# **Returning the Favor**

Leveraging quality insights of OpenStreetMap-based land-use/landcover multi-label modeling to the community

Moritz Schott Sven Lautenbach Alexander Zipf VGI (e.g. OSM)



Big Earth Observation

Adina Zell Begüm Demir

New Big Data information retrieval methods







### Multi-Label RS Images

- Classes
- Align OSM
- Forest
- Agricultural
- Build-up
- Water

- Select tags
  - Filter small objects
  - Assign labels only on considerable (>=1 pixel) overlap
- Potential
  - more classes
  - raw OSM tags



Forest, Build-up, Agricultural



Dog, Cat



#### **Fitness for Purpose**

- Filter process highly impacts accuracy
  - 80% correct multi-labels

	Precision Users accuracy	Recall Producers accuracy	F1
Agricultural Areas	0,97	0,95	0,96
Built-up Areas	0,96	0,97	0,96
Forests	0,96	0,99	0,98
Water Bodies	0,87	0,98	0,92





### **Machine Learning**

- Deep Learning on noisy labels is possible
  - Artificially add noise to OSM to simulate areas of bad quality
- Deep Learning outperforms OSM on noisy training data
  - Training data volume is key
  - Performance gap can be leveraged



ML model — OSM training data

\*OSM base noise in experiemnt area = 0.2

# **Community Feedback**

ΙDFΛΙ

- Thank YOU for the nice labels!
- Extract multi-label disagreement
  - Locate disagreement within patch
- No automated mapping, let the community decide
  - Don't (blindly) trust the machine



Localisation of classes within a patch

green – forest

- agricultural
  - build-up



### **Tasking Manager**

- Support consistent but localised mapping
  - Mapping hints
- Potential alternative Platforms
  - Map Roulette
  - Street Complete
- Try it out (OSM Sandbox): https://ideal-vgi.geog.uni-heidelberg.de/tm
- Code:
  https://gitlab.gistools.geog.uni-heidelberg.
  de/giscience/ideal-vgi/osm-multitag

