GeoSpatial Big Data in Forest Environment Challenges and Perspectives

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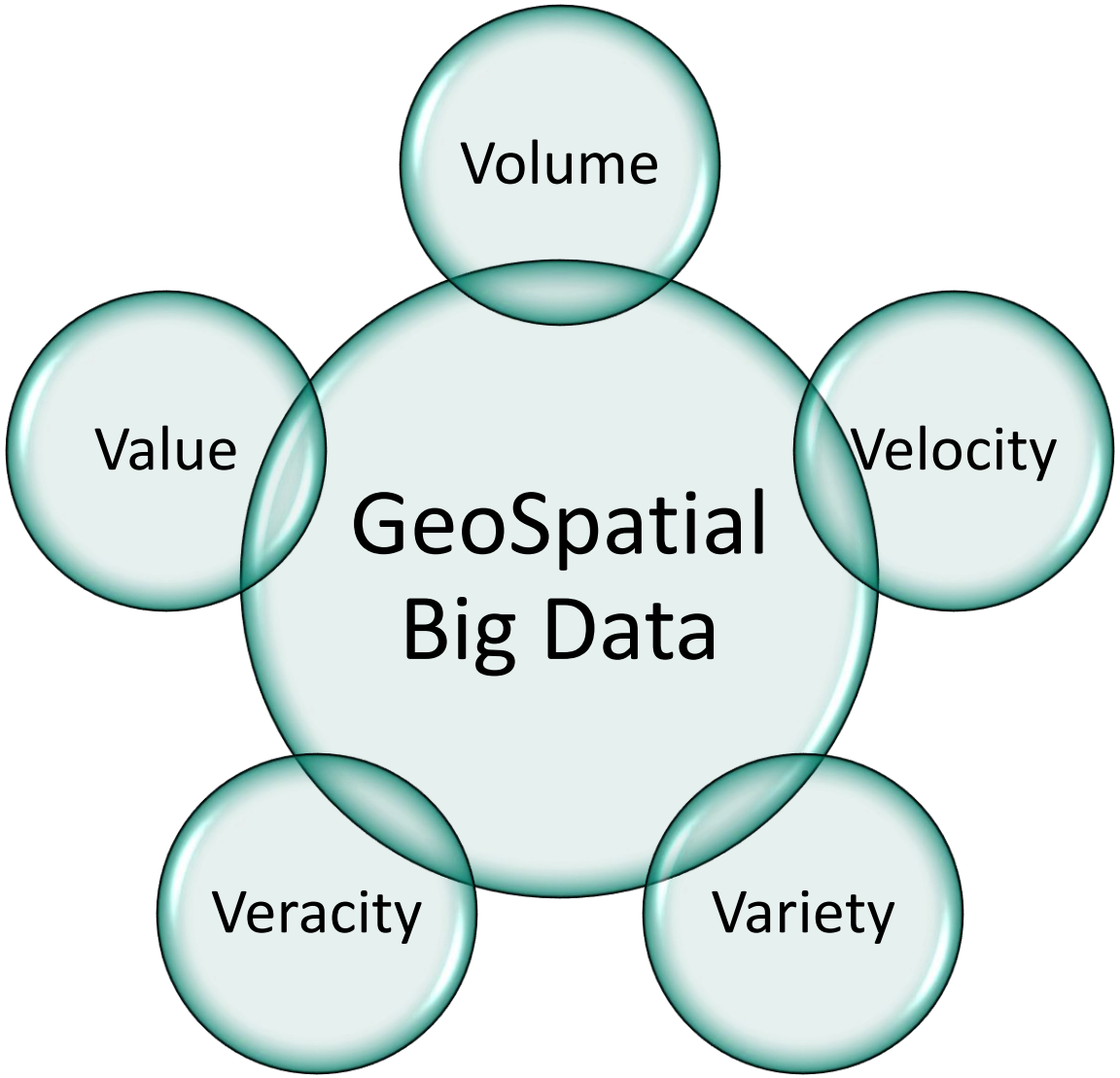
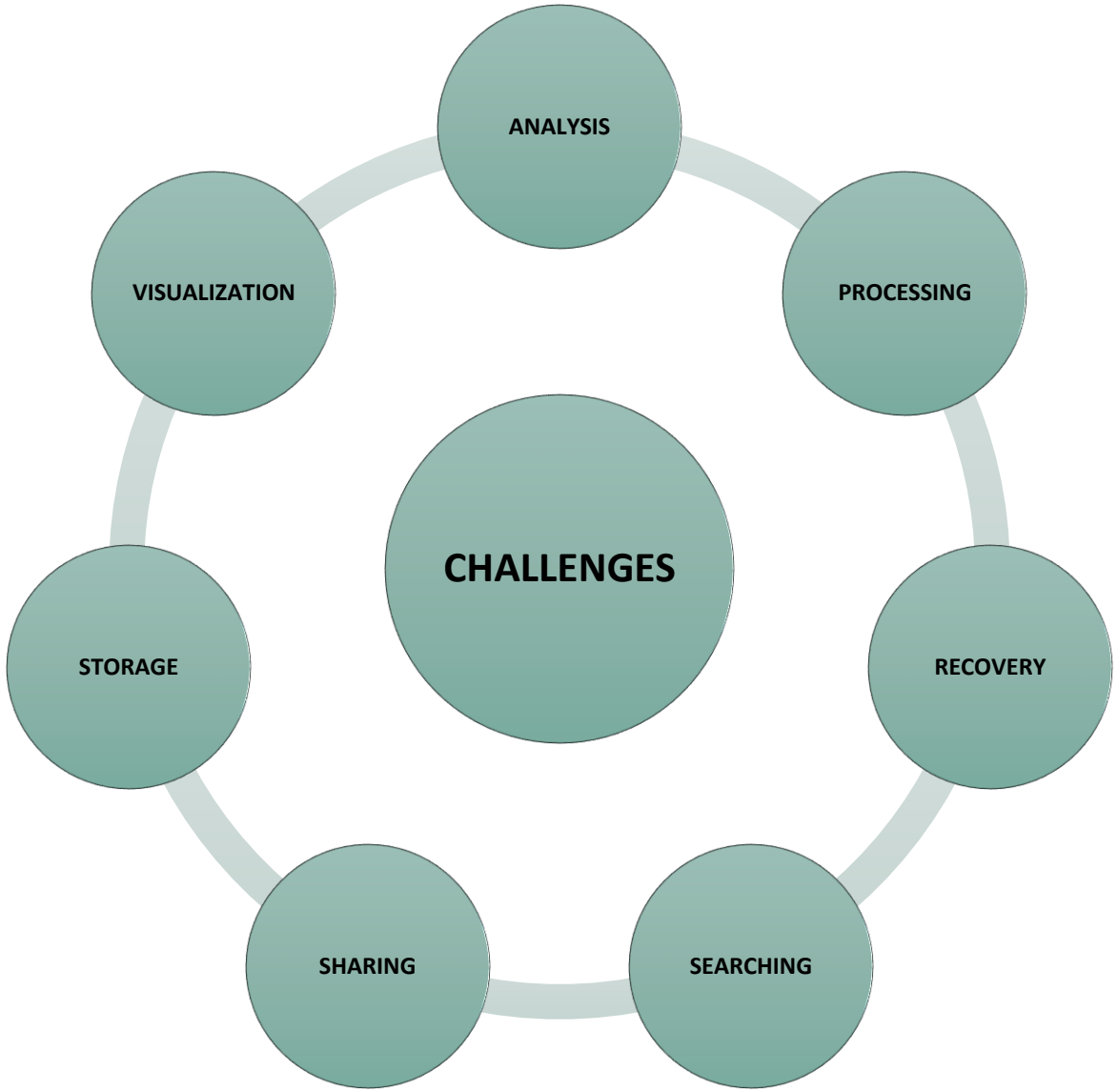
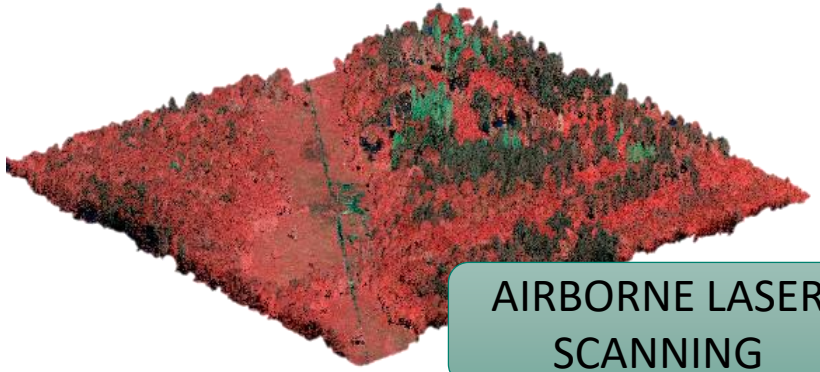
Forest Research Institute


