

GEO4D 1

Digital mapping using LiDAR data

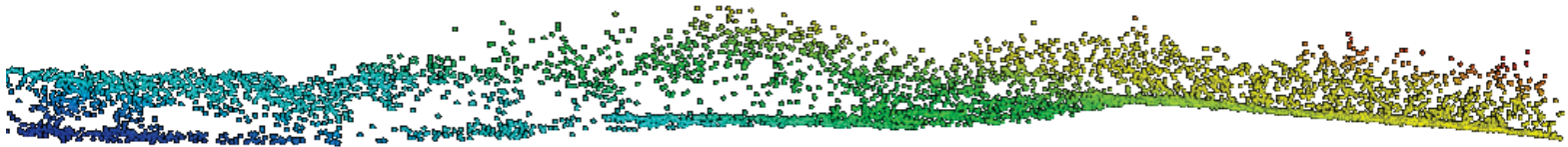
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Ponferrada, León

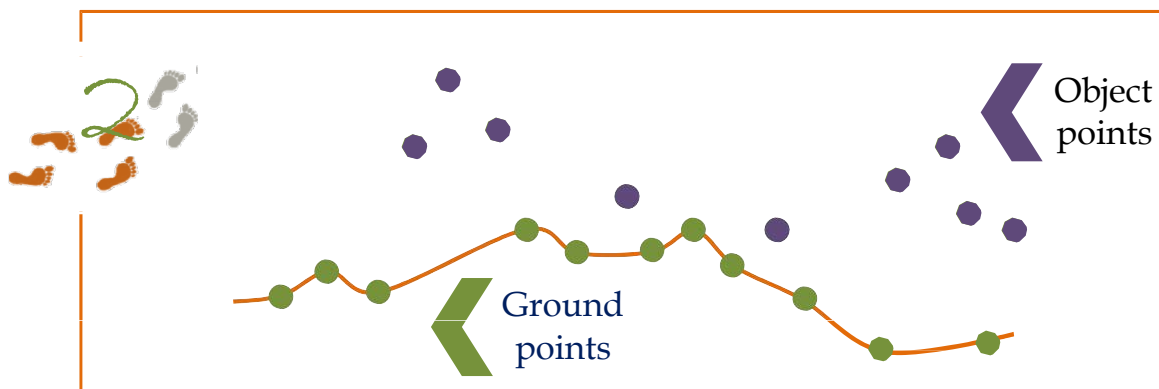
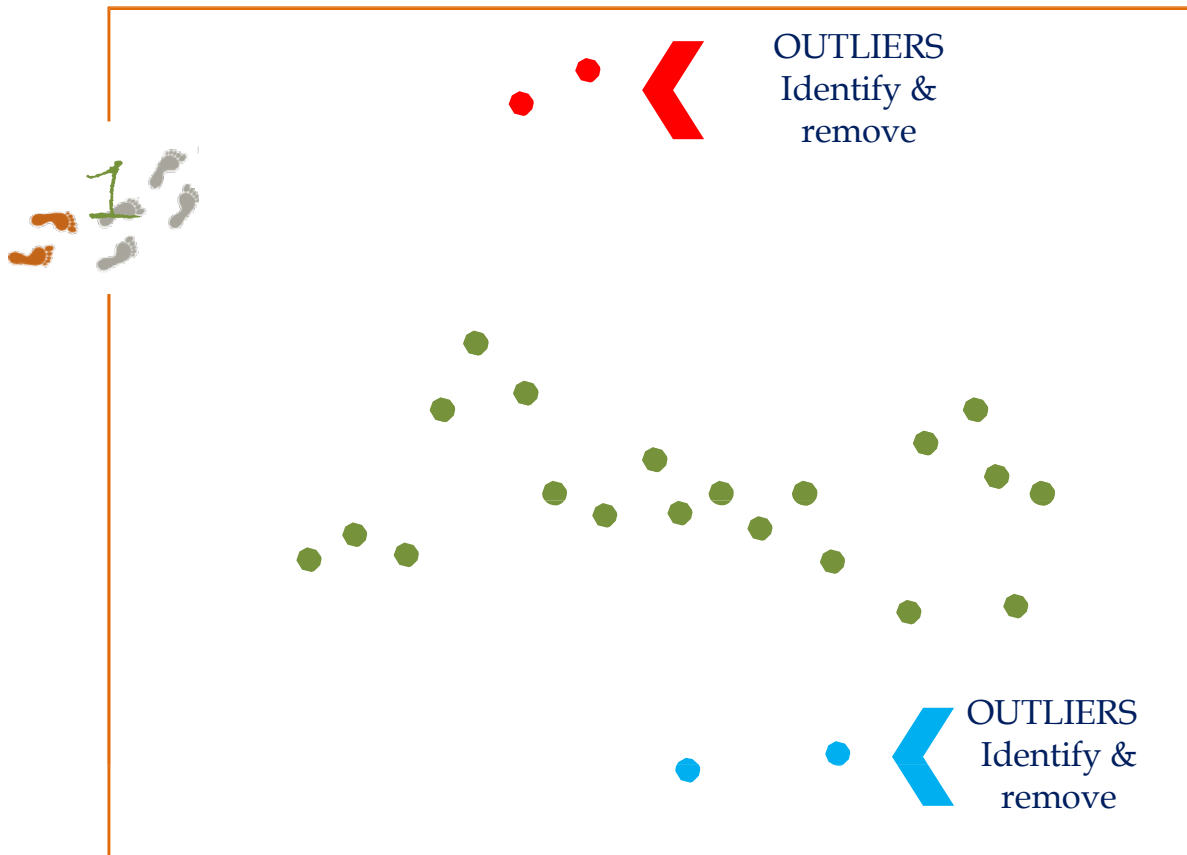


