1. Title

Interactive learning system based on Augmented Reality and gesture recognition

2. Introduction

Because of the abstraction of celestial movement, magnetic lines of force, microscopic particle structure, and medicine, it is impossible to intuitively understand the content of the textbook through textbook images and texts, which will inevitably reduce students' interest in learning. We combined Augmented Reality (AR) technology and gesture recognition on the platform of Xilinx ZYNQ-7020. Firstly, for the purpose of making the book content become "active" and "alive", the AR technology integrated multiple elements such as sound, animation, and interactive modules on the APP and PC. Then, we built a mobile control platform on ZYNQ-7020, allowing the users connect to APP or PC through Bluetooth or WIFI. Besides this, we designed a camera model attached to the control system to perform gesture recognition, which allows users to operate the AR model to move, zoom, rotate, combine, etc., and that makes the learning process become more interactive and funny.

3. The architecture of our system

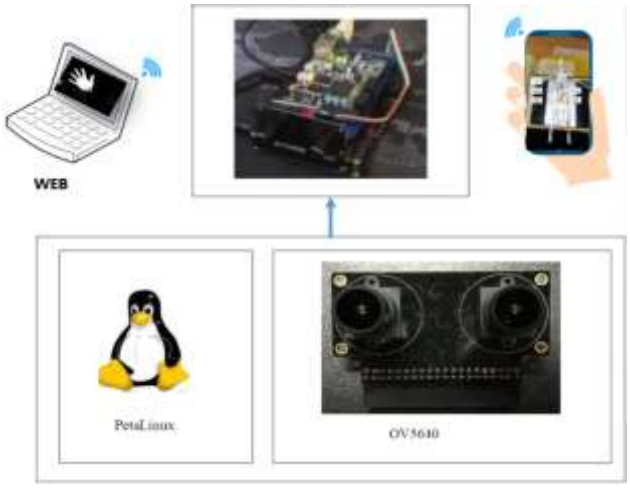

Fig 1. The architecture of our system

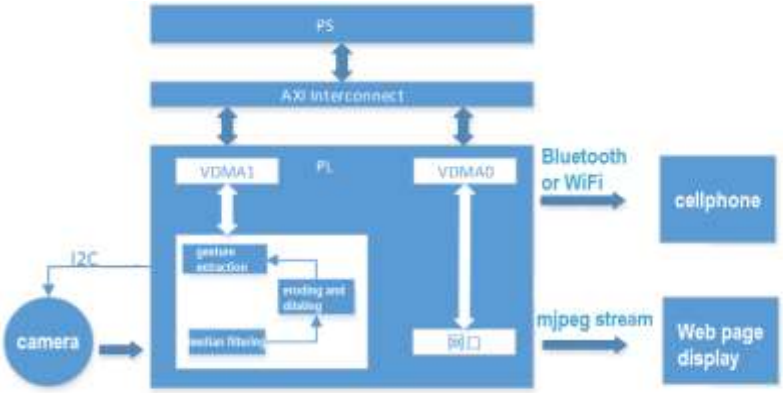

Fig 2. The architecture of the Programmable Logic

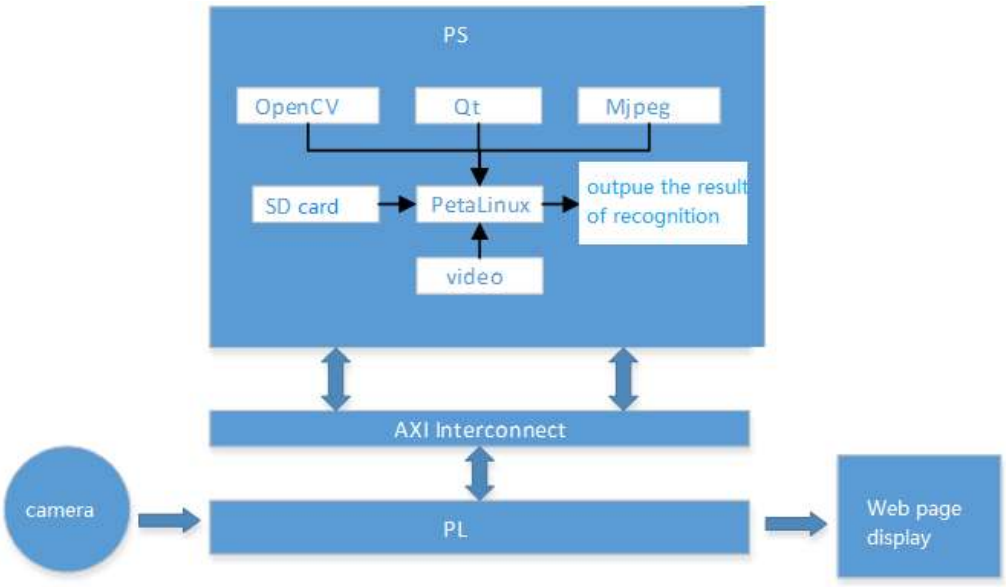

Fig 3. The architecture of the Processor System

4. Photos of our system

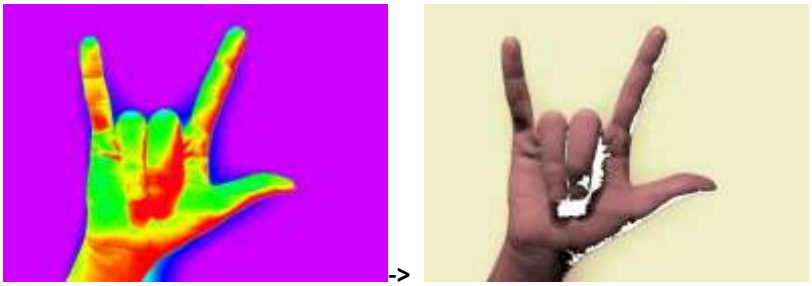

Fig 3. The result of gesture segmentation

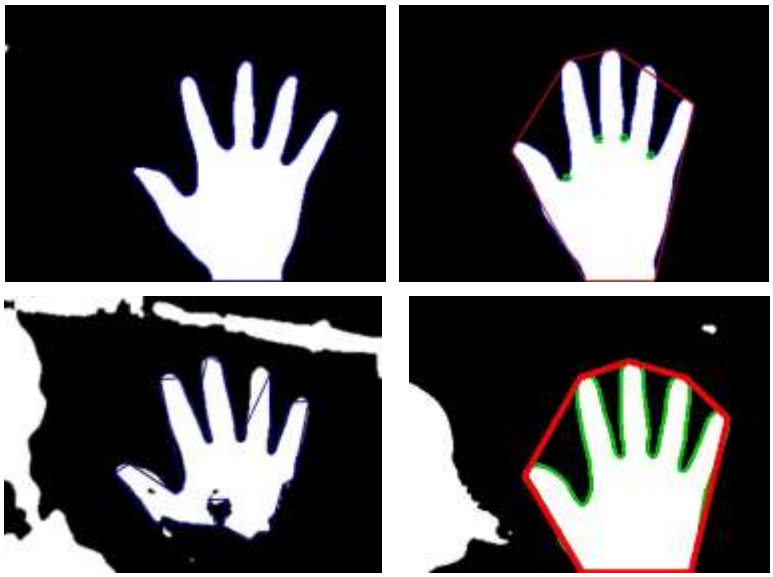

Fig 4. The results of gesture recognition

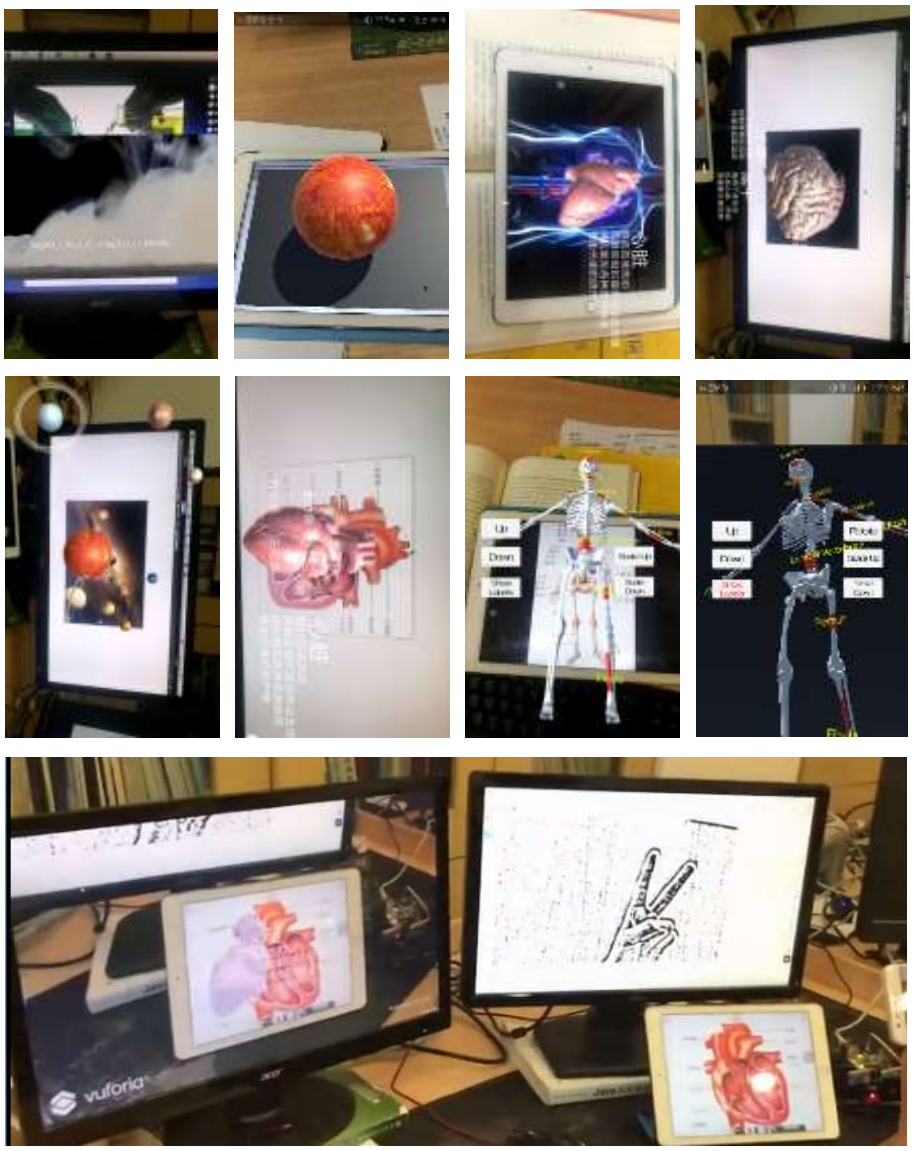

Fig 5. The results of augmented reality