



LOCAL IMAGE DESCRIPTOR CO-OCCURENCE ANALYSIS FOR ROBUST MOBILE SELF LOCALIZATION AND AR OBJECT VISUALIZATION

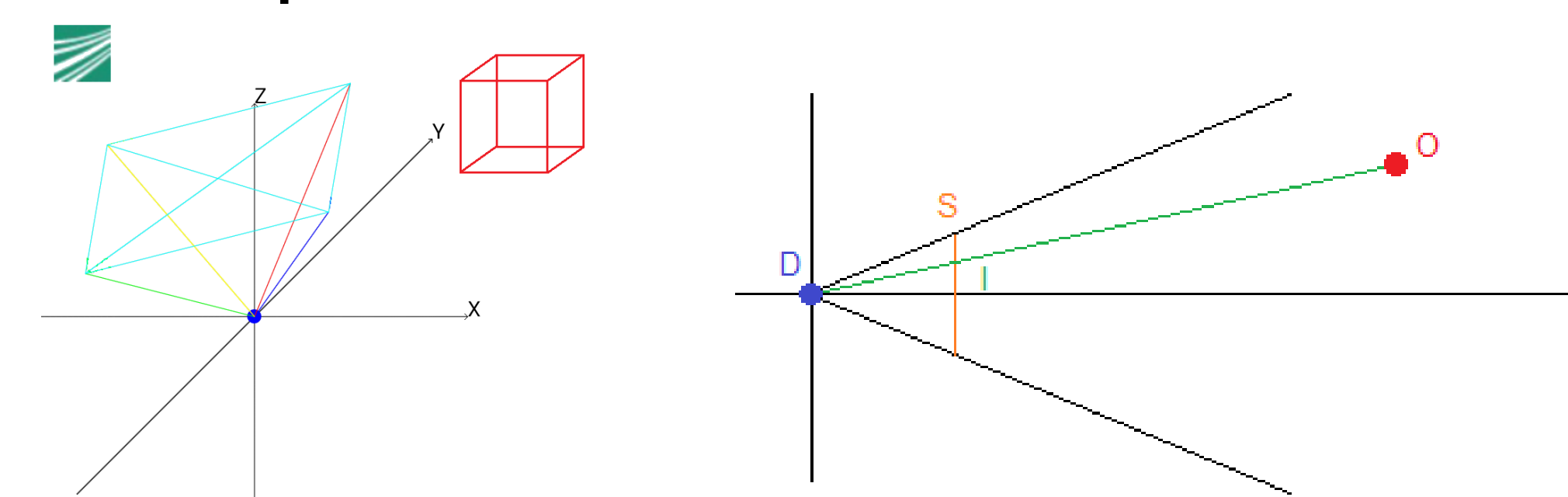
Abstract:

We present a novel approach for optimizing the set of geo-referenced image descriptors used for mobile device localization and geo-referenced object visualization. The data set analysis uses a statistical approach which rates the co-occurrence relations between geo-referenced map descriptors. The statistical analysis is able to efficiently reduce the dataset size needed for image based localization and automatically eliminates short-term foreground objects. We also use existing location information and inertial sensors to enable a region based decomposition to circumvent vector quantization methods. The proposed approach is rather general and we show its feasibility on a mobile augmented reality application.

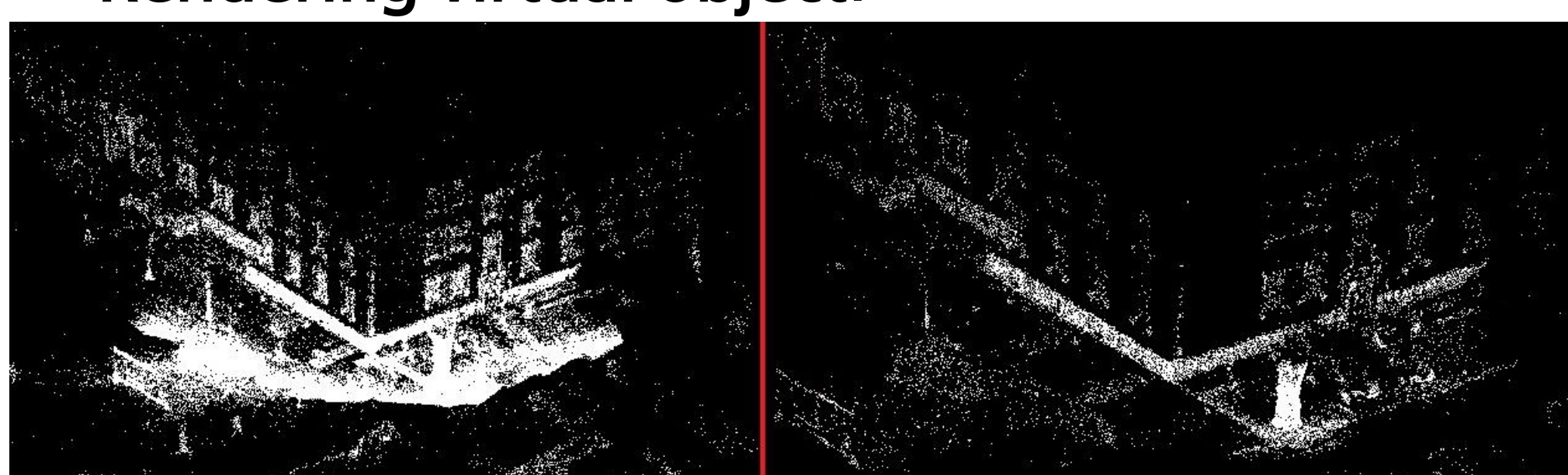


Methods:

