

H. Lee, J. Seo and H. Jo, "Acquisition of eye images in the gaze tracker based on depth sensor and zoom camera," *2015 17th International Conference on Advanced Communication Technology (ICACT)*, Seoul, 2015, pp. 279-282.

doi: 10.1109/ICACT.2015.7224803

Abstract: We designed and developed a gaze tracking device to provide comfortability in gaze tracking and freedom of head movement of a user to be applicable to the large display environment with a long Z distance. We also propose the method of stereo calibration and pixel mapping between the wide-angle camera and the depth sensor, and the method of PTZ calibration between the wide-angle camera and the zoom camera to make the device continuously and effectively track and capture the eye image even though a user's irregular movements in 3D space.

keywords: {calibration;cameras;gaze tracking;image sensors;PTZ calibration;depth sensor;eye images;gaze tracker;head movement;pixel mapping;stereo calibration;wide-angle camera;zoom camera;Calibration;Cameras;Head;Image resolution;Three-dimensional displays;Tracking;Calibration;Device;Gaze;PTZ;Tracking},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7224803&isnumber=7224736>

M. Schmidt *et al.*, "Remote airport traffic control center with augmented vision video panorama," *2009 IEEE/AIAA 28th Digital Avionics Systems Conference*, Orlando, FL, 2009, pp. 4.E.2-1-4.E.2-15.

doi: 10.1109/DASC.2009.5347479

Abstract: Research is described for realizing a Remote Airport Traffic Control Center (DLR project RAiCe) for remote surveillance and control of several small airports from a central location. Work and task analyses performed in a previous project resulted in the concept of a high resolution video panorama system with zoom and augmented vision functions as controllers main HMI in the Remote Tower Center (RTC). Video-see-through augmentation of the reconstructed outside view by means of superimposed flight information and data from electronic non-visual sources is supposed to improve the controllers situational awareness. The augmented vision function allows for a compact RTO-work environment due to its potential for reduction of displays. A corresponding 180°-video panorama system was set up as experimental testbed at Braunschweig research airport which served for initial field testing. It consists of four digital high resolution CCD cameras located near Braunschweig tower, and a remotely controlled pan-tilt zoom (PTZ) camera (including automatic tracking option) with PC clusters for compression, image processing/movement detection, decompression and panorama reconstruction, and a 450 m fiberoptic Gbit Ethernet link between sensor and display clusters. Field testing of the reconstructed far view with participation of local controllers shows an effective visual resolution of <2 arcmin in agreement with the theoretical predictions. The PTZ camera provides a "foveal" vision with a high resolution exceeding the human eye (1 arcmin) within an observation angle <15°. In addition to the experimental testbed simulation systems for two-airport control are under development for support of the RTC work environment design, based on a 200°-tower-simulator with RTO-console extension and a simplified two-airport microworld computer simulation for laboratory type part task simulations.

keywords: {CCD image sensors;air traffic control;telecontrol;video cameras;video surveillance;Braunschweig research airport;CCD cameras;Remote Tower Center;augmented vision video panorama;fiberoptic Gbit Ethernet link;foveal vision;remote airport traffic control center;remote surveillance;remotely controlled pan-tilt zoom camera;two-airport microworld computer simulation;video-see-through augmentation;Airports;Automatic control;Charge-coupled image sensors;Computer simulation;Digital cameras;Displays;Image reconstruction;Poles and towers;System testing;Traffic control},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5347479&isnumber=5347412>

A. S. Barry and D. S. Mazel, "The Secure Perimeter Awareness Network (SPAN) at John F. Kennedy International Airport," *2007 41st Annual IEEE International Carnahan Conference on Security Technology*, Ottawa, Ont., 2007, pp. 183-188.

doi: 10.1109/CCST.2007.4373487

Abstract: The secure perimeter awareness network (SPAN) at JFK is an integrated system of networked sensors for intrusion detection, assessment, reporting, and video recording. The system includes our airport security display processor (ASDP) system, pan-tilt-zoom (PTZ) cameras, an ASDP graphical user interface (GUI), and a common operational picture (COP). The ASDP system takes raw radar data from the ASDE-3 ground surveillance radar and monitors the airport property and perimeter for any security breaches. The system detects and tracks objects of interest beyond and at the perimeter, and on the air operations area. If a tracked object, such as a car, a boat (JFK borders Jamaica Bay), or a person, breaches the user-defined perimeter, the ASDP system issues an alarm, displays the intruder's position on the GUI, and slews a camera to the location of the intruder and tracks the intruder. The video is displayed on the COP, an integrated geo-registered, situational awareness display of all sensor data. The COP shows not only the video, but also a layered display and interface for radar data and other sensor inputs. Finally, SPAN records all video for review and possible future prosecution.

keywords: {airports;graphical user interfaces;national security;search radar;security;surveillance;tracking;ASDP system;COP display;GUI;airport security display processor;common operational picture;graphical user interface;ground surveillance radar;object tracking;secure perimeter awareness network;video recording;Airports;Cameras;Data security;Displays;Graphical user interfaces;Intrusion detection;Radar tracking;Sensor systems;Variable speed drives;Video recording;Airport security;SPAN;airport security display processor (ASDP);common operational picture;detection;intrusion;tracking},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4373487&isnumber=4373447>

J. Park, K. An and J. Choi, "Realistic 3D simulation of multiple human recognition over Perception Sensor Network," *The 23rd IEEE International Symposium on Robot and Human Interactive Communication*, Edinburgh, 2014, pp. 507-512.

