UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Baechle-Clayton M., Loos E., Taheri M., Taheri H., 2022. Failures and Flaws in Fused Deposition Modeling (FDM) Additively Manufactured Polymers and Composites. Journal of Composites Science, 6(7), Art. 202. doi:10.3390/jcs6070202

Banadaki Y., Razaviarab N., Fekrmandi H., Sharifi S., 2020. Toward Enabling a Reliable Quality Monitoring System for Additive Manufacturing Process using Deep Convolutional Neural Networks. arXiv preprint. arXiv:2003.08749.

Cao M., Fu L., Ai F., Zhou K., 2024. An Improved 3D Printing Extrusion Defect Detection Method Based On YOLO-v8. Research Square preprint. doi: 10.21203/rs.3.rs-3993733/v1

Choi B., Choi Y., Lee M.G., Kim J.S., Lee S.W., Jeon Y., 2021. Defect Detection Using Deep Learning-Based YOLOv3 in Cross-Sectional Image of Additive Manufacturing. Archives of Metallurgy and Materials, 66(4), 1037–1041

Coban D., 2020. The Impact of 3D Printing on Supply Chains: A Systematic Literature Review. MSc Thesis, Trinity College Dublin. doi: 10.13140/RG.2.2.11690.18884

Cojocaru V., Frunzaverde D., Miclosina C.-O., Marginean G., 2022. The Influence of the Process Parameters on the Mechanical Properties of PLA Specimens Produced by Fused Filament Fabrication—A Review. Polymers, 14(5):886. https://doi.org/10.3390/polym14050886

Deshpande S., Venugopal V., Kumar M., Anand S., 2024. Deep learning-based image segmentation for defect detection in additive manufacturing: an overview. International Journal of Advanced Manufacturing Technology, 134, pp. 2081–2105. doi: 10.1007/s00170-024-14191-6

Gantla H.R., Prabhakar V., Mohanta H.C., Anandhan A., Goyal P., Seelaboyina R., 2025. ML-Driven Defect Detection in Additive Manufacturing of Polymer Composites Using Thermal Imaging. Journal of Polymer & Composites, 13(SI-6), S201–S215.

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Hu J., 2017. Study on STL-based slicing process for 3D printing. Proceedings of the 28th Annual International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference, pp. 885–893.

Hu W., Chen C., Su S., Zhang J., Zhu A., 2024. Real-time defect detection for FFF 3D printing using lightweight model deployment. International Journal of Advanced Manufacturing Technology, 134(10–11), pp. 4871–4885. doi: 10.1007/s00170-024-14452-4

Hu Y., Tian G., Zhang H., Liu Y., 2024. A Universal Structure of YOLO Series Small Object Detection Models. Proceedings of the Asian Conference on Computer Vision (ACCV).

Huang J., Qin Q., Wang J., 2020. A Review of Stereolithography: Processes and Systems. Processes, 8(9), 1138. doi:10.3390/pr8091138

Jamal M., Faisal S., Kusumaningrum D.S., Rohana T., 2024. Application of YOLOv8 for Product Defect Detection in Manufacturing Companies. JUSIKOM PRIMA, Vol. 8 No.1

Jiang Y., 2023. Surface Defect Detection of Steel Based on Improved YOLOv5 Algorithm. Mathematical Biosciences and Engineering, 20(11), 19858–19870

Joseph T.M., Kallingal A.K., Suresh A.M., Mahapatra D.K., Hasanin M.S., Haponiuk J., Thomas S., 2022. 3D Printing of Polylactic Acid: Recent Advances and Opportunities. The International Journal of Advanced Manufacturing Technology, 119, pp. 6911–6923. doi: 10.1007/s00170-022-10795-y

Kafle A., Luis E., Silwal R., Pan H.M., Shrestha P.L., Bastola A.K., 2021. 3D/4D Printing of Polymers: Fused Deposition Modelling (FDM), Selective Laser Sintering (SLS), and Stereolithography (SLA). Polymers, 13(18), 3101. doi: 10.3390/polym13183101

Kazhymurat T., Shehab E., Ali M.H., 2022. IoT-Based Real-Time 3D Printing Monitoring System. Proceedings of the 2022 International Conference on Smart Information Systems and Technologies (SIST 2022). doi: 10.1109/SIST54437.2022.9945778

