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Contents: The LADIO project participates to “Open Access to research data” initiative. In this task, we will formulate a data management plan to make available data sets that can benefit the academic community and other users.	

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Data Management Plan

Data sets description

The consortium will provide at least two of the three following data sets :

1. **LADIO_DATASET_Live_Action**

A shooting data set provided by a preparation for feature film in Oslo-Plaza, provided by partner Quine. This data set will combine

- a. Main camera raw data footage
- b. Witness cameras footage
- c. Still images captured with DSLR camera
- d. 360 video captured with device like Ricoh Theta
- e. Lidar data captured with device like Velodyne Puck

This data set will include high quality video footage produced in a professional film environment, mixed with complementary data survey of the set. The goal of this data set is to enable researchers to improve the quality of state-of-the-art camera tracking and 3D reconstruction algorithms by experimenting with industry data.

The data set includes footage from the main Arri film camera, both in SDI dump and Arri Raw together with two witness cameras attached rigidly to the main camera. The witness cameras have a broader FOV and higher shutter speed allowing for a recording better suited for tracking than the main camera alone. Additionally, some of the tests include footage of CCtags fiducial markers attached in the ceiling of the studio or on the wall.

The data set will include a CG world with 3D renderings of the 3D reconstruction of the set. This data set will allow to evaluate the quality of any 3D reconstruction software and any camera tracker. The CG world will be created by the open source software components of LADIO and POPART projects.

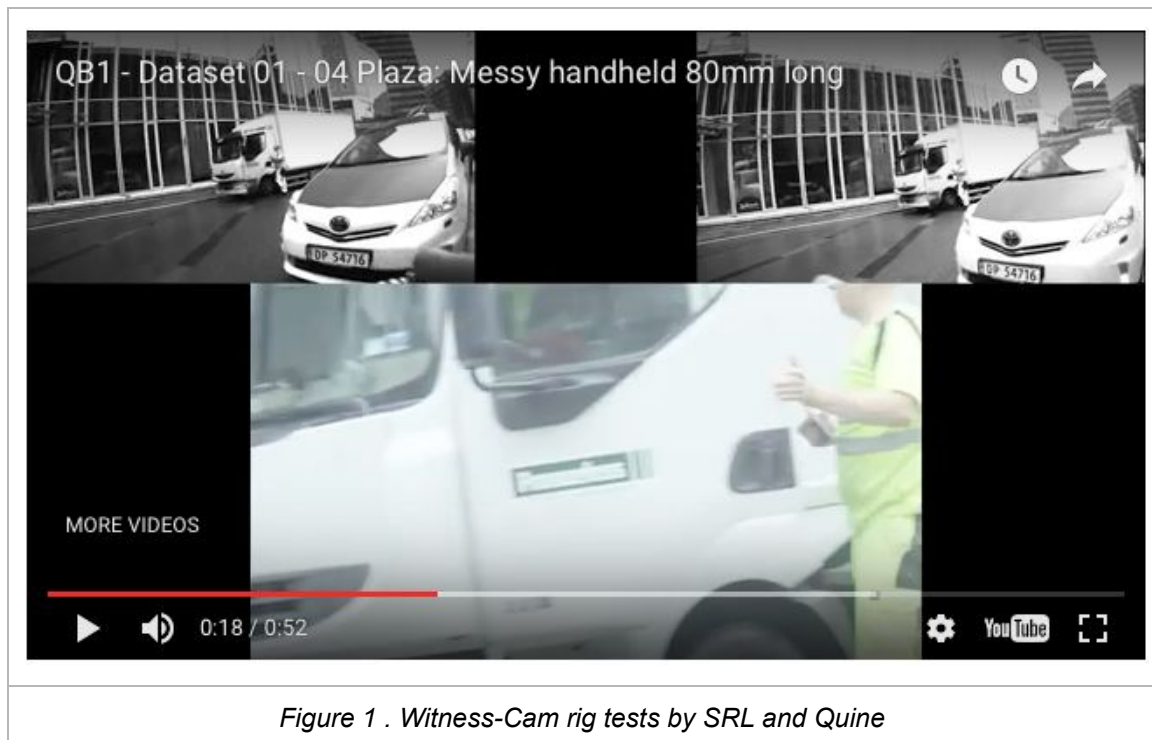


Figure 1 . Witness-Cam rig tests by SRL and Quine

The first contributions of this *LADIO_DATASET_Live_Action* will be available in June 2017, and we expect to further expand the dataset.

