UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abujayyab, S. K. M., Almajalid, R., Wazirali, R., Ahmad, R., Taşoğlu, E., Karas, I. R., & Hijazi, I. (2023). *Integrating object-based and pixel-based segmentation for building footprint extraction from satellite images. Journal of King Saud University - Computer and Information Sciences, 35*(10). https://doi.org/10.1016/j.jksuci.2023.101802

Abdul-Rahman, A., Zlatanova, S., & Coors, V. (Eds.). (2006). *Innovations in 3D geo information systems* (*Lecture Notes in Geoinformation and Cartography*). Springer. https://doi.org/10.1007/978-3-540-36998-1

Ahmed, S. F., EL-Shazely, A. H., & Ahmed, W. (2024). *Deep Learning for Building Footprint Extraction Using UAV-Based Orthoimages*. *Journal of the Indian Society of Remote Sensing*, *0123456789*. https://doi.org/10.1007/s12524-024-02050-6

Alif, M. A. R., & Hussain, M. (2025). *YOLOv12: A Breakdown of the Key Architectural Features*. *February*. https://doi.org/10.48550/arXiv.2502.14740

Amo-Boateng, M., Ekow Nkwa Sey, N., Ampah Amproche, A., & Kyereh Domfeh, M. (2022). *Instance segmentation scheme for roofs in rural areas based on Mask R-CNN*. *Egyptian Journal of Remote Sensing and Space Science*, *25*(2), 569–577. https://doi.org/10.1016/j.ejrs.2022.03.017

Andaru, R., Aditya, T., Cahyono, B. K., Santosa, P. B., Yulaikhah, & Swantika, S. P. (2024, September 24–26). *Automatic DTM and building footprint extraction from imageries and point clouds in Indonesia's land registration drone survey: A roadmap towards reconstruction of LOD1 3D building model* [Conference paper]. 12th International FIG Land Administration Domain Model & 3D Land Administration Workshop, Kuching, Malaysia.

Atkinson, K. . (2015). *Close Range Photogrammetry and Machine Vision*. *In Etika Jurnalisme Pada Koran Kuning : Sebuah Studi Mengenai Koran Lampu Hijau* (Vol. 16, Issue 2).

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Baroroh, A., & Harintaka, H. (2025). Ekstraksi Otomatis Tapak Bangunan (Building Footprint) Pada Ortofoto Menggunakan Segment Anything Model (Sam). *Elipsoida : Jurnal Geodesi Dan Geomatika*, *8*(1), 52–59. https://doi.org/10.14710/elipsoida.2025.25145

Baş, N. (2022). *Building footprint extraction using orthophotos based on Artificial Neural Network and fusion of dense point cloud with Digital Topographic Map — Istanbul , Turkey*. *Arabian Journal of Geosciences*. https://doi.org/10.1007/s12517-022-10365-2

Bengio, Y., Goodfellow, I., & Courville, A. (2015). *Deep Learning*. MIT Press. https://www.deeplearningbook.org

Biljecki, F., Ledoux, H., & Stoter, J. (2016). *An improved LOD specification for 3D building models*. *Computers, Environment and Urban Systems*, *59*, 25–37. https://doi.org/10.1016/j.compenvurbsys.2016.04.005.

Biljecki, F., Ledoux, H., & Stoter, J. (2017). *Generating 3D city models without elevation data*. *Computers, Environment and Urban Systems*, *64*, 1–18. https://doi.org/10.1016/j.compenvurbsys.2017.01.001

Biljecki, F., Ledoux, H., Stoter, J., & Vosselman, G. (2016). *The variants of an LOD of a 3D building model and their influence on spatial analyses*. *ISPRS Journal of Photogrammetry and Remote Sensing*, *116*, 42–54. https://doi.org/10.1016/j.isprsjprs.2016.03.003

Cabral, R., Santos, R., Correia, J. A. F. O., & Ribeiro, D. (2025). *A hybrid YOLO and Segment Anything Model pipeline for multi-damage segmentation in UAV inspection imagery*. *Sensors, 25*(21), 6568. https://doi.org/10.3390/s25216568

Chen, C., Zheng, Z., Xu, T., Guo, S., Feng, S., Yao, W., & Lan, Y. (2023). *YOLO-based UAV technology: A review of the research and its applications*. *Drones, 7*(3), Article 190. https://doi.org/10.3390/drones7030190

Edson, G., Gaong, A., Idris, A. N., Luh, L. C., Rahman, A. A., Mohamed, W., Wan, S., Sabri, M., Hadi, A., & Jalil, A. (2025). *Comparative Evaluation of 3D Building Model Using UAV Photogrammetry and Terrestrial Laser Scanner*

