Developing property and tax registration using AI algorithms: automated mapping the Municipality of Kendal, Indonesia,

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SUMMARY

Amid the COVID-19 global pandemic, tax (i.e., property tax) remains crucial as a source of funding for public services. Updated and reliable data of property tax enormously influences the efficiency of property tax collection over time. However, many developing countries, including Indonesia, show inefficient and inaccurate property tax collection due to unavailability, obsolesce, and low accuracy of the tax object data. The development of Artificial Intelligence allows improving property tax collection by giving more reliable source of tax object. We are helping the municipality of Kendal – a fast-growing municipality in Central Java, by providing an updated tax object information by utilizing AI. To serve this purpose, we utilized Generative Adversarial Networks (GANs). LeCun (2014) declared that GANs is the most interesting idea in the last ten years in Machine Learning. GANs is developed upon a deep learning model with a significant model variation to obtain data distribution through unsupervised learning and generate more actual data. In this case study, we examined the use of GANs for a binary training and classification of building and non-building objects. For the creation of the training data, we used high-resolution (0.30m) imagery from WorldView-3 and we manually digitized the 2 training sample classes. The workflow included also some pre- and post-processing steps. The model was trained with 50 epochs and the results gave a satisfactory 82% of accuracy. Since the project is still ongoing, no solid conclusions have been drawn, but trying using more training data and epochs would possibly achieve more accurate results for the tax object information (building footprints). Furthermore, the produced data will be implemented in tax registration processes.

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