EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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COST Actions TD1202 Mapping and the Citizen Sensor & IC1203 ENERGIC 2012 | 2016

VGI Quality

Three main areas of research and published outputs from both Actions

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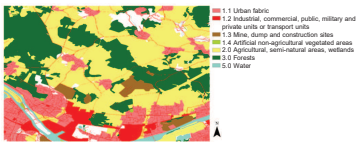
VGI to assess the quality of maps

VGI may be used to assist in the **validation of maps**. The research includes a review on the use of VGI for this purpose (Fonte et al. 2015), an assessment of the **feasibility of using geo-tagged photographs** available in collaborative projects to extract LULC data, regarding their availability (Estima et al. 2014, Antoniou et al. 2016a) and their content (Antoniou et al. 2016a), and the use of **OpenStreetMap (OSM) to extract LULC data** in Paris and Milan (Fonte et al. 2016), Vienna and Slovenia (Jokar Arsanjani et al. 2015) which were compared to authoritative land cover maps. The figure below shows an example from the city of Vienna where a building has been incorrectly captured in the authoritative LISA land cover product but has not been mapped as a building feature in OSM.

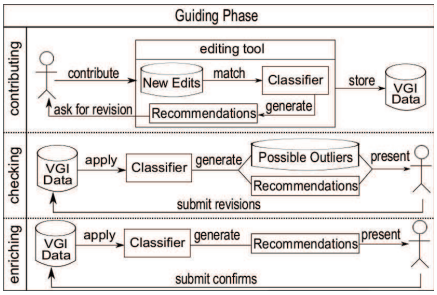
From left to right: a section of Vienna; buildings in OSM; buildings in LISA; volleyball field incorrectly mapped as a building in LISA but correct in OSM



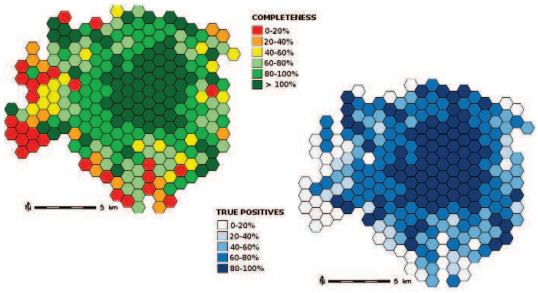
Paris LULC map derived from OSM data

Assessing VGI quality

The chapter by Fonte et al. (2017) and the paper by Antoniou and Skopeliti (2015) provide an overview of the **measures for evaluating VGI quality**. Criscuolo et al. (2016) review **strategies for VGI quality control** and provide a flexible decision-making framework for assessing quality that can take both the credibility of the volunteers and the accuracy of the spatial data into account. Senaratne et al. (2016) review the different methods of **VGI quality assessment** that have been used in the literature and categorize them. Other topics include: assessing the **quality of LULC data extracted from crowdsourced photographs** (Antoniou et al. 2016b); assessing completeness, positional quality (Brovelli et al. 2015, Antunes et al. 2015, Brovelli et al. 2016a,b,c) and thematic quality (Ali 2016) of OSM features; and **quality issues related to biodiversity** (Jacobs 2016).



Guiding phase of the proposed guided classification approach



Completeness analysis of OpenStreetMap buildings in Milan, Italy

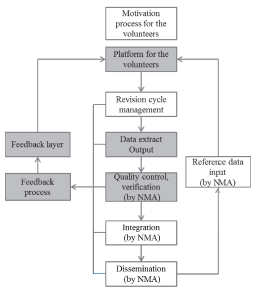
Guidelines to improve the quality of VGI

VGI is collected using a great diversity of protocols from very simple to very detailed. The **metadata** collected, the **instructions** provided to the volunteers and the **procedures** used to collect the data may play an important role in both the quality of the collected data and also on the applicability of methods that can assess some aspects of the quality, such as enabling the comparison of multiple contributions or the **assessment of the volunteers' credibility**. Some articles addressing this topic have been published, suggesting the use of some general **protocols** for several types of data (e.g. Fonte et al. 2015a,b, Minghini et al. 2017).

Phase	Aspects that may contribute to quality control
Acquisition	• Collection of metadata • Collection of volunteers' confidence • Real-time quality control procedures and corrective feedback • Ease of use of the VGI portal or website
Post-acquisition	• Assessment of contributor's credibility • Assessment of VGI reliability • Quality control performed by the crowd or selected volunteers • Quality control performed by experts

QC measures in the acquisition & post-acquisition phases of VGI production

Protocol steps for VGI data collection



Typical workflow for VGI data collection by NMAs

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