



Virtual Reality-based Robot Arm Simulator

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This simulator is developed for modeling and simulating fixed serial link robots. It can simulate and analyze robot kinematics and dynamics. Architecture of this software is demonstrated in Figure 1. In this system, user can model robot in various and flexible configuration such as defining different position and orientation of each component. Robot joint can be modeled as a revolute or a prismatic joint. Operating with virtual reality is used to improve effectiveness of the simulator. Virtual reality in this system can be shown in Figure 2. This simulator is presented in 3D computer graphics with stereoscopic viewing for giving perception of depth and realism using the Microsoft DirectX SDK and Visual C++. Tracking user view point is a master component of presenting reality. The corresponding graphics are achieved by position of user's head from Head Mounted Display (HMD). User can manipulate virtual object such as assembling virtual objects by wearing data glove and motion tracker. Therefore, the user can learn and use this simulator easily and intuitively.

In addition, this simulator shown in Figure 3 could improve students understanding in Robotics. Since the user can use this VR-base simulator to analyze, design, and adjust configuration of robot before building a real one, it can be also used in industrial such as operator training.

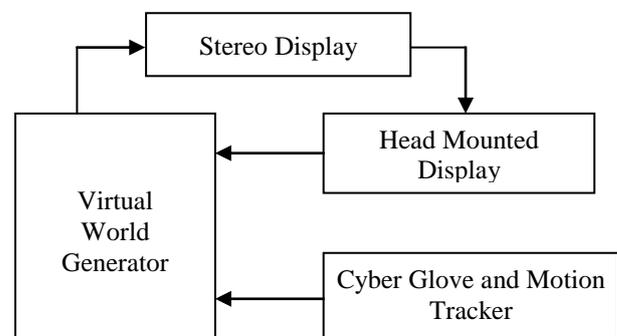


Figure 2 Virtual reality in robot simulator

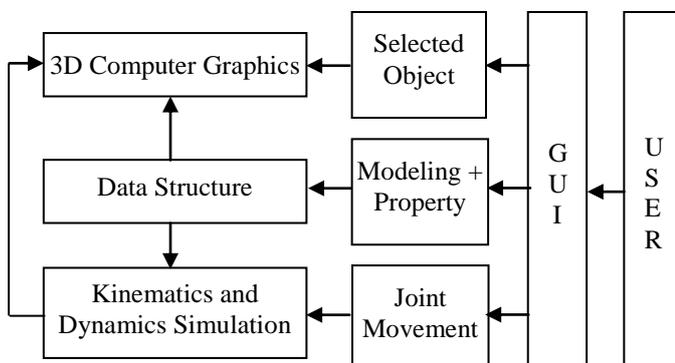


Figure 1 Architecture of robot simulator

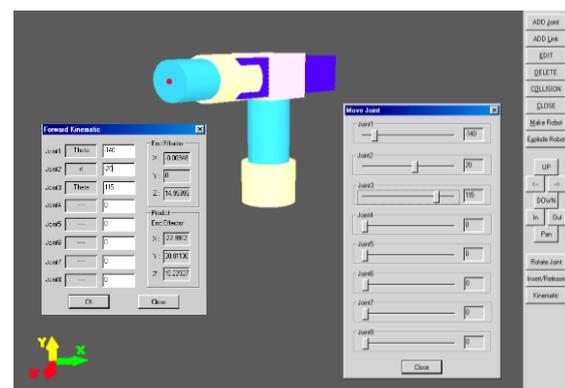


Figure 3 Robot simulator developed at FIBO