2. *LADIO_DATASET_Advanced_3D_Reconstruction*

This data will consist of *web-collected data* and include, based upon an academic data set from INP experiments in WP3. It will include :

- a. A selection of publicly available 3D object models,
- b. A set of synthetically rendered images per object model coupled with camera poses,
- c. A set of web-selected real images of object model instances coupled with camera poses.

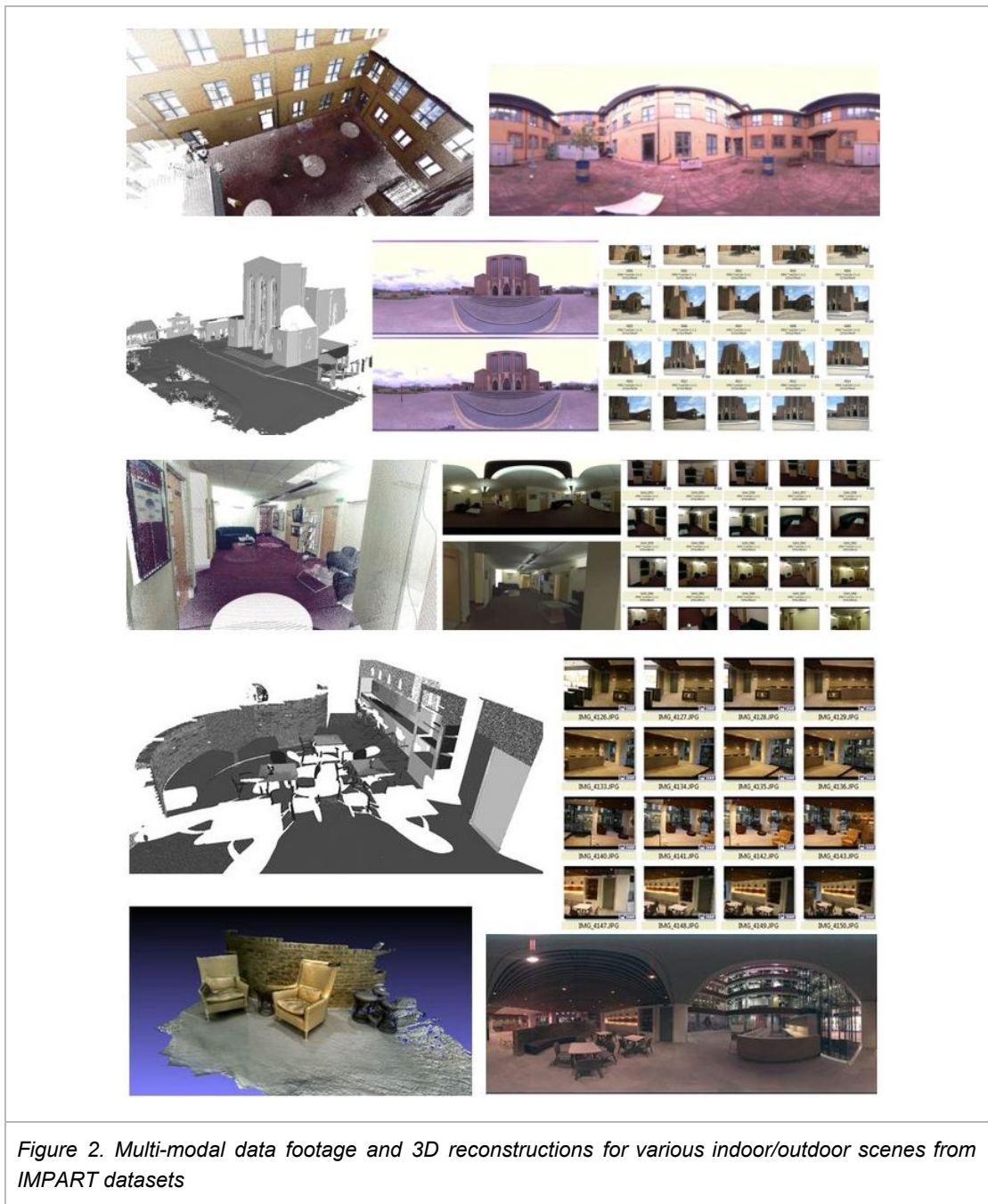
In a) the 3D object models will be taken from sites sharing online free 3D models e.g., like free3D.com (formerly tf3dm.com). They will be completed by pre-computed differential geometry information (Gaussian maps, derivatives w.r.t. the surface parameters, first and second fundamental forms, principal curvatures etc.) which will be associated to each vertex of the surface. In LADIO, the 3D object will be given by a set of 3D depth maps, which describes how the original object surface is “shortened” by a perspective viewing. We will provide a code along with the dataset for generating the depth map from the 3D models, given a camera pose. On the other hand, b) and c) will be used as test intensity images. In b) camera poses are known and will correspond to ground-truth. In c) the camera poses camera poses will be determined by *manually* registering the real images to the 3D model and will be considered as ground-truth.