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Kelvin Mark V., Raashika R., Pradeep Kumar J., Arun Prakash R., 2024. Experimental Analysis of the Stringing Problem in FDM Printers. Proceedings of the International Conference on Advancements in Materials, Design and Manufacturing for Sustainable Development (ICAMDMS 2024), 23–24 February 2024, Coimbatore, Tamil Nadu, India. doi: 10.4108/eai.23-2-2024.2346991

Kozhay K., Turarbek S., Asselbekova T., Ali H., Shehab E., 2024. Convolutional Neural Network-Based Defect Detection Technique in FDM Technology. Procedia Computer Science, 231, pp. 119–128. doi: 10.1016/j.procs.2023.12.183

Kühlechner R., 2025. Object detection survey for industrial applications with focus on quality control. TechRxiv Preprint, pp. 1–25. doi: 10.36227/techrxiv.175616901.10303345/v1.

Kumar V., Tripathi V., Pant B., 2022. Exploring the Strengths of Neural Codes for Video Retrieval. doi: 10.1007/978-981-16-2354-7_46

Leenheer B., 2025. Improved Low-contrast Spaghetti Defect Detection for FDM Printers (Master's thesis, University of Twente). University of Twente, Enschede

Lodhi S.K., Gill A.Y., Hussain I., 2024. 3D Printing Techniques: Transforming Manufacturing with Precision and Sustainability. International Journal of Multidisciplinary Sciences and Arts, 3(3), pp. 129–138. doi: 10.47709/ijmdsa.v3i3.4568

Lohaus C., König J., Lipsmeier F., 2024. Defects in 3D Printing and Strategies to Enhance Quality of FFF Additive Manufacturing: A Review. Defects in Additive Manufacturing, pp. 1–29.

Lu L., Hou J., Yuan S., Yao X., Li Y., Zhu J., 2025. Deep Learning-Assisted Real-Time Defect Detection and Closed-Loop Adjustment for Additive Manufacturing of Continuous Fiber-Reinforced Polymer Composites. Robotics and Computer-Integrated Manufacturing, 79, 102491. doi:10.1016/j.rcim.2025.102491

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Luo W., Li Y., Urtasun R., Zemel R., 2017. Understanding the Effective Receptive Field in Deep Convolutional Neural Networks. arXiv preprint arXiv:1701.04128. doi: 10.48550/arXiv.1701.04128

Mohamed O.A., Masood S.H., Bhowmik J.L., 2015. Optimization of fused deposition modeling process parameters: a review of current research and future prospects. Advances in Manufacturing, 3(1), pp. 42–53. doi: 10.1007/s40436-014-0097-7

Mwania F.M., Maringa M., van der Walt J.G., 2021. A review of the techniques used to characterize laser sintering of polymeric powders for use and re-use in additive manufacturing. Manufacturing Review, 8, Article 14. doi: 10.1051/mfreview/2021012

Ngo T.D., Kashani A., Imbalzano G., Nguyen K.T.Q., Hui D., 2018. Additive Manufacturing (3D Printing): A Review of Materials, Methods, Applications and Challenges. Composites Part B: Engineering, 143, pp. 172–196. doi: 10.1016/j.compositesb.2018.02.012

Özsoy K., Erçetin A., Çevik Z.A., 2021. Comparison of mechanical properties of PLA and ABS based structures produced by fused deposition modelling additive manufacturing. European Journal of Science and Technology, (27), pp. 802–809. doi: 10.31590/ejosat.983317

Paraskevoudis K., Karayannis P., Koumoulos E.P., 2020. Real-Time 3D Printing Remote Defect Detection (Stringing) with Computer Vision and Artificial Intelligence. Processes, 8(11), Article 1464. doi: 10.3390/pr8111464

Prakash A., Malviya R., Singh P.D., 2024. Transformative Potential and Healthcare Applications of 3D Printing. Current Pharmaceutical Design, 30(42), pp. --. doi: 10.2174/0113816128324761240828064443