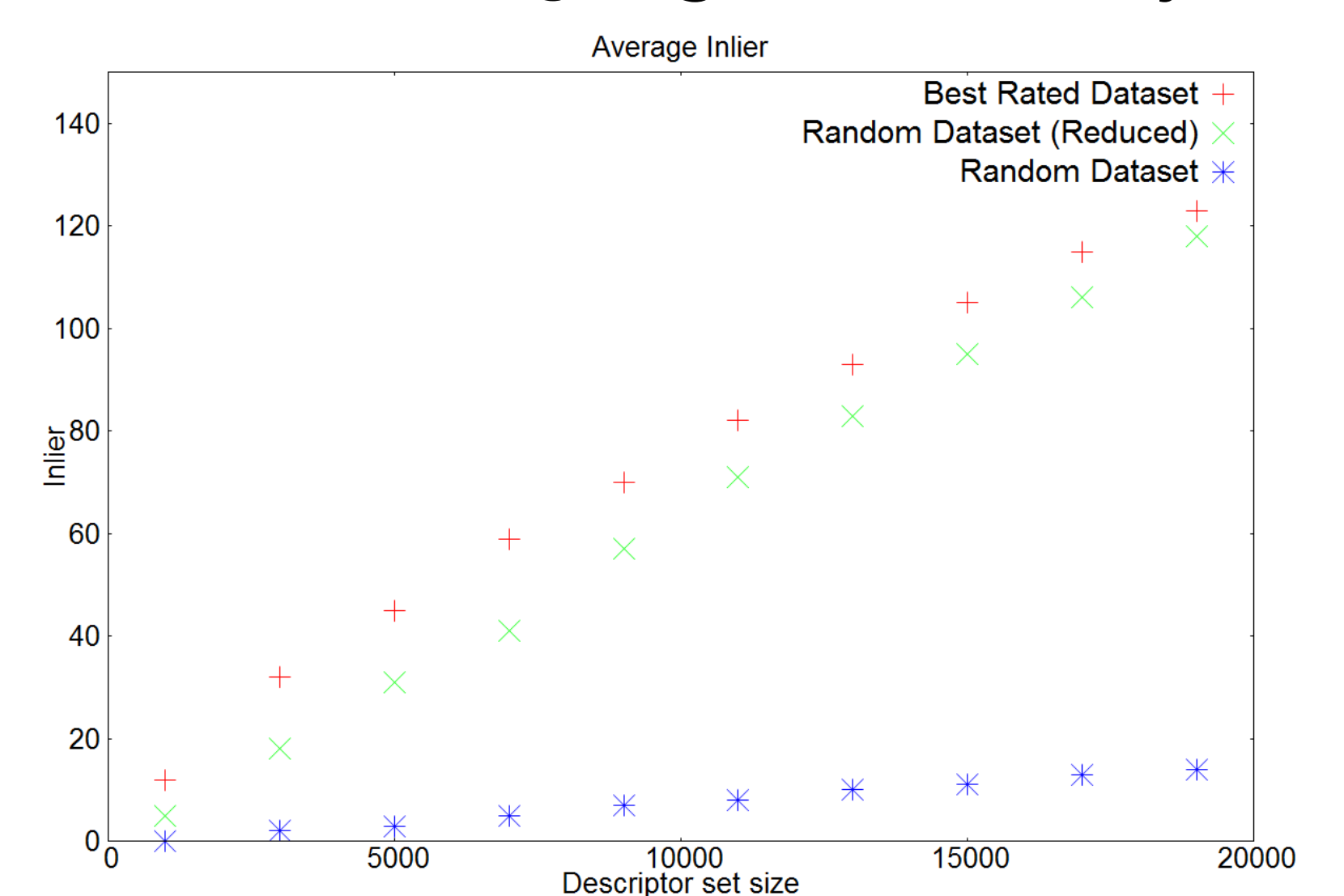
- Camera locations and descriptors are separated in regions by a **region system**.
- Descriptors are extracted from the **localized image** and converted into a **geo-referenced descriptor map**.
- The relation between all the descriptors in each image is extracted and the relation is **stored in a relational database**.
- The relations are **analyzed** and rating results are exported.
- Results are used to create new **compact descriptor datasets**.



- Mobile device **sensors** are used to estimate the orientation and location of the device.
- A geo-referenced descriptor dataset is used in combination with PnP techniques to **localize** the device camera.
- Rendering virtual object.**



- Image matching (ORB) and sensor information are used to find the object of interest.
- Optical Flow (Lukas Kanade) is applied to track the object.
- Visualization using **augmented reality**.



Results:

- The mean amount of inliers in dependence of the dataset size was increased.
- Dataset size was effectively reduced.
- Removal of temporary objects.