This data set will allow to evaluate the performances of algorithms for registering 2D images to 3D untextured models. In particular it will allow to measures the degree of repeatability of the proposed features. In our case, the repeatability of a feature is defined as the frequency with

which one detected in the depth image is found within pixels of the same location in the corresponding intensity image.

We will also provide annotations for existing data sets (original data can not be redistributed) , explaining to how to use them with respect to LADIO.

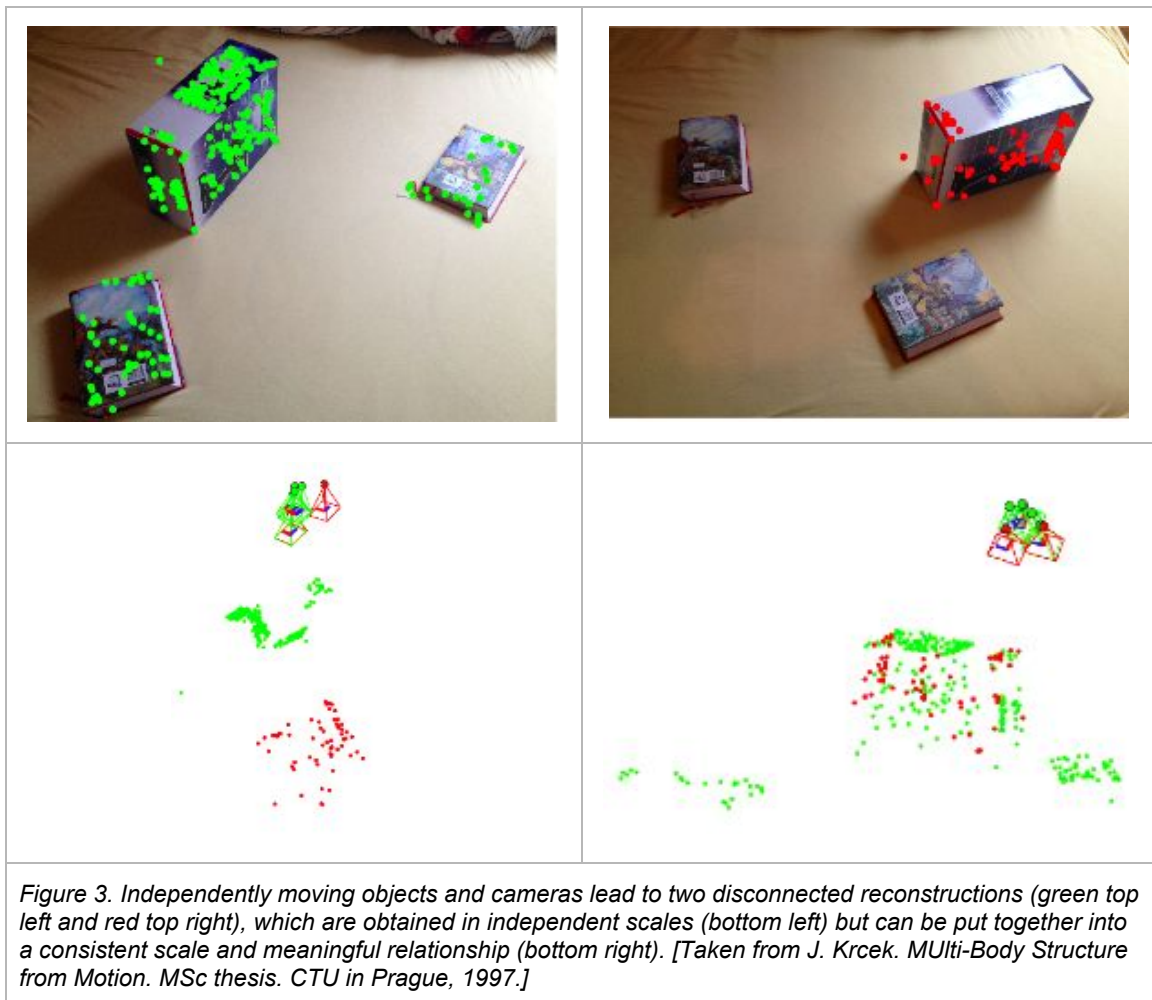
- IMPART datasets (cvssp.org/impart): multi-modal/multi-view datasets created by Univ. of Surrey and Double Negative within the EU FP7 IMPART project.
- PASCAL3D+ dataset (cvgl.stanford.edu/projects/pascal3d.html)