Praveena B.A., Lokesh N., Buradi A., Santhosh N., Praveena B.L., Vignesh R., 2022. A comprehensive review of emerging additive manufacturing (3D printing technology): Methods, materials, applications, challenges, trends and future potential. Materials Today: Proceedings, 52(Part 3), pp. 1309–1313. doi: 10.1016/j.matpr.2021.11.059

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Redmon J., Divvala S., Girshick R., Farhadi A., 2016. You Only Look Once: Unified, Real-Time Object Detection. Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), pp. 779–788. doi:10.1109/CVPR.2016.91

Sakthivel Rasu, 2023. The Future of 3D Printing in Prototype Development: Minimizing Prototype Costs and Decreasing Validation Timelines. Journal of Engineering and Applied Sciences Technology, 5(3), pp. 2–4. doi:10.47363/JEAST/2023(5)E134

Sampedro G.A.R., Agron D.J.S., Amaizu G.C., Kim D.-S., Lee J.-M., 2022. Design of an In-Process Quality Monitoring Strategy for FDM-Type 3D Printer Using Deep Learning. Applied Sciences, 12(17), Article 8753. doi: 10.3390/app12178753

Sani A.R., Zolfagharian A., Kouzani A.Z., 2024. Automated Defects Detection in Extrusion 3D Printing Using YOLO Models. Journal of Intelligent Manufacturing. doi: 10.1007/s10845-024-02543-8

Siegel J.E., Beemer M.F., Shepard S.M., 2019. Automated Non-Destructive Inspection of Fused Filament Fabrication Components Using Thermographic Signal Reconstruction. arXiv preprint arXiv:1907.02634.

Siddique T. H. M., Sami I., Nisar M. Z., Naeem M., Karim A., Usman M., 2019. Low Cost 3D Printing for Rapid Prototyping and its Application. arXiv preprint arXiv:1911.10758. doi: 10.48550/arXiv.1911.10758

Suresh V., Balasubramaniam B., Yeh L.-H., Li B., 2025. Recent Advances in In Situ 3D Surface Topographical Monitoring for Additive Manufacturing Processes. J. Manuf. Mater. Process., 9(4), 133. doi:10.3390/jmmp9040133

Tay Y.W.D., Li M., Tan M.J., 2019. Effect of printing parameters in 3D concrete printing: Printing region and support structures. Journal of Materials Processing Technology, 271, pp. 189–198. doi:10.1016/j.jmatprotec.2019.04.038

Wang Q., Wang M., Sun J., Chen D., Shi P., 2025. Review of surface-defect detection methods for industrial products based on machine vision. IEEE Access, 13, pp. 90668–90697. doi: 10.1109/ACCESS.2025.3571297.

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Wang W., Wang P., Zhang H., Chen X., Wang G., Lu Y., Chen M., Liu H., Li J., 2023. A real-time defect detection strategy for additive manufacturing processes based on deep learning and machine vision technologies. Micromachines, 15(1), pp. 28. doi: 10.3390/mi15010028.

Wang W., Wang P., Zhang H., Chen X., Wang G., Lu Y., Chen M., Liu H., Li J., 2024. A Real-Time Defect Detection Strategy for Additive Manufacturing Processes Based on Deep Learning and Machine Vision Technologies. Micromachines, 15(1), 28. doi:10.3390/mi15010028

Xu N., Lim J.-S., Yoon H.-J., Lee S.-I., 2019. Small Object Detection using Context and Attention. arXiv preprint. arXiv:1912.06319.

Ye L., Xue H., Li Z., Zhou Y., Chen G., Xu F., Melentiev R., Newman S., Yu N., 2025. Review of Online Quality Control for Laser Directed Energy Deposition Additive Manufacturing. Int. J. Extrem. Manuf., 7(062005), 1–46. doi:10.1088/2631-7990/acdee3

Yean F.P., Chew W.J., 2024. Detection of Spaghetti and Stringing Failure in 3D Printing. 2024 International Conference on Green Energy, Computing and Sustainable Technology (GECOST). doi: 10.1109/GECOST60902.2024.10475059

Yin X., Akmal J., Salmi M., 2025. Artificial intelligence-driven defect detection and localization in metal 3D printing using convolutional neural networks. Materials Science in Additive Manufacturing, 4, pp. 025150022. doi: 10.36922/MSAM025150022.

