

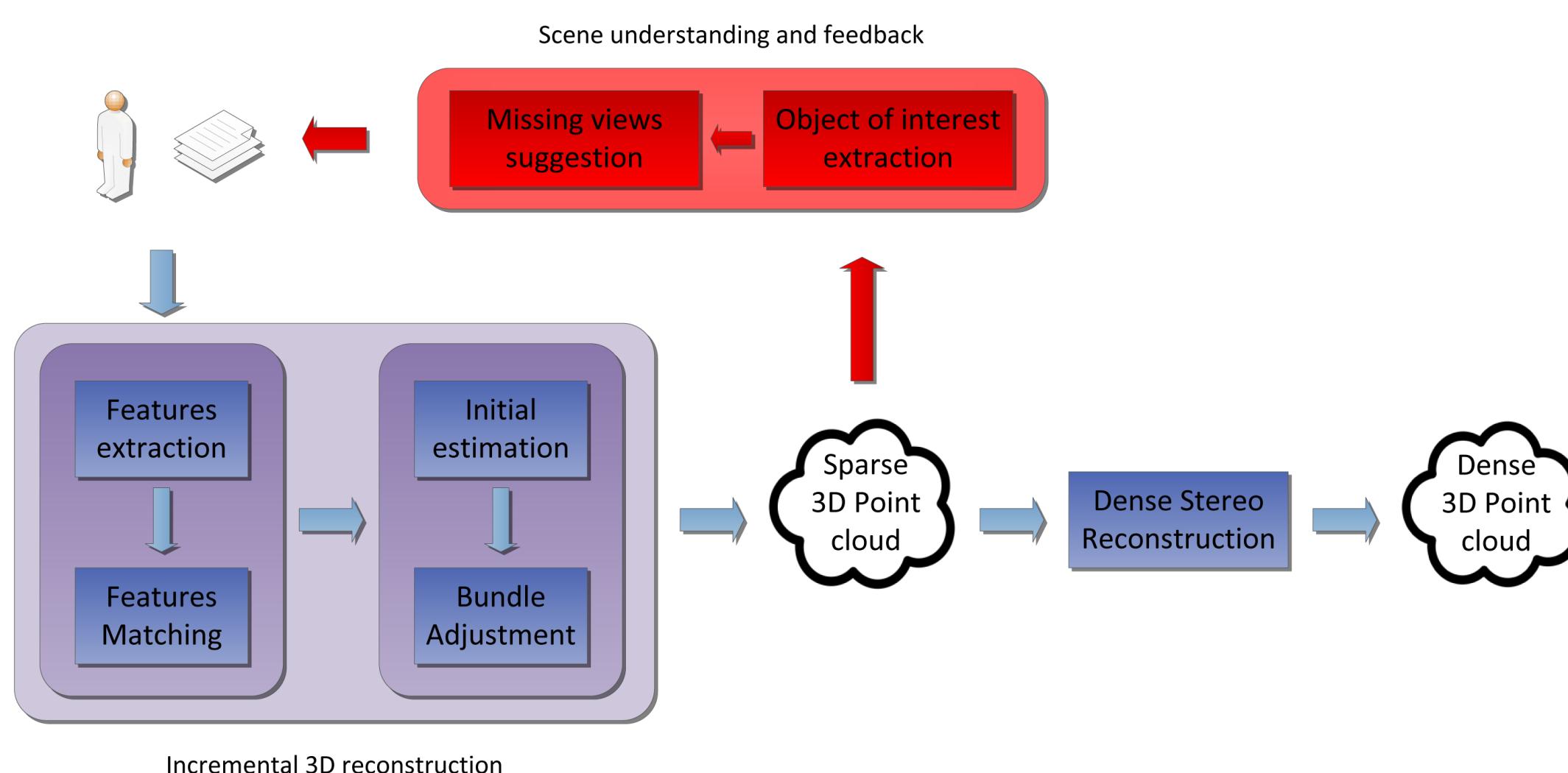
Scene analysis for *automatic object segmentation* and *view suggestion* in Assisted Multi-View Stereo Reconstruction.