Volume
Value
Velocity
GeoSpatial
Big Data
Veracity
Variety

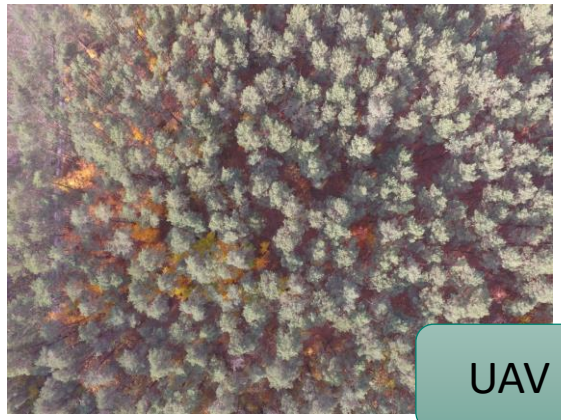
Introduction



Variety

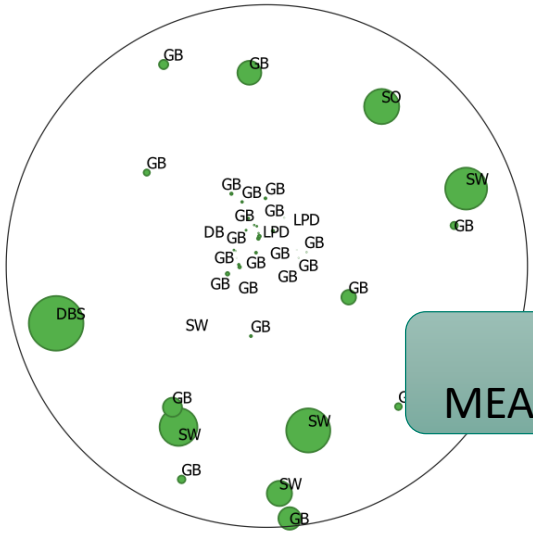


AIRBORNE LASER SCANNING



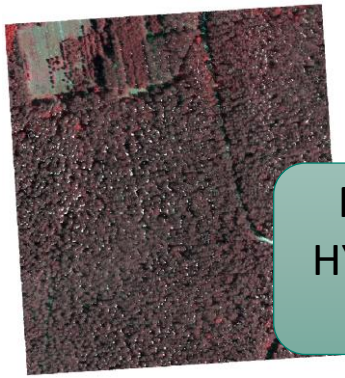
UAV IMAGES

VARIETY

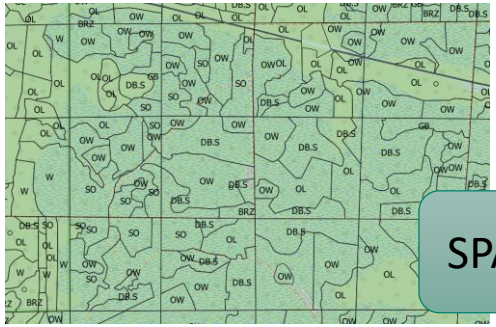


FIELD MEASUREMENTS

TERRESTRIAL LASER SCANNING



MULTISPECTRAL AND HYPERSPECTRAL AERIAL IMAGES



SPATIAL LAYERS

VOLUME

Disk Arrays

4 PB

amazon drive

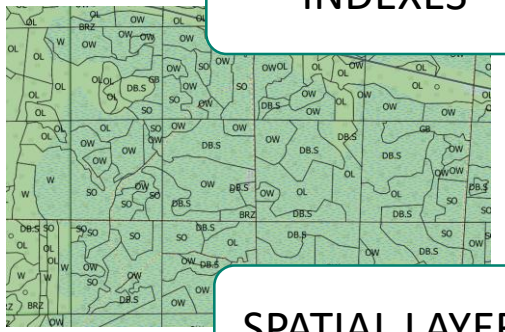
SECURITY

VOLUME

DataBase

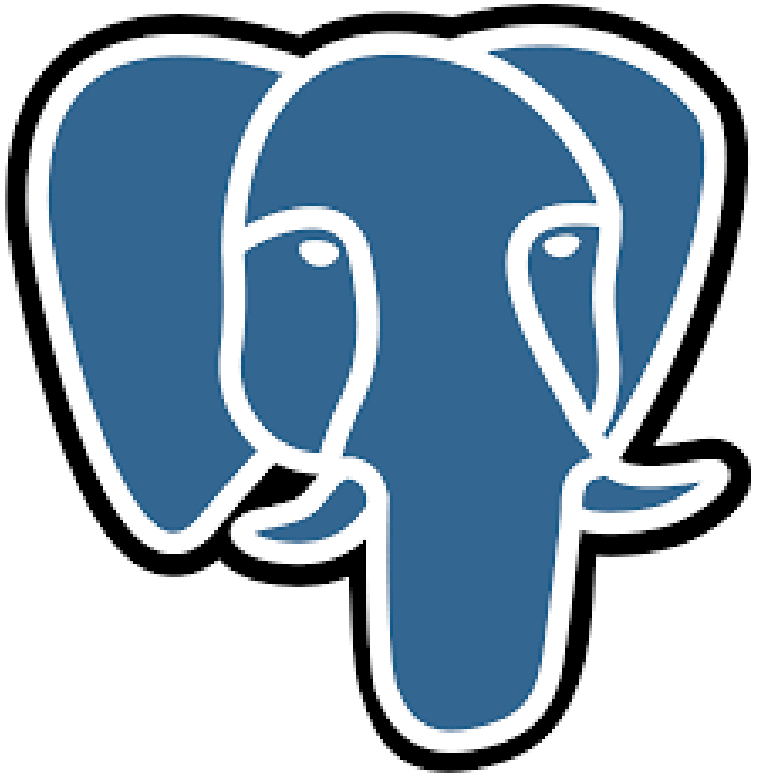