doi: 10.1109/ROMAN.2014.6926303

Abstract: In this paper, we introduce a simulation approach for emulating a real-world human recognition system called a Perception Sensor Network (PSN). The proposed PSN system has fusion components for automatic localization and facial recognition that uses multiple Kinect sensors and pan-tilt-zoom (PTZ) cameras. We verified that the generic vision schemes utilized in human detection and facial recognition algorithms were interoperable in a scenario that consisted of virtual avatar humans. In experiments, we tested a perception scenario in which multiple humans in a 3D simulation space are automatically recognized in both location and identification with real-world system parameters.

keywords: {avatars;cameras;computer vision;face recognition;image fusion;object detection;object recognition;visual perception;wireless sensor networks;Kinect sensors;PSN system;PTZ camera;automatic localization algorithm;facial recognition algorithms;fusion

components;human detection;multiple human recognition system;pan-tilt-zoom cameras;perception sensor network;realistic 3D simulation;virtual avatar humans;vision scheme;Avatars;Cameras;Face recognition;Robot sensing systems;Solid modeling;Three-dimensional displays},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6926303&isnumber=6926219>

S. Hrabar, P. Corke and V. Hilsenstein, "PTZ camera pose estimation by tracking a 3D target," *2011 IEEE International Conference on Robotics and Automation*, Shanghai, 2011, pp. 240-247.

doi: 10.1109/ICRA.2011.5980380

Abstract: We present a technique for estimating the 6DOF pose of a PTZ camera by tracking a single moving target in the image with known 3D position. This is useful in situations where it is not practical to measure the camera pose directly. Our application domain is estimating the pose of a PTZ camera so that it can be used for automated GPS-based tracking and filming of UAV flight trials. We present results which show the technique is able to localize a PTZ after a short vision-trackshort vision-tracked flight,ed flight, and that the estimated pose is sufficiently accurate for the PTZ to then actively track a UAV based on GPS position data.

keywords: {Global Positioning System;aircraft control;image sensors;mobile robots;pose estimation;remotely operated vehicles;robot vision;target tracking;3D target tracking;PTZ camera pose estimation;UAV flight trials;automated GPS-based tracking;short vision-tracked flight;Cameras;Estimation;Global Positioning System;Optimization;Position measurement;Robot vision systems;Three dimensional displays;PTZ camera;Visual tracking;camera pose estimation;numerical optimization},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5980380&isnumber=5979525>

E. Ettinger and Y. Freund, "Coordinate-free calibration of an acoustically driven camera pointing system," *2008 Second ACM/IEEE International Conference on Distributed Smart Cameras*, Stanford, CA, 2008, pp. 1-9.

doi: 10.1109/ICDSC.2008.4635685

Abstract: We present a camera pointing system controlled by real-time calculations of sound source locations from a microphone array. Traditional audio localization techniques require explicit estimates of the spatial coordinates for each microphone in the array. In addition, positional information for the camera is needed to use such techniques to drive a camera pointing system. Sometimes this positioning can be done by hand, but for large aperture microphone arrays with many elements this is impractical. We show that in this setting, where elements are placed in an ad-hoc manner, explicitly learning the microphone positions is an unnecessary step. We give a calibration method whose focus is learning the mapping from time delays between pairs of microphones to the associated pan and tilt a PTZ-camera should be given to point at. This curtails the need to explicitly learn the microphone and camera positions. We use this method to calibrate a real-time camera pointing system used by the UCSD interactive display.

keywords: {calibration;image sensors;microphone arrays;PTZ-camera;acoustically driven camera pointing system;audio localization techniques;coordinate-free calibration;microphone array;Calibration;Cameras;Coordinate measuring machines;Delay effects;Delay estimation;Logic arrays;Microphone arrays;Position measurement;Real time systems;Steering systems;A/V System Calibration;Audio Sound Localization},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4635685&isnumber=4635670>

A. del Bimbo and F. Pernici, "Uncalibrated 3D Human Tracking with A PTZ-Camera Viewing A Plane," *2008 3DTV Conference: The True Vision - Capture, Transmission and Display of 3D Video*, Istanbul, 2008, pp. 281-284.

doi: 10.1109/3DTV.2008.4547863

Abstract: In this paper we propose a novel method for tracking a human target based on uncalibrated video analysis techniques. The main focus here is on the observation model of sequences acquired by rotating and zooming camera sensors. In these sequences targets may appear and disappear from the field of view (FOV), their size may change very much in a few frames as a result of the camera zoom or target motion and the scene background change from frame to frame. According to this, measurements become intermittent such that a significant time lag may exist between consecutive observations of a target. Moreover targets generally change their size when they exit and then reenter the FOV of the camera. We argued that good performance in prediction (which is strongly dependent on the observation model) can improve the robustness of target tracking especially during disappearance and reappearance of target objects. The geometry of the rotating and zooming camera viewing a scene plane together with the projective geometry of imaged play-field geometric patterns (circle and lines) are exploited for computing measurement equation in the extended Kalman filter.

keywords: {Kalman filters;cameras;image sequences;nonlinear filters;target tracking;video signal processing;PTZ-camera;extended Kalman filter;measurement equation;projective geometry;uncalibrated 3D human target tracking;video analysis;video sequences;Cameras;Computational geometry;Equations;Humans;Layout;Predictive models;Robustness;Rotation measurement;Target tracking;Time measurement},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4547863&isnumber=4547776>