Summary 2:

Multi-target indoor tracking and recognition system with infrared markers for virtual reality

Tracking is a vital part to more immersive VR environments. The paper proposes an indoor multi-user tracking system that improves accuracy and stability and is low cost. The system does not need to fix numerous infrared markers on the walls but instead puts a few markers on the user's head and uses infrared cameras on the ceiling to monitor those markers. The camera detects position information of the user through the infrared markers on their heads and this data is transferred back to a computer to calculate the spatial position and location and orientation of other users. Then these results are transferred to the laptop which is connected to the head mounted display the users are wearing to update the VR environment. Unique identification is achieved through identifying the distance between individual markers on a particular user (each user has a different marker module). Studies conducted show that the system can locate user position within 7mm accuracy and user orientation within 4 degrees. More user results in lower refresh rate and lower performance in real time feedback. The range of tracking can easily be expanded with introduction of additional infrared cameras.

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abstract={Virtual reality (VR) is a computer simulation technology, which can create a virtual world to allow users to immerse in the simulated environment, and be able to interact with objects in a nature way. This paper presents an indoor tracking and recognition system to meet the interactive of multiple users in virtual reality. As we all know, tracking in real time and accurately play a vital role in VR application. Interactive VR games require data update rate above 35HZ to make players fell well. In our system, we use infrared cameras, infrared markers and image processing techniques to acquire the users' position and orientation information in real time. We describe a relatively inexpensive, but can monitor the precise location and orientation information system. In our system, cheap infrared cameras are fixed on ceiling. Every user in the environment wears an infrared LED module. The distance between any two infrared LED in a LED module is different with others. We can distinguish every user and get their precise position and orientation in real time by stereo vision theory and our recognition algorithm. This system strikes a good balance between price and capability.},