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MASTER 2 INTERNSHIP 2017 – PIPING EXTRACTION FROM POINT-CLOUDS

We are looking for a highly motivated Master student to work on piping extraction from point-clouds, for a research internship.

- Keywords: Shape analysis, Geometry Processing
- Advisor: Nicolas Mellado (nicolas.mellado@irit.fr)
- Location: Laboratoire IRIT, équipe VORTEX (Groupe AGGA), Université Paul Sabatier – Toulouse
- Duration: from February/March 2017, 5-7 months

Context



Interior view of an aircraft (source (<http://share.sandia.gov/news/resources/releases/2007/aircraft.html>)). Observe cables and tubes in the bottom left quarter.

This project focuses on developing techniques to segment, classify and extract pipings in acquired point clouds. More specifically, our goal is to recognize different classes of elements

inside cluttered scenes, such as pipes, cables and harnesses, as shown in the right figure.

The proposed system expectation are:

- Ability to run on point-clouds with tens/hundreds millions of points.
- Extraction of pipes/cables/harnesses as 3d polylines + varying radius function.
- Classification of the extracted primitives (e.g. pipe, cable and/or harness).
- Possibility to export the points associated to each primitives or class of primitive.
- When available, the extraction should take into account color information.
- Interactive methods may be considered in order to solve ambiguities due to occlusion, missing data. A pre-processing stage can be considered, as long as the output solution can be edited interactively.

This internship is focused on the preliminary development of data-structures and algorithms required for robust extraction on real-world data.

Depending on the intern progress and interests, several research challenges will be considered. For instance, an interesting feature would be to constrain the primitive extraction wrt. the extracted primitive class properties (e.g. straightness). Another important challenge is the automatic detection of the analysis scale, which may vary over the scene depending on the primitive radii, the amount of clutter, occlusions, noise and missing data.

Student profile

- Master student in Computer Science or Applied Mathematics
- Strong programming skills (C++), GPU programming will be appreciated
- Knowledge of linear algebra is required, knowledge on geometry processing will be appreciated
- Fluent English or French spoken

How to apply

Send your application to Nicolas Mellado (email at the top), with

- a complete CV,
- previous internship reports if available,
- reference name/email address (optional)

☐ Research (<https://www.irit.fr/recherches/VORTEX/MelladoNicolas/category/research/>)

Comments are closed.