Automatic Face Tracking System using Flying Blimp for Estimation of Elderly People's Emotion

For health care provided to elderly people or people with some mental disorders, patients' emotion needs to be observed regularly. The current practice uses a number of staff to observe their faces and use smile as the indicator. However, the ratio of staff to patients is not enough and the task requires regular observation, resulting in inefficiency, ineffectiveness, and fatigue of the caregivers. Therefore, a system for tracking people's face and processing for their emotion is necessary for this task. This research proposes the use of environmental cameras together with mobile cameras to track people's face to obtain their facial images.

In the previous system, a quadrotor equipped with small video camera was used to follow and track people's face. Xbox 360's Kinect cameras were installed in the environment to cover the area for localization of person and quadrotor, and control the quadrotor to be in front of the person at a constant distance. The system could perform tracking of person in a 3-by-3.5-meter area, with limitations of quadrotor's short battery life and noise caused by vibrating system used to cancel interferences among Kinects. A new system is proposed with blimp filled with lighter-than-air (LTA) gas to perform face tracking, and multiple fisheye cameras attached to the ceiling for locating position of people and blimp (see Fig.1). LTA gas's buoyancy makes hovering possible without the need of constant propulsion, reducing power consumption as well as noise created by propellers. The blimp also provides safer platform and is friendlier to people. The prototype of the blimp is shown in Fig.2.

Keywords: blimp, airship, fisheye cameras, human tracking, face tracking

Reference

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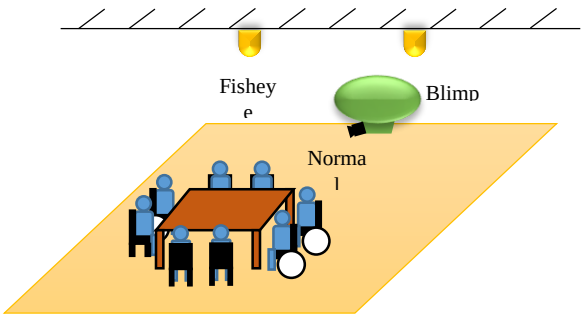

Fig 1. System of blimp and fisheye cameras in elderly nursing home.

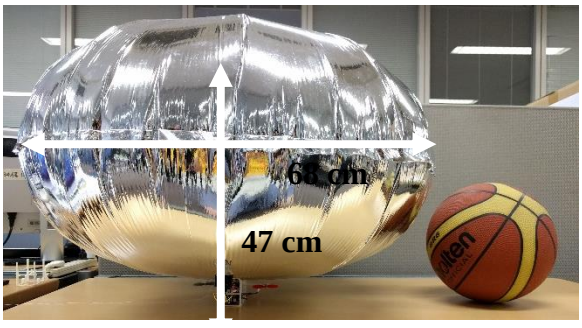

Fig 2. Prototype of the blimp compared to a basketball