Inertial sensor-aligned visual feature descriptors

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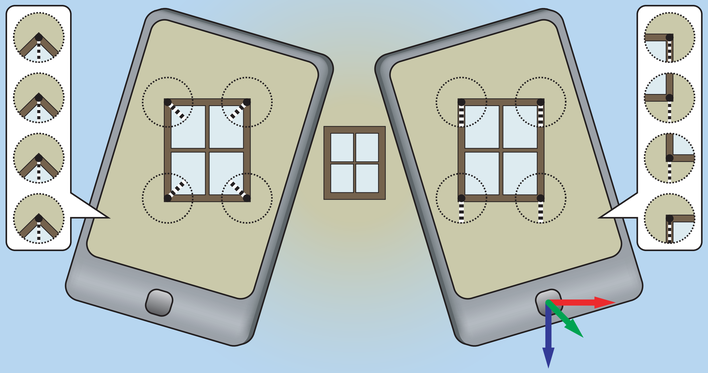
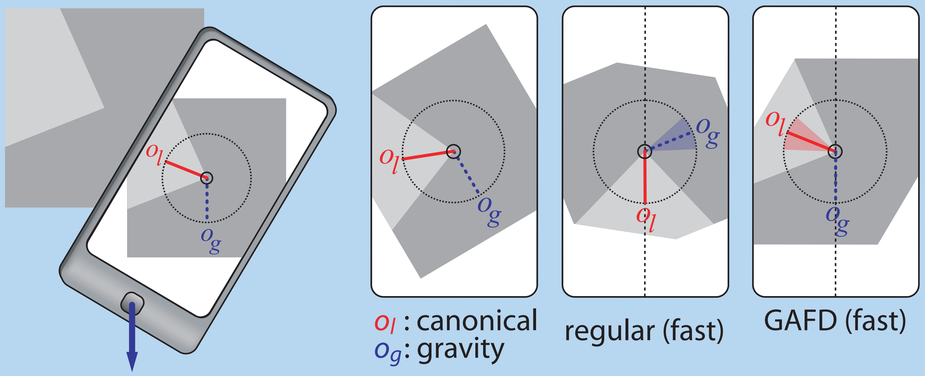
Motivation and Approach: GAFD



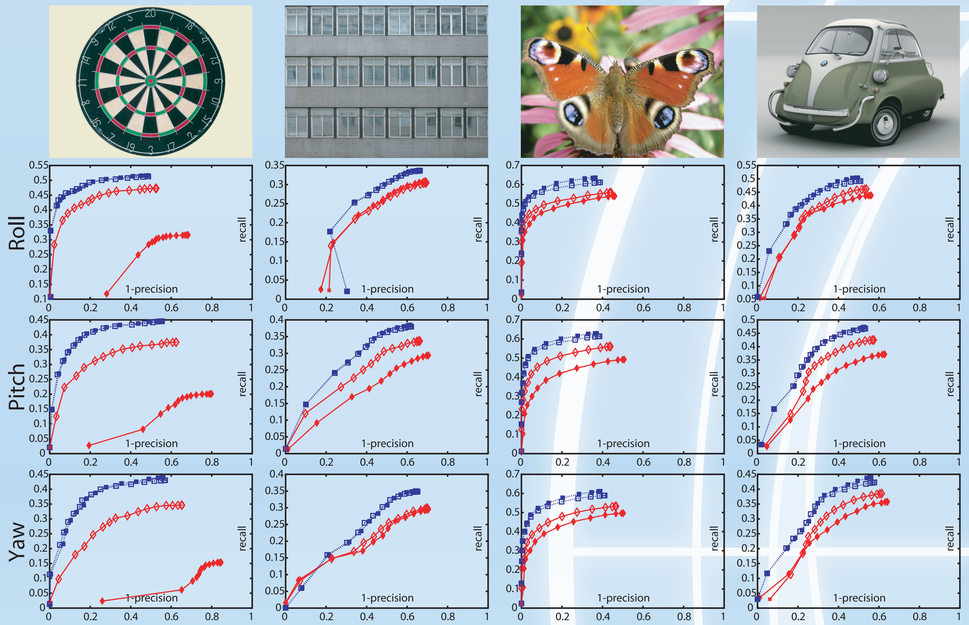
Gravity-aligned feature descriptors (GAFD) use the orientation of the gravity instead of the canonical gradient orientation of a feature.

Regular feature descriptors (left) and gravity-aligned feature descriptors (right) on a building facade.



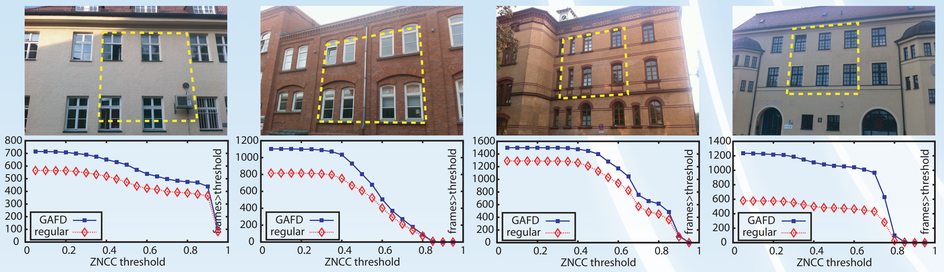
Every feature has a local (o_l) and a global orientation (o_g). Their difference is constant and can be used to preclude feature matches.

Evaluation: GAFD improves SIFT's recall-precision



Recall-precision characteristic for different target images under different camera motions. GAFD-SIFT clearly outperforms regular SIFT.

Facade detection and tracking in outdoor AR



Number of successful detections with respect to the similarity measure threshold: GAFD improves the detection rate.

Mobile AR application using GAFD for large scale outdoor tracking.

Live Demo: Handheld AR

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