UNIVERSITAS GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

(TLS). https://doi.org/10.24191/bej.v22i1.1066

Eker, O., Avcı, M., Cigdem, S., ¨Ozdemir, O., Nar, F., & Dmitry, K. (2024). *Integrating SAM and LoRA for DSM-Based Planar Region Extraction in Building Footprints*. *June*. https://doi.org/10.5194/isprs-archives-XLVIII-4-W10-2024-57-2024

Falahatnejad, S., Karami, A., Sharifirad, R., Shirani, M., Mehrabinejad, M., Khrasanimotlagh, M., & Soleymani, M. (2024). *Building footprint segmentation using the modified YOLOv8 model* (Preprint). Research Square. https://doi.org/10.21203/rs.3.rs-4409713/v1

Fatty, A., Li, A. J., & Yao, C. Y. (2024). *Instance segmentation based building extraction in a dense urban area using multispectral aerial imagery data*. *Multimedia Tools and Applications*, *83*(22), 61913–61928. https://doi.org/10.1007/s11042-023-15905-w

Ge, T., Ning, B., & Xie, Y. (2025). *YOLO-AFR: An Improved YOLOv12-Based Model for Accurate and Real-Time Dangerous Driving Behavior Detection*. *Applied Sciences (Switzerland)*, *15*(11). https://doi.org/10.3390/app15116090

Gilani, S. A. N., Awrangjeb, M., & Lu, G. (2016). *An automatic building extraction and regularisation technique using LiDAR point cloud data and orthoimage*. *Remote Sensing*, *8*(3), 1–27. https://doi.org/10.3390/rs8030258

Güngör, R., Uzar, M., Atak, B., Yilmaz, O. S., & Gümüş, E. (2022). *Orthophoto production and accuracy analysis with UAV photogrammetry*. *Mersin Photogrammetry Journal*, *4*(1), 1–6. https://doi.org/10.53093/mephoj.1122615

Guo, H., Du, B., Zhang, L., & Su, X. (2022). *ISPRS Journal of Photogrammetry and Remote Sensing A coarse-to-fine boundary refinement network for building footprint extraction from remote sensing imagery*. *183*(June 2021), 240–252. https://doi.org/10.1016/j.isprsjprs.2021.11.005

Hao, S., Cui, Y., & Wang, J. (2021). *Segmentation scale effect analysis in the object-oriented method of high-spatial-resolution image classification*. *Sensors*, *21*(23), 1–17. https://doi.org/10.3390/s21237935

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Harintaka, & Wijaya, C. (2023). *Automatic point cloud segmentation using RANSAC and DBSCAN algorithm for indoor model*. *21*(6), 1317–1325. https://doi.org/10.12928/TELKOMNIKA.v21i6.25299

He, H., Yang, K., Cai, Y., Jiang, Z., Yu, Q., Zhao, K., Wang, J., Fatholahi, S. N., Liu, Y., Petrosians, H. A., Hu, B., Qing, L., Zhang, Z., Xu, H., Li, S., Gao, K., Xu, L., & Li, J. (2021). *The impact of data volume on performance of deep learning-based building rooftop extraction using very high spatial resolution aerial images.* In *2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS* (pp. 1343–1346). IEEE. https://doi.org/10.1109/IGARSS47720.2021.9553422.

Hossain, M. D., & Chen, D. (2022). *A hybrid image segmentation method for building extraction from high-resolution RGB images*. *ISPRS Journal of Photogrammetry and Remote Sensing*, *192*(August), 299–314. https://doi.org/10.1016/j.isprsjprs.2022.08.024

Huawei Technologies Co., Ltd. (2023). *Artificial intelligence technology*. Springer Singapore. https://doi.org/10.1007/978-981-19-2879-6

Janiesch, C., Zschech, P., & Heinrich, K. (2021). *Machine learning and deep learning. Electronic Markets, 31*(3),685–695.https://doi.org/10.1007/s12525-021-00475-2

Ji, Y., Wu, W., Wan, G., Zhao, Y., Wang, W., Yin, H., Tian, Z., & Liu, S. (2024). *Segment Anything Model-Based building footprint extraction for residential complex spatial assessment using LiDAR data and very high-resolution imagery*. *Remote Sensing, 16*(14), 2661. doi:10.3390/rs16142661

Kamilaris, A., & Prenafeta-boldú, F. X. (2018). *Deep learning in agriculture : A survey*. *147*(February), 70–90. https://doi.org/10.1016/j.compag.2018.02.016

Karsli, B., Yilmazturk, F., Bahadir, M., & Karsli, F. (2024). *Automatic building footprint extraction from photogrammetric and LiDAR point clouds using a novel improved-Octree approach*. *Journal of Building Engineering*, *82*(December 2023), 108281. https://doi.org/10.1016/j.jobe.2023.108281

Khatua, A., Bhattacharya, A., Goswami, A. K., & Aithal, B. H. (2024). *Developing*

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

approaches in building classification and extraction with synergy of YOLOV8 and SAM models. *Spatial Information Research*, *32*(5), 511–530. https://doi.org/10.1007/s41324-024-00574-0

Kirillov, A., Mintun, E., Ravi, N., Mao, H., Rolland, C., Gustafson, L., Xiao, T., Whitehead, S., Berg, A. C., Lo, W.-Y., Dollár, P., & Girshick, R. (2023). *Segment anything*. arXiv. https://doi.org/10.48550/arXiv.2304.02643.