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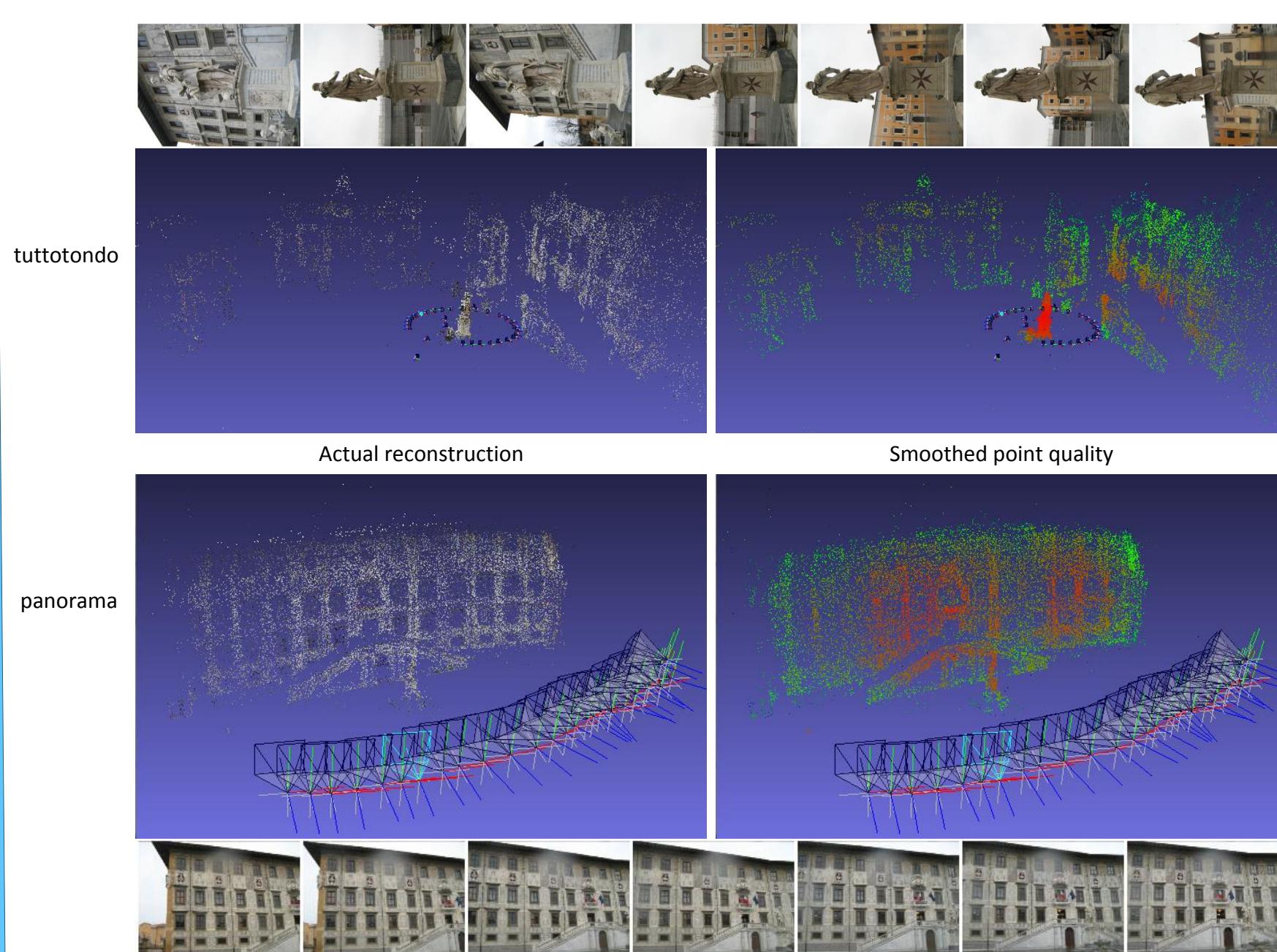
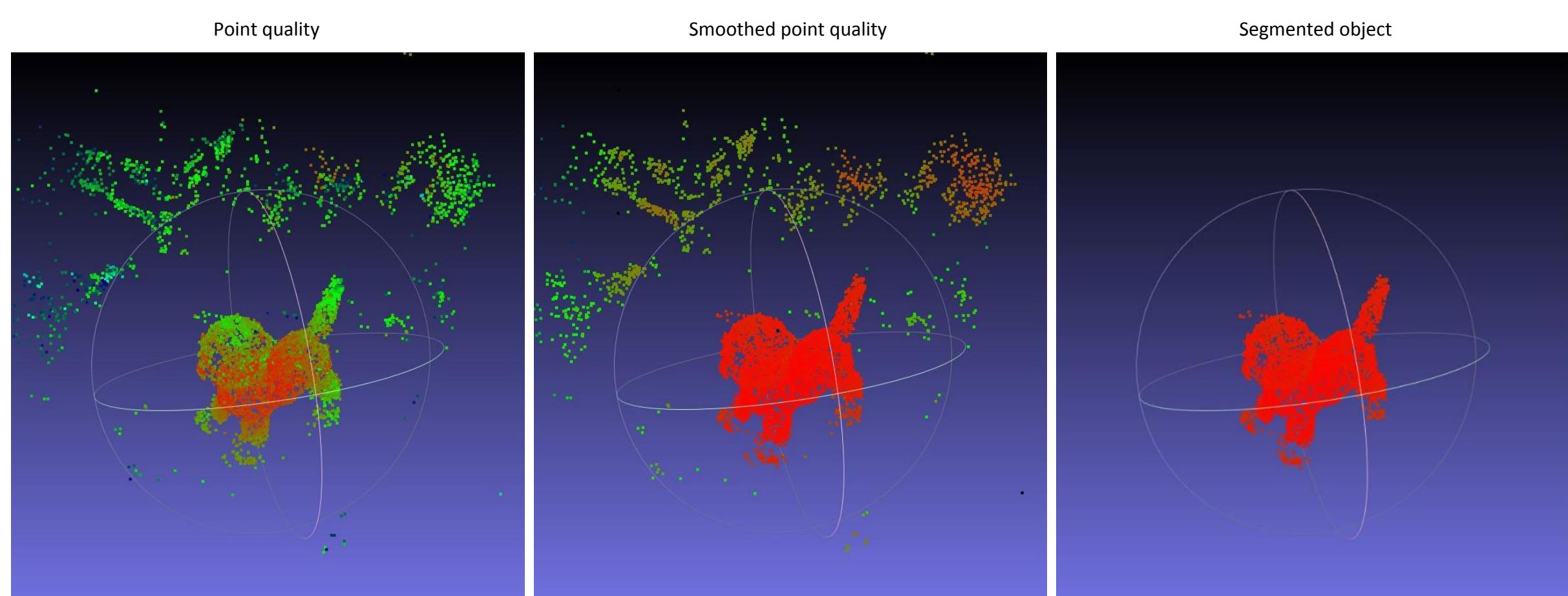
The core of the method is *a novel scene analysis algorithm*, that allows the system to suggest views to the user, that can improve the coverage of the actual reconstruction.