PostGIS
Spatial PostgreSQL

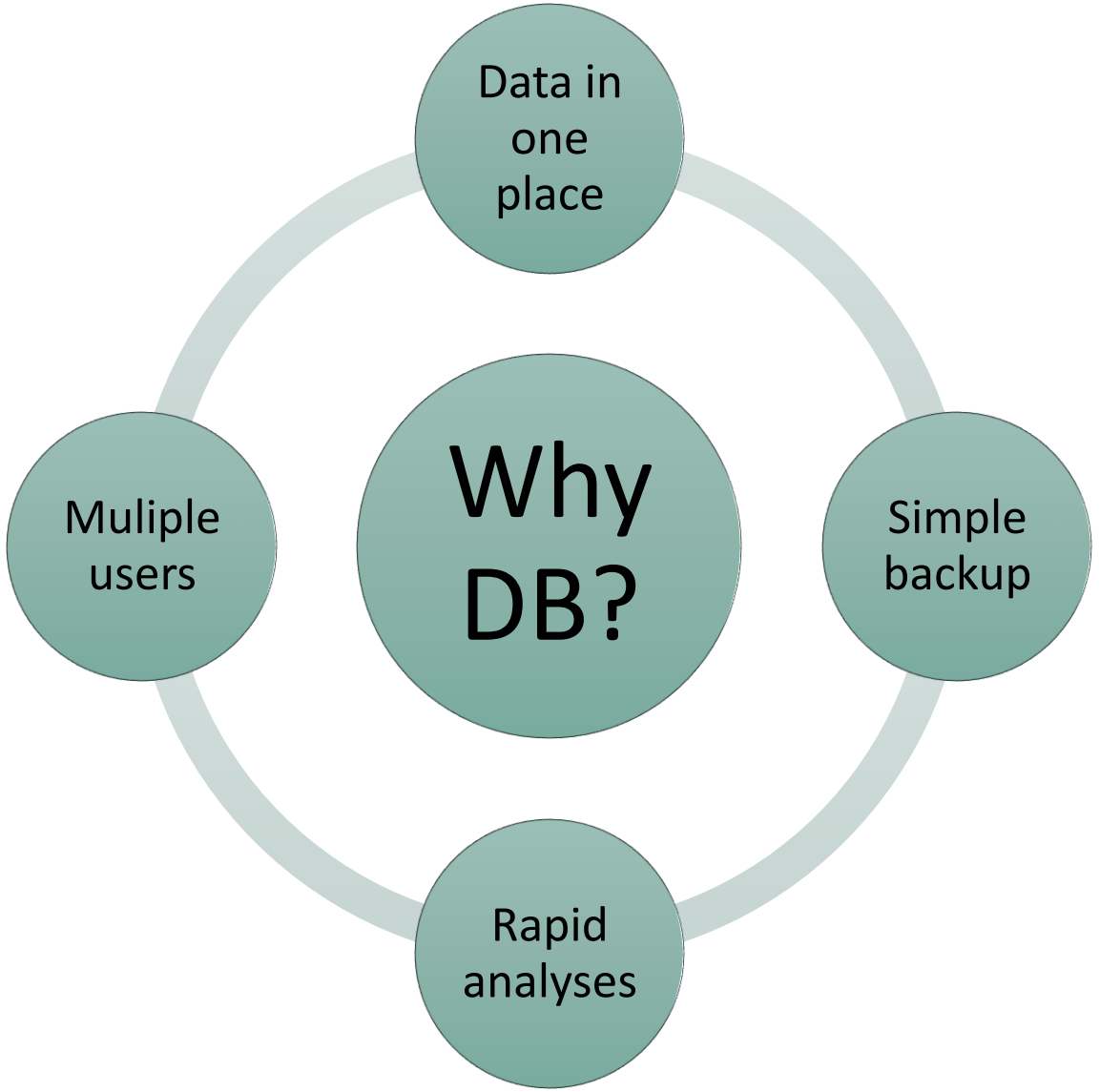
pdal



INDEXES

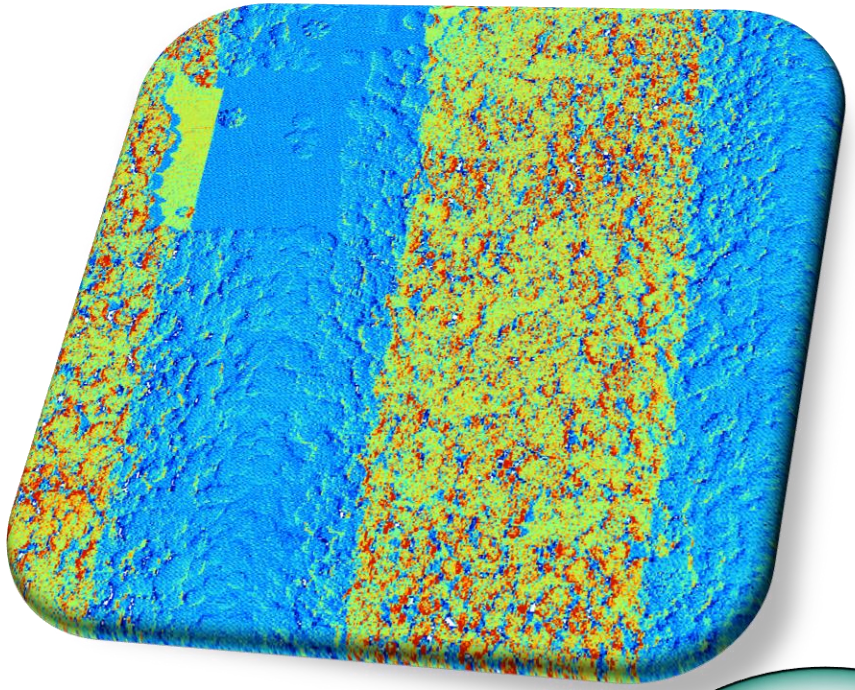
SPATIAL LAYERS

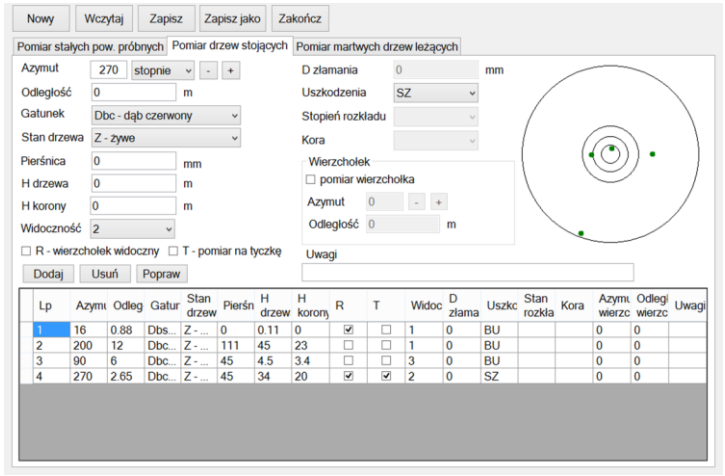


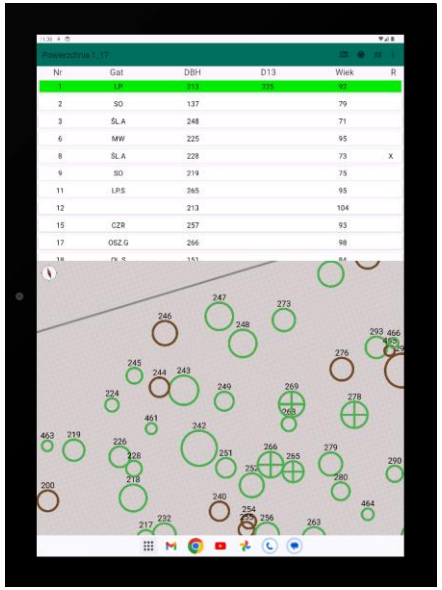

Data in one place
Muliple users
Why DB?
Simple backup
Rapid analyses

VERACITY

Own remote sensing data control software







Own software for mobile devices to acquire field data

DATA QUALITY

VELOCITY

PostGIS

PostgreSQL

External sources

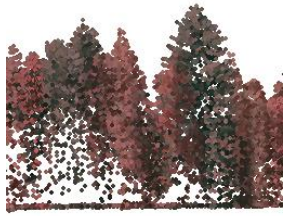
GeoSpatial Data

VELOCITY

Servers

Desktop

Why R?