Kristal, A., & Harintaka, H. (2024). Analisis Kehandalan Ekstraksi Garis Tepi Bangunan dari Data Foto Udara Menggunakan Pendekatan Deep Learning Berbasis Mask R-CNN Analisis Kehandalan Ekstraksi Garis Tepi Bangunan dari Data Foto Udara Menggunakan Pendekatan Deep Learning Berbasis Mask R-CNN. *April 2022*. https://doi.org/10.12962/j24423998.v17i2.11401

LeCun, Y., Bengio, Y., & Hinton, G. (2015). *Deep learning*. *Nature*, *521*(7553), 436–444. https://doi.org/10.1038/nature14539.

Li, J., Tao, B., Bosché, F., Xiaoxuan, C., & Wilson, L. (2024). *Automation in Construction Automated generation and semantic segmentation of roof orthophoto for digital twin -based monitoring of slated roofs. Automation in Construction*, *167* (August), 105725. https://doi.org/10.1016/j.autcon.2024.105725

Li, Q., Zorzi, S., Shi, Y., Fraundorfer, F., & Zhu, X. X. (2022). RegGAN: *An end-to-end network for building footprint generation with boundary regularization*. *Remote Sensing*, *14*(8), 1835. https://doi.org/10.3390/rs14081835.

Liao, J., Yu, C., Jiang, L., Guo, L., Liang, W., Li, K., & Pathan, A. K. (2025). *A method for composite activation functions in deep learning for object detection*. *Signal, Image and Video Processing*, *123*. https://doi.org/10.1007/s11760-025-03938-7

Lin, J., Zhang, A., Lécuyer, M., Li, J., Panda, A., & Sen, S. (2022). *Measuring the effect of training data on deep learning predictions via randomized experiments. In Proceedings of the 39th International Conference on Machine Learning (Proceedings of Machine Learning Research*, Vol. 162, pp. 13468–13504). PMLR. https://proceedings.mlr.press/v162/lin22h.html

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Lin, Y., Li, H., Shao, W., Yang, Z., Zhao, J., He, X., Luo, P., & Zhang, K. (2025). *SAMRefiner: Taming Segment Anything Model for Universal Mask Refinement*. arXiv (arXiv:2502.06756)

Luhmann, T., Robson, S., Kyle, S., & Harley, I. (2007). *Close range photogrammetry: Principles, techniques and applications*. Wiley

Lussange, J., Yu, M., Tarabalka, Y., & Lafarge, F. (2025). *ISPRS Journal of Photogrammetry and Remote Sensing KIBS : 3D detection of planar roof sections from a single satellite image*. *ISPRS Journal of Photogrammetry and Remote Sensing*, *220* (November 2024), 207–216. https://doi.org/10.1016/j.isprsjprs.2024.11.014

Mayladan, A., Nasrallah, H., Moughnieh, H., Shukor, M., & Ghandour, A. J. (2023). *Zero-shot refinement of buildings' segmentation models using SAM*. *arXiv*. https://doi.org/10.48550/arXiv.2310.01845

McGlone, J. C. (2016). *Manual of Photogrammetry*, 6th Edition. *Photogrammetric Engineering & Remote Sensing*, *82*(4), 249–250. https://doi.org/10.14358/pers.82.4.249

Muftah, H., Rowan, T. S. L., & Butler, A. P. (2022). *Towards open-source LOD2 modelling using convolutional neural networks*. In *Modeling Earth Systems and Environment* (Vol. 8, Issue 2, pp. 1693–1709). https://doi.org/10.1007/s40808-021-01159-8

Osco, L. P., Wu, Q., de Lemos, E. L., Gonçalves, W. N., Ramos, A. P. M., Li, J., & Marcato Junior, J. (2023). *The Segment Anything Model (SAM) for remote sensing applications: From zero to one shot*. *International Journal of Applied Earth Observation and Geoinformation*, *124*, 103540. https://doi.org/10.1016/j.jag.2023.103540

Partovi, T., Fraundorfer, F., Bahmanyar, R., Huang, H., & Reinartz, P. (2019). *Automatic 3-D building model reconstruction from very high resolution stereo satellite imagery*. *Remote Sensing*, *11*(14), 1–37. https://doi.org/10.3390/rs11141660

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Parulekar, B., Singh, N., & Ramiya, A. M. (2024). *Evaluation of segment anything model (SAM) for automated labelling in machine learning classification of UAV geospatial data*. *Earth Science Informatics*, 4407–4418. https://doi.org/10.1007/s12145-024-01402-7

Pratomo, R. A., Purwanto, M. Q., & Ariansyah, M. (2025). *Capturing Rural – Urban Region (RUR) Assessment through Integrated Conceptual and Geo – Big Data Approaches : A Case Study from Penajam Paser Utara , Neighboring Indonesia ' s New Capital (IKN)*. *13*(4), 173–207.