P2 Outlier removal and LiDAR data filtering

STEPS TO CREATE A Digital Elevation Model (DEM)



SUMMARY OF PRACTICAL #2

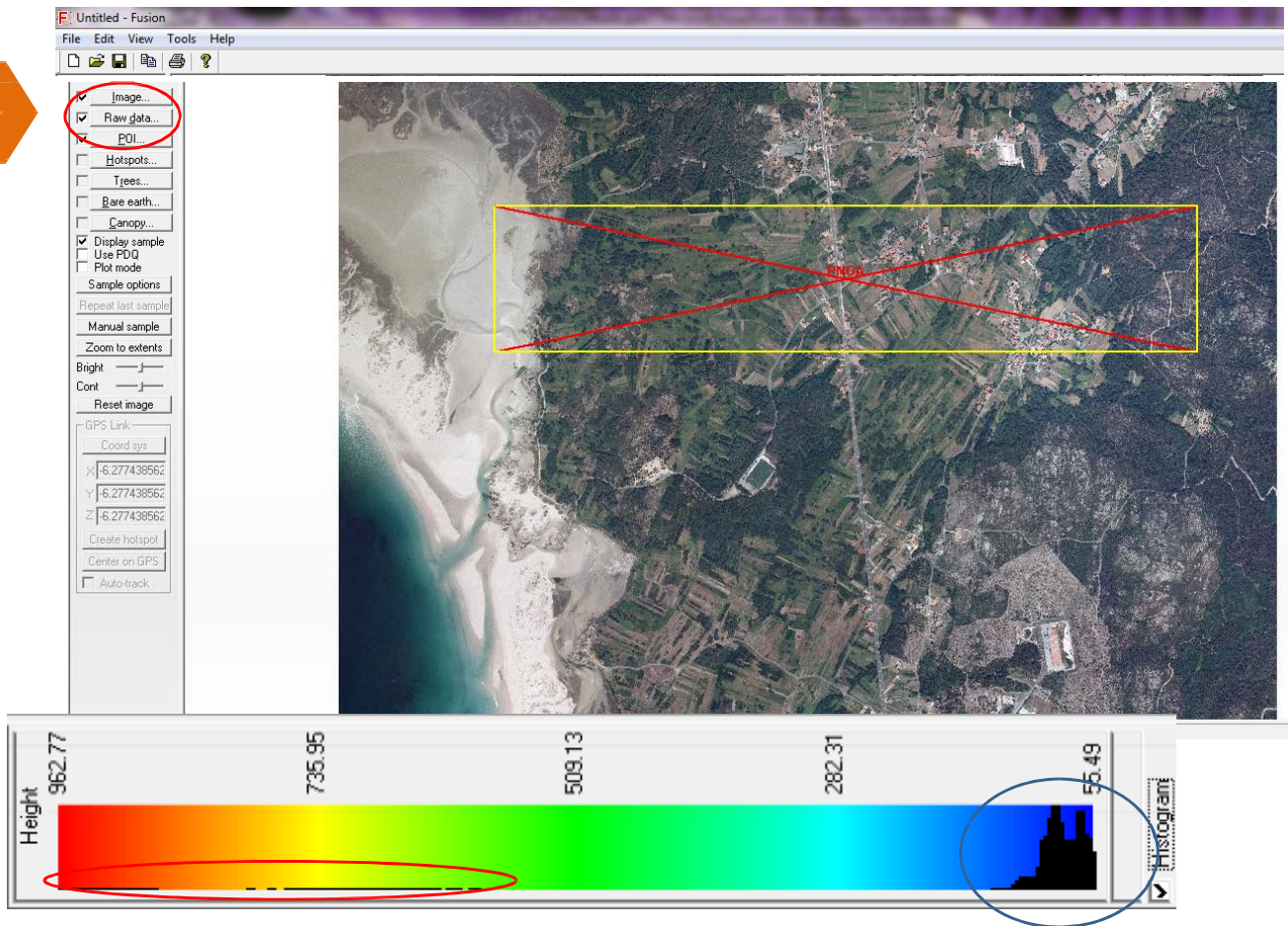




OUTLIER DETECTION

1.1. ANALYSE THE DATA HISTOGRAM: ARE THERE ANY OUTLIERS?

Load data



Folder for the results

C:\...\GEO4D\Results





OUTLIER DETECTION & REMOVAL



TOOL in FUSION: FILTERDATA

TOOL IN FUSION

/SWITCHES

FILTER

PARAMETER

CELL SIZE (m)

OUTPUT FILE

INPUT FILE



filterdata.txt

Outlier: $\bar{x} \pm \text{parameter} \cdot \sigma$

What about a parameter value of 3? (Tip: check the roofs)

C:\FUSION\FilterData.exe outlier 2 150 GEO4D\Results\03_FreeOutliers\AOIfree.las
 GEO4D\Results\02_Polyclipdata\AOI.las

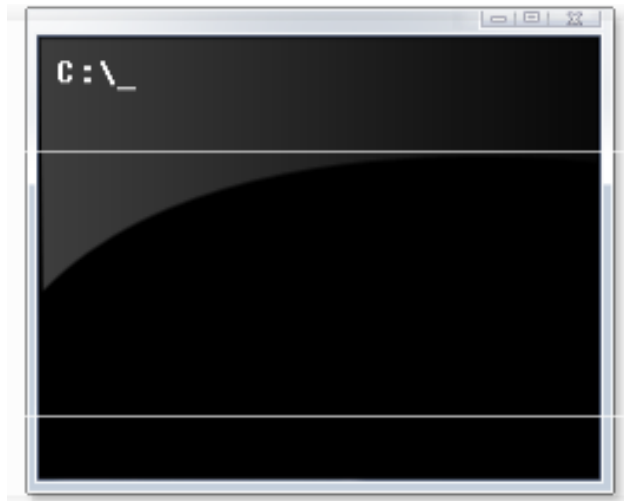
SAVE AS...



filterdata.bat



AOIfree.las



MAXIMUM Z IN PNOA.LAS?

MAXIMUM Z IN PNOA_OUT.LAS?

HOW MANY POINTS HAVE BEEN REMOVED FROM PNOA.LAS?



FILTERING (BARE EARTH)