The first contributions of this *LADIO_DATASET_Advanced_3D_reconstruction* will be made available in September 2017, and we expect to further expand the dataset.

3. *LADIO_DATASET_Multi_Body*

Fully general Multi-Body Structure from Motion is a very difficult problem, which is very unconstrained and perhaps can't be solved without adopting additional constraints and priors for particular situations at hand. We will therefore investigate several key use cases. We will be looking for the additional constraints and priors allowing to find, formulate and solve a well defined task.



We plan to investigate three cases that correspond to situations we encountered in LADIO applications.

1. Data: A few objects of similar size and importance moving around at the same time.
Task: Segment, independently reconstruct individual objects and try to bring them into reasonable geometrical relationship, Figure 1.

Application: Basic research task leading to understanding, formulating and testing different Multi-Body SfM approaches.

- a. Data: A main background scene with additional moving (nuisance) objects (cars, pedestrians, etc.).

Application: Reconstructing large outdoors scenes for during extended time periods when some objects (often distractors) are moving in the scene.

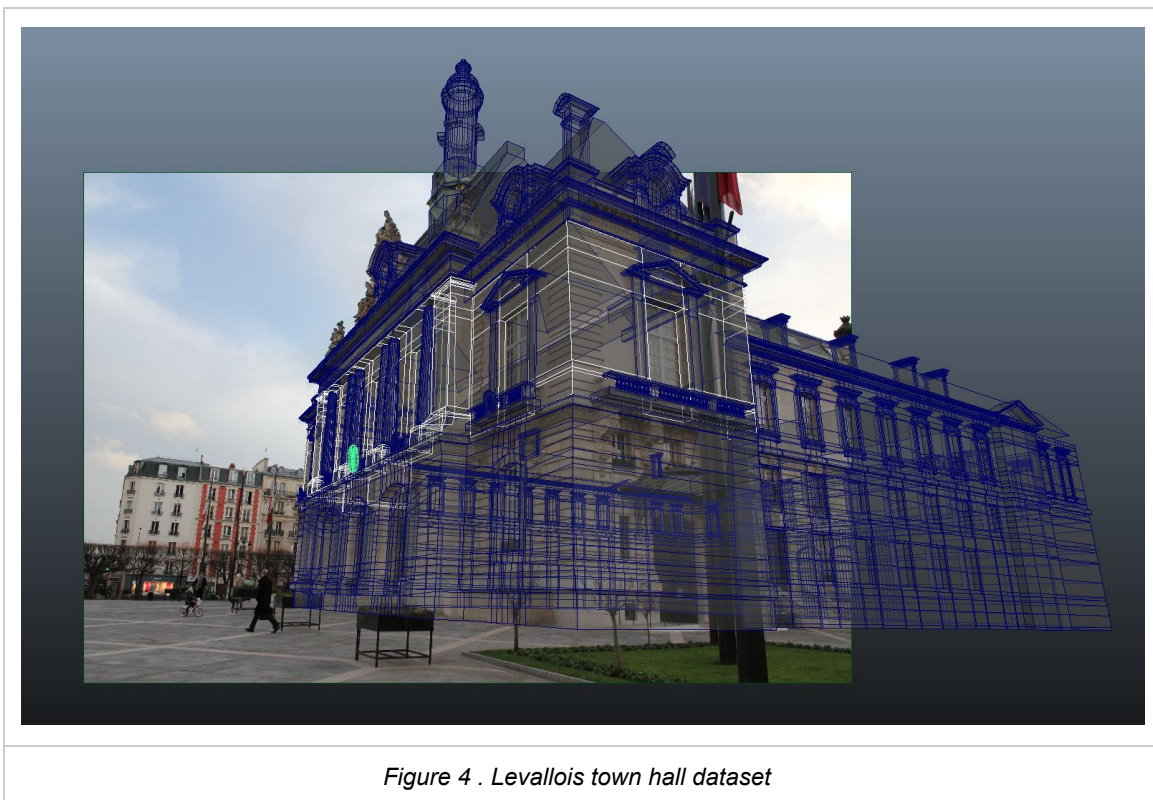
Task: Segment moving objects from the background scene and ignore them.