Redmon, J., Divvala, S., Girshick, R., & Farhadi, A. (2016). *You Only Look Once: Unified, real-time object detection. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* (pp. 779–788). https://doi.org/10.1109/CVPR.2016.91

Sakeena, M., Stumpe, E., Despotovic, M., Koch, D., & Zeppelzauer, M. (2023). *On the Robustness and Generalization Ability of Building Footprint Extraction on the Example of SegNet and Mask R-CNN*. *Remote Sensing*, *15*(8). https://doi.org/10.3390/rs15082135

Schuegraf, P., Shan, J., & Bittner, K. (2024). PLANES4LOD2: *Reconstruction of LoD-2 building models using a depth attention-based fully convolutional neural network*. *ISPRS Journal of Photogrammetry and Remote Sensing*, *211*(April), 425–437. https://doi.org/10.1016/j.isprsjprs.2024.04.015

Shi, W., Goodchild, M. F., Batty, M., Kwan, M.-P., & Zhang, A. (Eds.). (2021). *Urban informatics*. Springer. https://doi.org/10.1007/978-981-15-8983-6

Terven, J., Córdova-Esparza, D.-M., & Romero-González, J.-A. (2023). *A comprehensive review of YOLO architectures in computer vision: From YOLOv1 to YOLOv8 and YOLO-NAS*. *Machine Learning and Knowledge Extraction*, *5*(4), 1680–1716. doi:10.3390/make5040083.

Terven, J., Cordova-Esparza, D. M., Ramírez-Pedraza, A., Chávez-Urbiola, E. A., & Romero-González, J. A. (2025). *Loss functions and metrics in deep learning* (Version 5) [Preprint]. *arXiv*. https://doi.org/10.48550/arXiv.2307.02694

UNIVERSITAS
GADJAH MADA
EKSTRAKSI TAPAK BANGUNAN MENGGUNAKAN KOMBINASI DEEP LEARNING YOLO-V12 DAN SAM-AI BERBASIS ORTOFOTO UNTUK PEMODELAN 3D BANGUNAN LOD-2
Durbyana Desriany Isliko, Ruli Andaru, S.T., M.Eng., Ph.D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Tian, Y., Ye, Q., & Doermann, D. (2025). *YOLOv12: Attention-centric real-time object detectors* (arXiv:2502.12524) [Technical report]. arXiv.

Vi, C., & Vi, W. G. (2015). *Sfm For Orthophoto Generation : A Winning Approach For Cultural Heritage Knowledge*. *XL* (September), 91–98. https://doi.org/10.5194/isprsarchives-XL-5-W7-91-2015

Vijayakumar, A., & Vairavasundaram, S. (2024). *YOLO-based object detection models: A review and its applications*. *Multimedia Tools and Applications, 83*, 83535–83574. https://doi.org/10.1007/s11042-024-18872-y

Wolf, P. R., Dewitt, B. A., & Wilkinson, B. E. (2014). *Elements of Photogrammetry with Applications in GIS* (Fourth Edi). McGraw-Hill Education.

Xu, H., In, J., Zhang, L., & Chen, J. (2023). *LOD2 for energy simulation* (LOD2ES) *for CityGML : A novel level of details model for IFC-based building features extraction and energy simulation*. *Journal of Building Engineering*, *78*(August), 107715. https://doi.org/10.1016/j.jobe.2023.107715

Y., Qixiang, Y., & Doermann, D. (2025). *YOLOv12: Attention-Centric Real-Time Object Detectors*. *Technical Report*.

Yu, D., Ji, S., Liu, J., & Wei, S. (2021). *ISPRS Journal of Photogrammetry and Remote Sensing Automatic 3D building reconstruction from multi-view aerial images with deep learning*. *ISPRS Journal of Photogrammetry and Remote Sensing*, *171*(November 2020), 155–170. https://doi.org/10.1016/j.isprsjprs.2020.11.011

Zhao, K., Kang, J., Jung, J., Sohn, G., Street, K., Drive, M., York, N., & Mb, O. N. (2018). *Building Extraction from Satellite Images Using Mask R-CNN with Building Boundary Regularization*. 247–251.