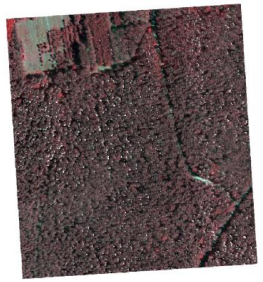


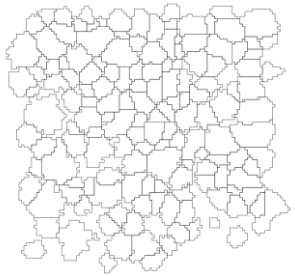
LiDAR data:

- lidR
- rLiDAR
- rlas

Raster:

- terra
- rSAGA
- EBImage



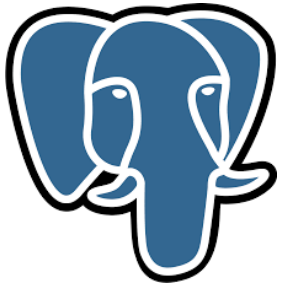


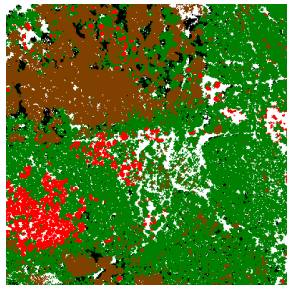
Spatial data:

- sf

Database:

- RPostgreSQL
- Rpostgis





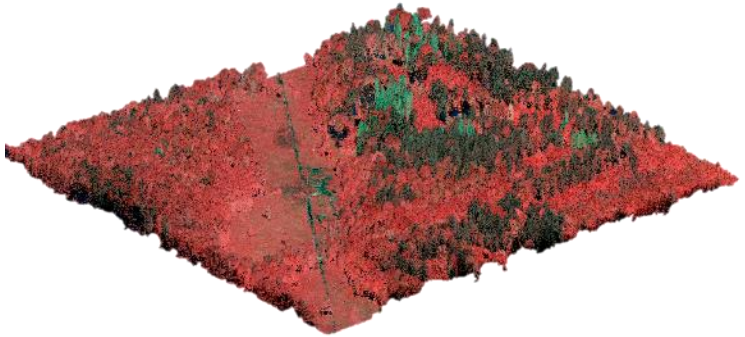
Classification:

- random forest
- caret
- moments
- mlr

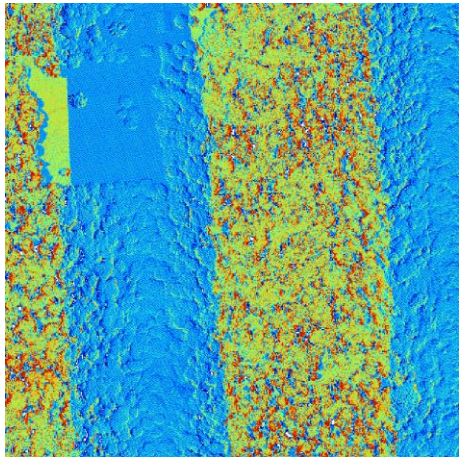
Multithreaded computing:

- foreach
- parallel
- doParallel

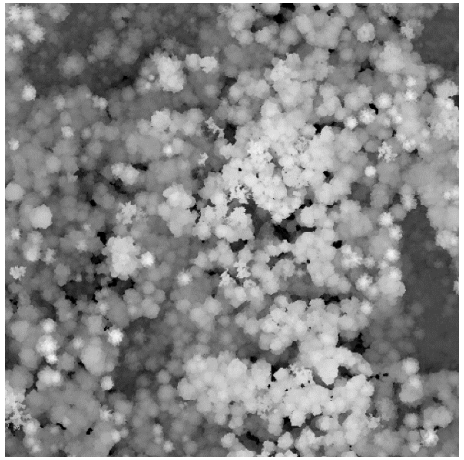
Create solutions



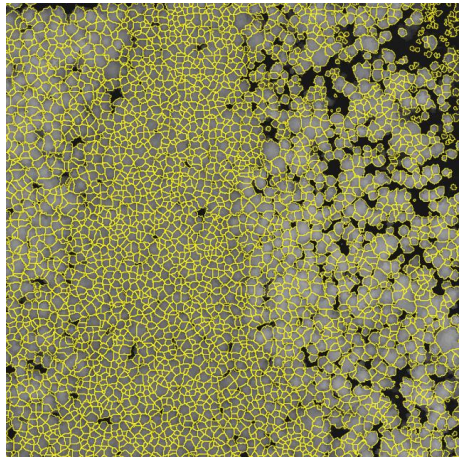
Tools to ALS data



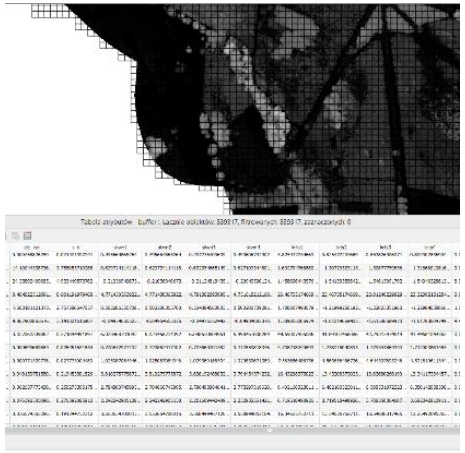
Quality check



Crown Height Model



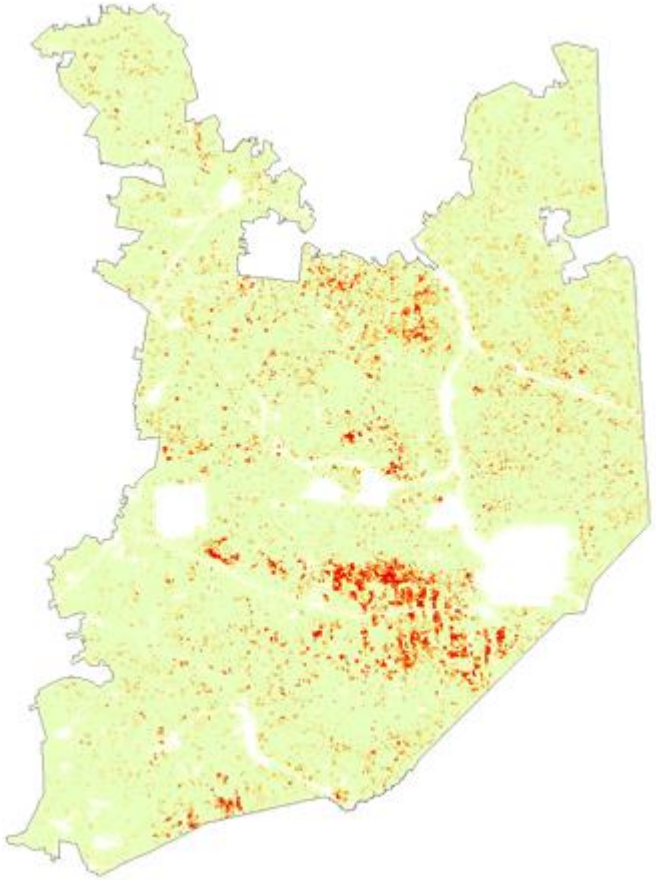
Trees detection



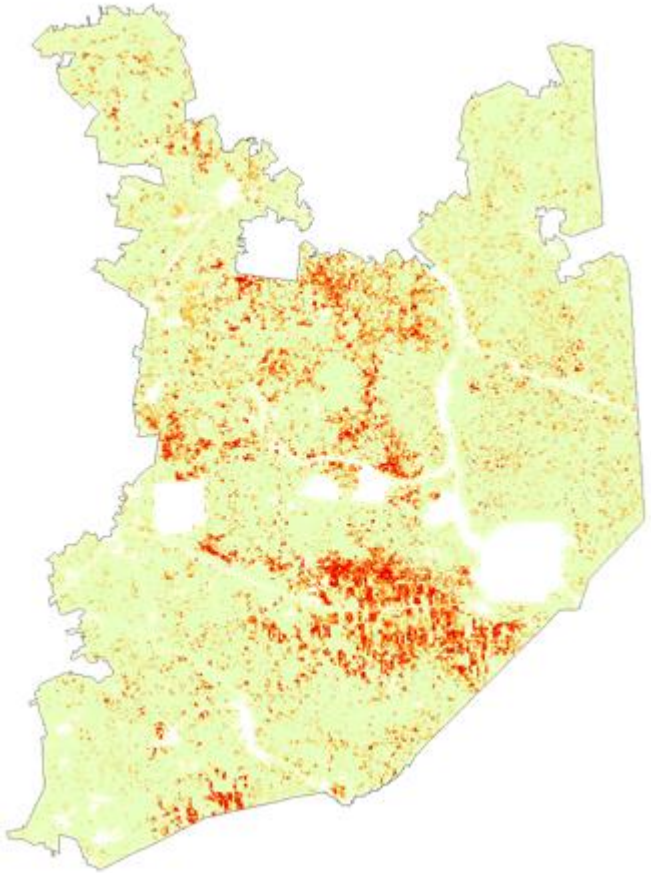
ALS stats calculator

Integration examples

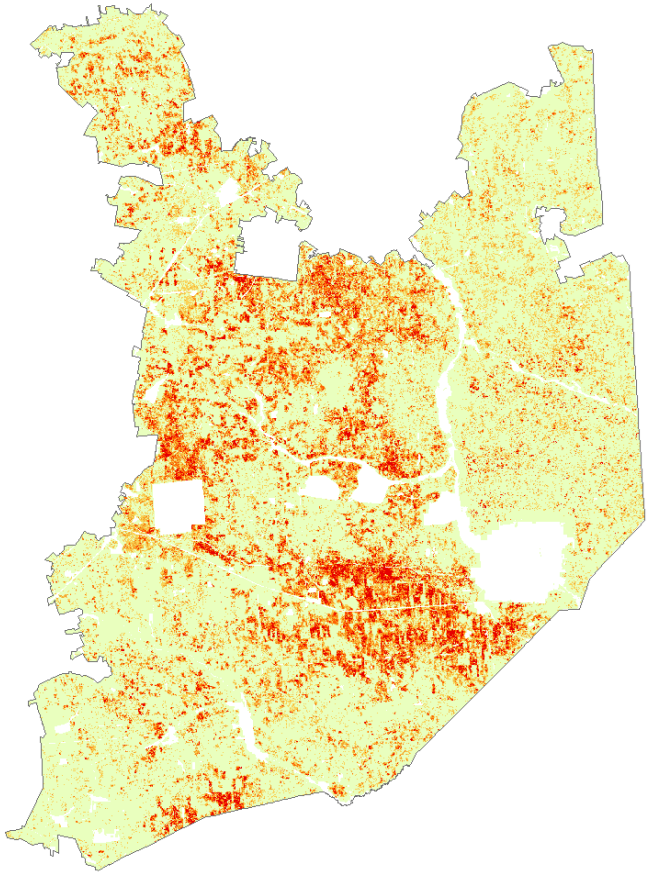
Dead tree detection



2015