Zhang H., Yu Y., Liu X., Liang N., Kim Y., Shin D., Moon S.K., Choi J.P., 2025. Autonomous Printing Process Optimisation and In-Situ Anomaly Detection in Fused Deposition Modelling Using an Integrated Data-Driven Approach. Virtual and Physical Prototyping, 20(1), e2545523. doi:10.1080/17452759.2025.2545523

Zhang W., Chen M., Ramanujan D., Ramani K., 2015. The status, challenges, and future of additive manufacturing in engineering. Computer-Aided Design, 67, pp. 65–89. doi:10.1016/j.cad.2015.05.001

Zhang X., Wang J., Jiang D., Li Y., Wang X., 2025. Defects detection in screen-printed circuits based on an enhanced YOLOv8n algorithm.

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

International Journal of Computational Intelligence Systems, 18(1), pp. 101. doi: 10.1007/s44196-025-00815-6

Zhao X., Xia Y., Zhang W., Zheng C., Zhang Z., 2023. YOLO-ViT-Based Method for Unmanned Aerial Vehicle Infrared Vehicle Target Detection. Remote Sensing, 15(15), 3778. doi: 10.3390/rs15153778.

Zheng X., Tian H., Wang Z., Xiao F., Qiao J., Li L., 2025. In-Situ Real-Time Defect Detection, Mitigation and Self-Supervised Adaptation Based on Visual Foundation Model for Material Extrusion Additive Manufacturing. Additive Manufacturing, 11, 102978. doi:10.1016/j.addma.2025.102978

Zhou C., Lu Z., Lv Z., Meng M., Tan Y., Xia K., Liu K., Zuo H., 2023. Metal Surface Defect Detection Based On Improved YOLOv5. Scientific Reports, 13, Article 20803

Sani A.R., Zolfagharian A., Kouzani A.Z., 2024. Automated defects detection in extrusion 3D printing using YOLO models. Journal of Intelligent Manufacturing, (online first). doi:10.1007/s10845-024-02543-8

Nikam D., Chukwuemeke A., Nigam A., Bhosale T., Nikam S., 2025. On the application of YOLO-based object detection models to classify and detect defects in laser-directed energy deposition process. Progress in Additive Manufacturing, 10, 7609–7624. doi:10.1007/s40964-025-01056-x

Zubayer M.H., Xiong Y., Wang Y., Imdadul H.M., 2024. Enhancing additive manufacturing precision: Intelligent inspection and optimization for defect-free continuous carbon fiber-reinforced polymer. Composites Part C: Open Access, 14, 100451. doi:10.1016/j.jcomc.2024.100451

Redmon J., Divvala S., Girshick R., Farhadi A., 2016. You Only Look Once: Unified, Real-Time Object Detection. Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 779–788. doi:10.1109/CVPR.2016.91

Zhang Z., Lu X., Cao G., Yang Y., Jiao L., Liu F., 2021. ViT-YOLO: Transformer-Based YOLO for Object Detection. Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops (ICCVW), pp. 2799–2808. doi:10.1109/ICCVW54120.2021.00314

UNIVERSITAS
GADJAH MADA
OPTIMASI HYBRID VISION TRANSFORMER-YOLO UNTUK DETEKSI DINI CACAT SPAGHETTI DAN STRINGING PADA 3D PRINTING BERBASIS EKSTRUSI
Raynaldi Farhan Ghiffary, Prof. Dr. Eng. Ir. Herianto, S.T., M.Eng., IPU., ASEAN Eng.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Jasen, J., & Hermanto, D. (2024). Penentuan epochs hasil model terbaik: Studi kasus algoritma YOLOv8. Digital Transformation Technology (Digitech), 4(2), 792–798. https://doi.org/10.47709/digitech.v4i2.4640

Wenkel, F., Breitenstein, D., dan Beyerer, J., 2021. Confidence score: The forgotten dimension of object detection performance evaluation. Sensors, 21(13), 4350. https://doi.org/10.3390/s21134350

Proto Labs. 2024. 3D printing trend report 2024: A global survey on market growth, ecosystem maturation, and technological innovations in 3D printing. Proto Labs.

Toor, R. . 2021. *The 3D printing waste problem*. Filamentive. https://www.filamentive.com/the-3d-printing-waste-problem/