*O.T-C. CHEN, C.H. TSAI.* ***Home activity log and life care using panoramic videos.*** *Gerontechnology 2016;15(suppl):9s*; doi:10.4017/gt.2016.15.s.741.00 **Purpose** In today's society, people have begun to acknowledge the importance of home care. Cameras have been proposed to use for monitoring and tracking subjects[1], and to employ images and biological data to build subject records[2]. However, the installation of fixed cameras is not likely straightforward, and bio-sensors in human body may not be convenient. Therefore, this work proposes a portable panoramic video platform to record activities of people in the scene. Additionally, image processing is conducted to analyze the information about activities of people. This activity information is massively accumulated to understand subject's habits which may be a clue of an illness. **Method** The proposed panoramic video platform has four cameras each of which has a fixed focus, a vertical angle of 45º, and a horizontal angle of 95º. In order to effectively capture a body height, the proposed platform is preferably located at a table or furniture with a height of around 100cm. Through stitching four images from four cameras of the proposed platform, the panoramic picture can be attained to perceive the whole environment of the scene. The stitched image goes through a Gaussian Mixture Model (GMM) to establish an adaptive background image[3]. Based on the background image, the moving subjects and objects are discovered. Additionally, the functions of erosion and expansion are fulfilled to minimize the noise, and obtain the converged objects. Particularly, the shadows of moving objects are eliminated to some extent by an adequate threshold of GMM in generation of the background image. After obtaining a moving subject, it is detected whether head and feet of the subject are located at the upper and lower boundaries of the captured picture. If yes, the height estimate can refer to the top and bottom boundaries of vertical pixels in a subject. The distance between the camera and the subject is computed by the triangular measurement manner. Otherwise, the proposed system only estimates the distance by variations of body widths during subject moving. To recognize the posture, the outline feature selection scheme is used to compute the distances between the centroid point and contour points of a moving object. Here, 36 representative contour points are adopted where the neighboring contour points relative to the centroid point have a 10º difference. Afterwards, the GMM classifier is used to train these heights, distances, and outline features of moving subjects to construct a model for posture identification. Based on the proposed system, the track activities, and attitudes of subject(s) can be well acquired for a daily log, and be recognized for life care. **Results & Discussion** In this study, the cross-validation approach is to assess the accuracy of the proposed system. The estimates of heights, distances, and postures of moving subjects are carried out. In our experiments, the accuracy rates of height estimates under 5% deviations can reach 94%. The averaged error rate of distance estimates is around 8.2%. The GMM classifier is trained to identify the postures of standing, sitting, and falling based on an image. The confusion matrix of recognition results is listed in *Table 1*. The results reveal that the posture of standing has the highest recognition rate. Some events of sitting and falling are misjudged as standing and sitting, respectively. These misjudged cases can be somehow overcome by the voting of results from multiple images at a short interval where the accuracies are effectively improved to reach over 80%. Overall, the proposed system provides a portable platform, is easily adaptive to the complex environment, and achieves fair performance for a daily log and home care.

**References**

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*Address*: Department of Electrical Engineering, National Chung Cheng University, Chiayi, Taiwan;
*E*: oscal@ee.ccu.edu.tw

*Table 1. Confusion matrix of postures; % denotes of posture recognition*

| | Standing | Sitting | Falling |
|---|---|---|---|
| **Standing** | 99.7 | 32.6 | 6.3 |
| **Sitting** | 0.2 | 66.8 | 25.2 |
| **Falling** | 0 | 0.5 | 68.4 |