Introduction

The project combined stereo cameras, a pair of 3D goggles, and a control unit together, to track short, moving features moving in depth and then control the user’s attention.

If the cameras are at one place, and the user in another place, the user could observe the scene in front of the cameras. 3D glasses have high accommodation value, to make user feel like part of the action and not just someone watching from a distance. The glasses give the user will be fed with feature maps, to draw user’s attention to some certain features at a certain distance from the camera.

This project intends to be used as a help for user to easily track the important things in view. It could be used by astronauts watch over a certain area, to keep an eye on the environment within a certain range. It could also be put on a robot, as part of the navigation system, to enable the robot intelligent tracking moving object.

System Diagram

(A) Acquire stereo images
(B) Compute feature maps
(C) Integrate feature maps into stereo images
(D) Display on goggles

Figure 1.1 System diagram

Main Functions

- Use the head as a trigger in stereo vision
- Color the moving objects to draw user’s attention
- Highlight the tracking object by red color and show
- 3D view of the environment

Methodology

Figure 2.1: Disparity theory, how depth is obtained from two images

- Near: Move eyes closer, converge, larger Disparity
- Fixation: Do not need to move eyes
- Far: Move eyes apart, diverge, smaller Disparity

Results:

1. Real-time: Cameras are used to see the real world.
2. Speed:Viewport
3. Intelligence: Highlight features are displayed to user.
4. Tracking function realized.

Figure 3.1 How to construct stereo images for smart binoculars to display.

Figure 3.2 Computer user interface view, when watching through binoculars, the view will be 3D.

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