

Handheld AR/AV system using PDR localization and image based localization with virtualized reality models

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Our demo will show a handheld AR/AV (Augmented Virtuality) system for indoor navigation to destinations and displaying detailed instructions of target objects with contextual interaction. A localization method of the system is based on two crucial functions, PDR (Pedestrian Dead Reckoning) localization, and image based localization. The main feature of the demo is a complementary use of PDR and image based method with virtualized reality models. PDR is realized with the built-in sensors (3-axis accelerometers, gyroscopes and magnetometers) in waist-mounted device for estimating position and direction on 2D map. An accuracy of the PDR localization is improved with map matching and image based localization. Maps of the environment for map matching are automatically created with virtualized reality models. Image based localization is realized with matching phase and tracking phase for estimating 6-DoF (degree of freedom) extrinsic camera parameters. In matching phase, correspondence between reference images included in virtualized reality models and images from the camera of the handheld device is used. An output of the PDR localization is used for an efficient searching of reference images. In tracking phase, interest point-tracking on images from the camera is used for relative motion estimation.

