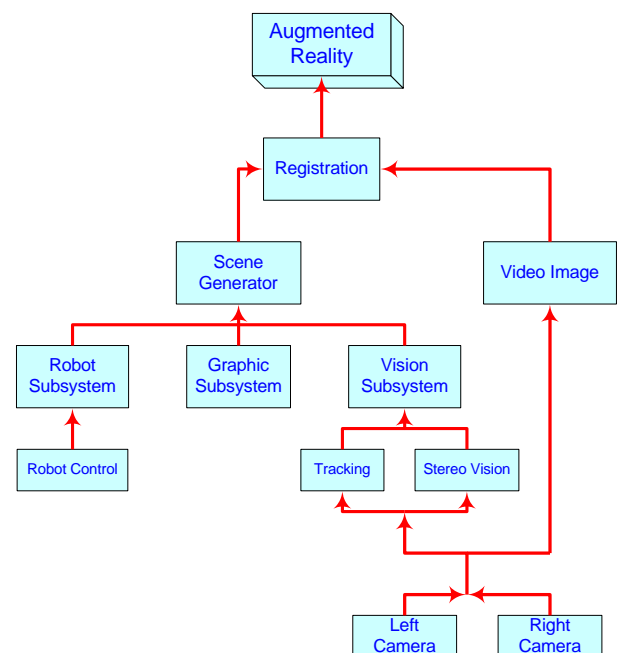

Fig.1 Process of augmented reality.