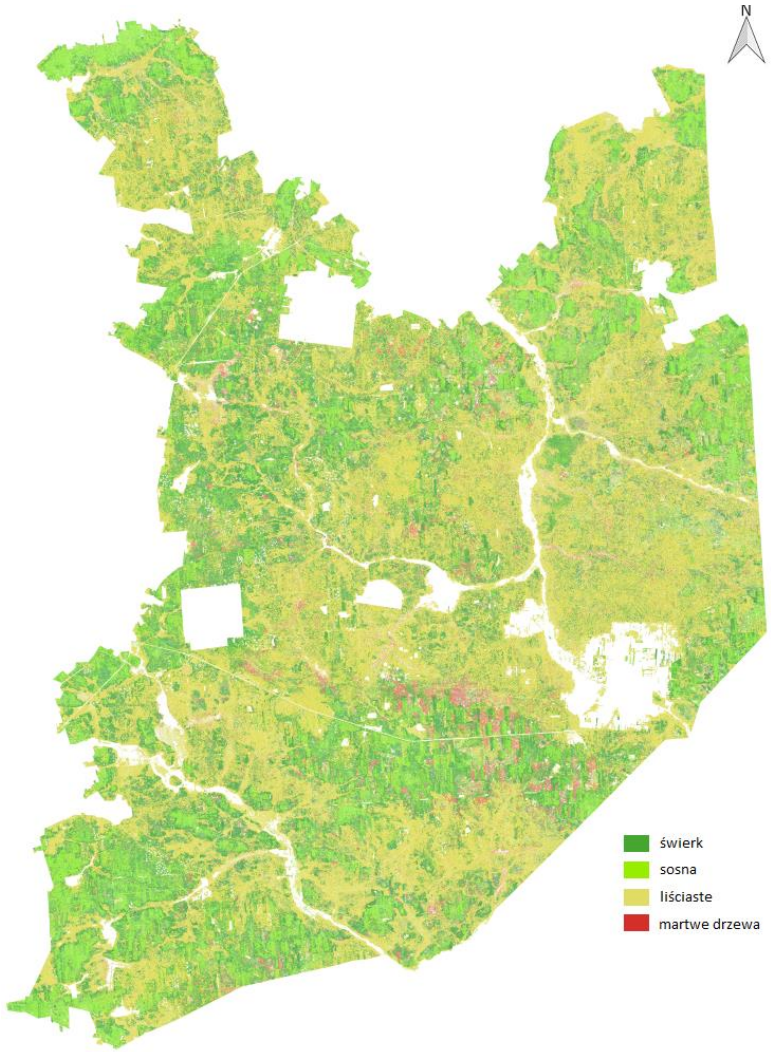
2016



2017

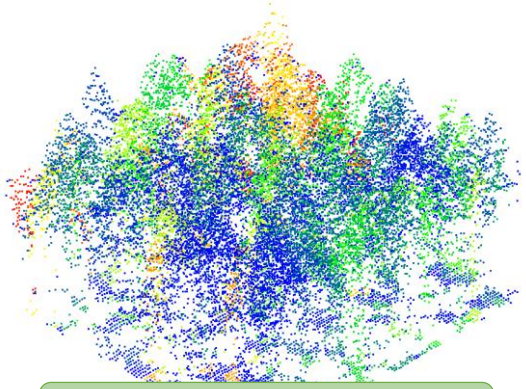
Integration examples

Individual trees species classification

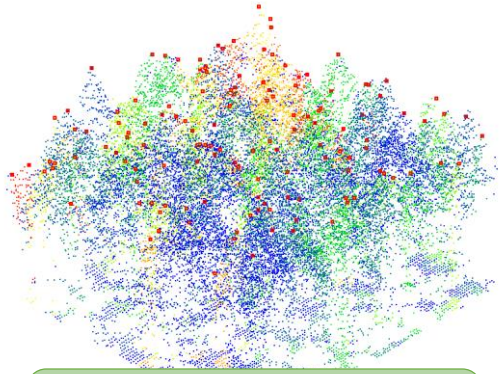


Integration examples

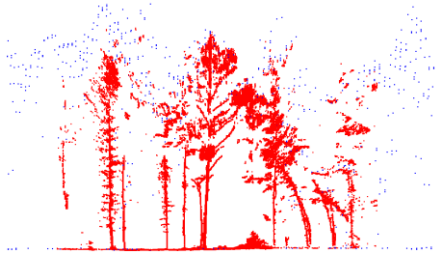
ALS and TLS data integration



ALS



Tree top detection



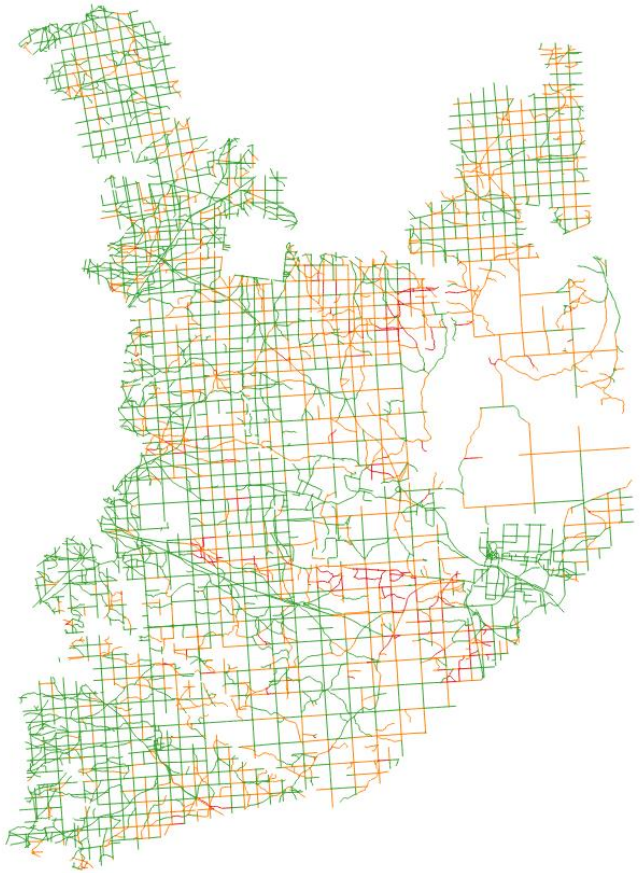
Integrated data set

TLS

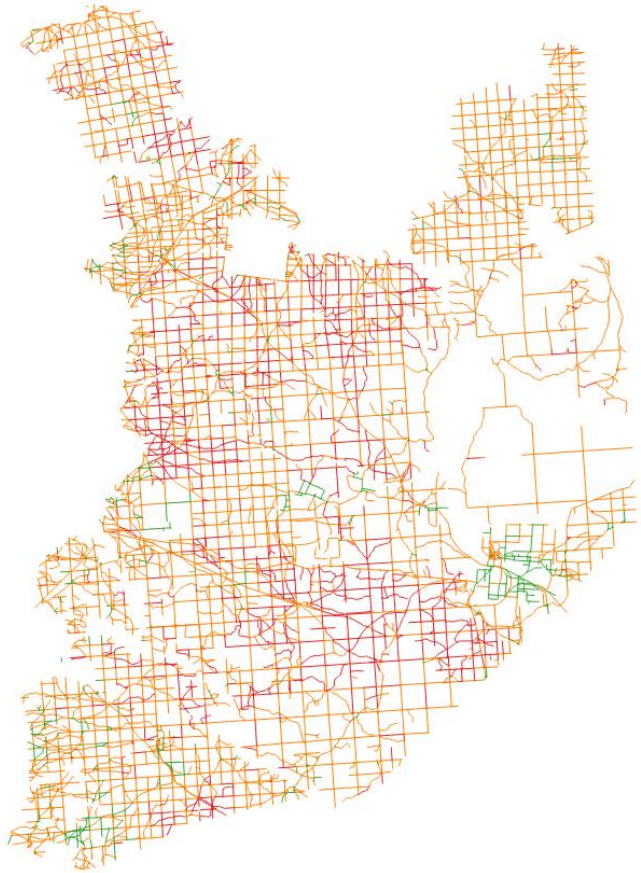
Tree trunk detection