- b. Data A main background scene changing in time.

- c. Task: Detect changes in the scene and build a 3D time dependent model representing the scene accurately at different time moments.

Application: Reconstructing studio setups where parts of the scene are being gradually restructures.

We will also extend POPART's ground truth data set "[POPART Virtual Dataset - Levallois Town Hall](#)" with moving objects as virtual data, corresponding to our 3 use cases.



This data set will allow to evaluate different scenarios and select the most important one for further development.

The first contributions of this *LADIO_DATASET_Multi_Body* will be made available in november 2017, and we expect to further expand the dataset.

Academic Publications

According to open access publications obligations In Horizon 2020 projects, and in accordance with the global open innovation philosophy of LADIO project, the academic partners of the consortium are committed to “Open access publishing” (aka “Gold open access”) whenever this option is provided by the venues where we must publish to reach the highest impact of our results.

Some of the most important venues in the research community are stored in the IEEE Xplore digital library and IEEE does not provide any option for making conference publications available as open access. However, it has become common practice in some communities, including computer vision, to re-publish these papers both on personal/institute web pages and on arXiv.org. In spite of the potential legal threat of publishing slightly different versions of works on arXiv while transferring copyright of the final work to the IEEE, we are following this dual approach since it is established practice in the community.

Standards and metadata

The video files in the data sets are based on ARRIRAW [1] and ISO MP4 [2]. Additionally, text files included describe lens metadata and other parameters.

3D models are stored in industry standards Alembic [3] and FBX [4].

See also Deliverable 2.2, for more description about File Formats.

[1] http://www.arri.com/camera/alexa/workflow/working_with_arriraw/arriraw/format/

[2] MPEG-4 Part 14 (ISO/IEC14496-14:2003)

[3] <http://www.alembic.io/>

[4] <http://www.autodesk.com/products/fbx/overview>

Data sets access and sharing

In the same spirit as the open source contributions of the project, LADIO's released data sets will be permanently available on <http://ladioproject.eu>, the project's Github page <https://github.com/alicevision> and from Zenodo <https://zenodo.org/collection/user-ladio> (to be created) or similar data repository.

The data sets will be released to the general public under the license of [Creative Commons Attribution-ShareAlike 4.0 International](#), allowing researchers and other interested parties to exploit the data sets.

Reminder : under this license, the users are free to share and adapt the content for any purpose, even commercially. The users must also give appropriate credit, provide a link to the license, and indicate if changes were made. If users remix, transform, or build upon the material, they must distribute their contributions under the same license as the original. They also may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Data sets reference and name

The identifier for these data sets will all be prefixed by 'LADIO_DATASET'.