ICT DAYS

Networks: space, land, water

Trento, 16-18 April 2024

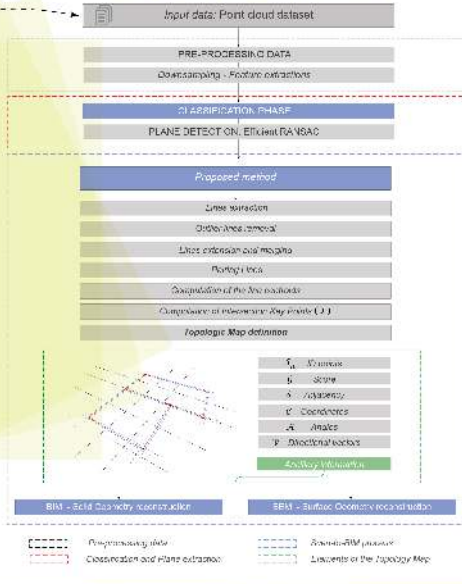# DIGITAL TWIN FOR ENERGY EFFICIENCY TO IMPROVE THE SMART USAGE OF LAND AND WATER
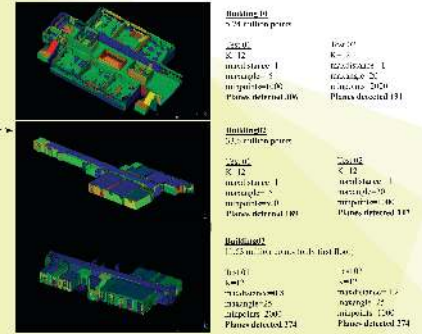
DATASETS
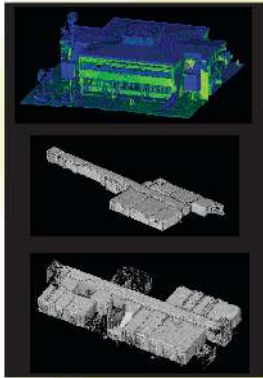
REALITY-BASED SURVEY
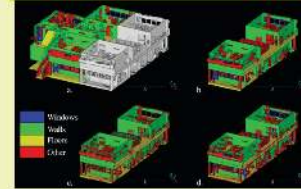

WORKFLOW

DIGITAL TWIN FROM POINT CLOUD

CGAL - Efficient RANSAC

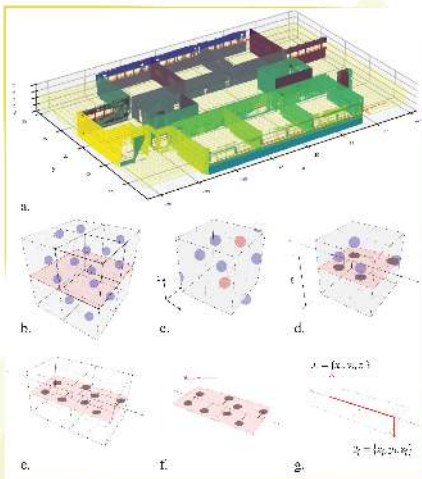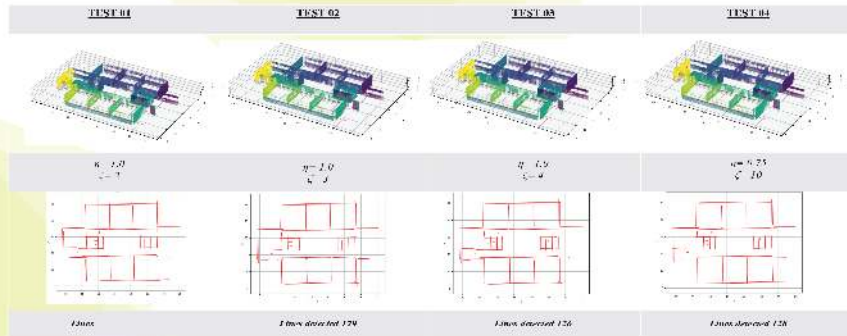### Classification -Instant segmentation

a. Dataset,
b. Ground Truth,
c. Point Transformer (Zhao et al. 2023)
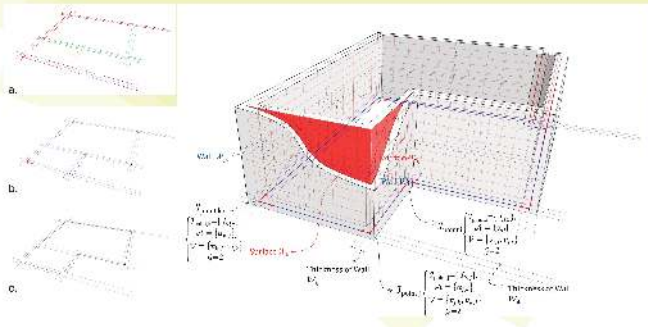d. Random Forest (Grilli e Remondino, 2020)

TOPOLOGIC MAP

a. Section plane,
b. voxelisation and
c. downsampling of the point cloud
d., e. Projection of points within buffer into section plane,
f. Principal Component analysis (PCA),
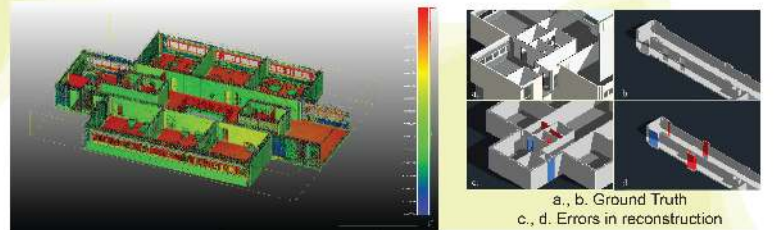g. Lines extraction

LINES EXTRACTION

TOPOLOGIC MAP - SOLID AND SURFACE MODELS

a. Pairing lines, b. Intersection points, c. Topologic Map.

TOPOLOGIC MAP - RECONSTRUCTION

a., b. Ground Truth
c., d. Errors in reconstruction

Results of the reconstruction and relative metrics.

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Digital twins for real estate energy efficiency

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3DOM 3D OPTICAL METROLOGY

Doctorate Program in Industrial Innovation