Integration examples

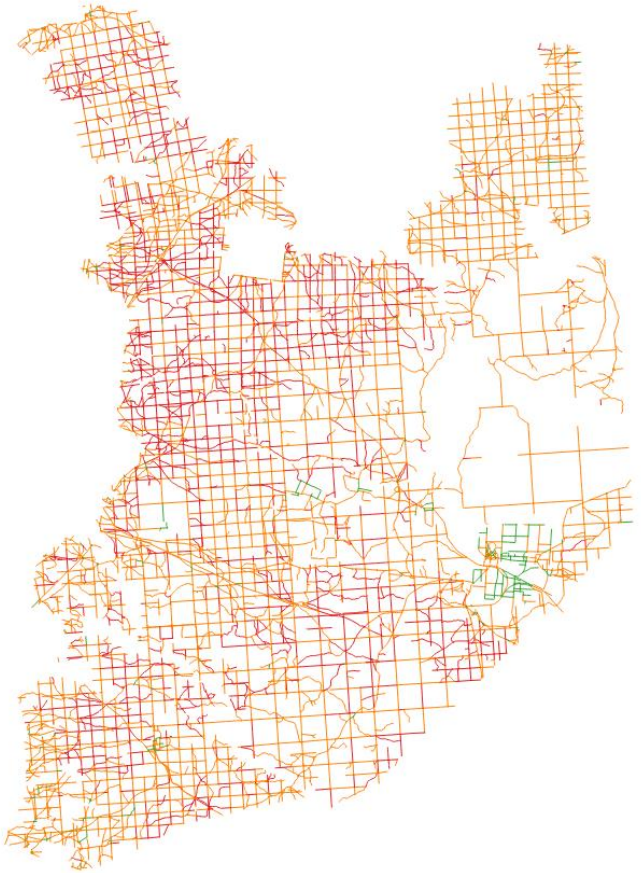
Danger of communication routes from standing dead trees



2015



2017



2019

Conclusion

Scalability

Simple development

+

Broad user community

Individual customization at low cost

Conclusion

Poor technical support

Specialistic knowledge

-

Complicated interfaces

More time-consuming

Thank you

Thank you for your attention ☺

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