As a first step the system understands which is the object that is being acquired, and segments it from the rest of the scene. In order to do this, a quality is computed for each point in the reconstruction, based on how much each point is near the center of the images generating it.

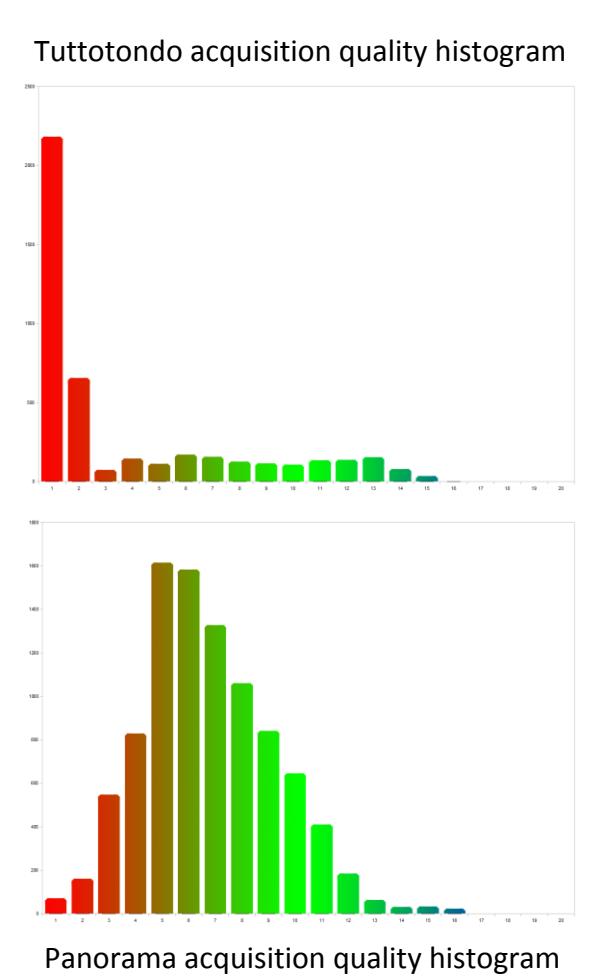
The quality value is then distributed among points by a smoothing operation, allowing for a better separation of the main subject from the background.

Multi-View Stereo Reconstruction is a process concerning the automated acquisition of object and scene models from multiple photographs. It aims to obtain a 3D representation of a real object, relying solely on images depicting it. A dense 3D point cloud is produced, approximating the surfaces visible in a set of photos.

In contrast with traditional blackbox approaches to MVS, a new method is proposed which allows the user to verify and control the completeness and quality of the reconstruction as it occurs. This method is implemented in a fully working framework for Assisted-MVS, that is able to run on average-end laptops, thus allowing the user to perform the reconstruction directly on-site.



Once the object of interest has been determined, view suggestion is supported in two steps. First, the object of interest is analyzed searching for points in areas with lower density, and a candidate point is selected. Second, a number of views are generated such that the selected point is in the center of the framing, and the view direction is perpendicular to that point. The direction is perturbated in order to generate views not too similar to existing ones.



The actual segmentation occurs by finding a separation threshold among the quality values, organized in histograms.

The defined threshold proved to be effective in both cases of a single object acquisition (*tuttotondo*) and a whole scene acquisition (*panorama-like*).