LINEAR PREDICTION
ALGORITHM
(KRAUS AND PFEIFER, 1998)



TOOL IN FUSION: GROUNDFILTER

TOOL in
FUSION

/SWITCHES

OUTPUT FILE

CELL SIZE

INPUT
FILE

groundfilter.txt

```
C:\FUSION\Groundfilter.exe /diagnostics /gparam:-2 /wparam:2.5 /median:5 /finalsmooth  
C:\GEO4D\Results\04_Filtering\BE_subset.las 5 GEO4D\Results\03_FreeOutliers\AOIfree.las
```

/SWITCHES

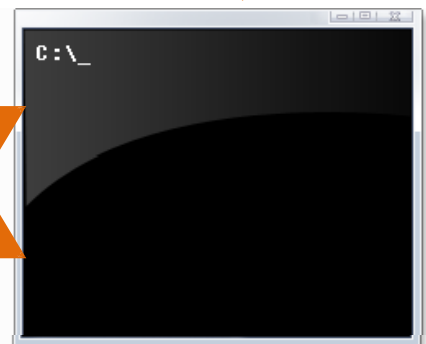
- /diagnostics** Info about return below the surface, etc
- /gparam:-2** Value for the g parameter (Eq.)
- /wparam:2.5** Value for the w parameter (Eq.)
- /median:5** Uses a median filter with a 5x5 window
- /finalsmooth** Smooth after the last iteration

$$p_i = \begin{cases} 1 & v_i \leq g \\ \frac{1}{1+(a(v_i - g)^b)} & g < v_i \leq g + w \\ 0 & g + w < v_i \end{cases}$$

SAVE AS...



groundfilter.bat



BE_subset.las

HOW MANY ITERATIONS HAVE BEEN DONE?

HOW MANY POINTS HAVE BEEN CLASSIFIED AS BARE EARTH?



