

## DAFTAR PUSTAKA

- (KOMINFO) MKDIRI. 2024. STANDAR TEKNIS PERANGKAT TELEKOMUNIKASI LOW POWER WIDE AREA NETWORK NONSELULER.
- Adam S, Akbar H, Rizki Fauzan M, Riswan. 2023. Determinan Kejadian Kecelakaan Kerja Pada Nelayan di Kecamatan Bolaang. *Graha Med Public Heal J*. 2(2):81–88.
- Adil Mudasir Malla, Banka AA. 2025. Comprehensive Review of Graph Neural Networks: Challenges, Classification, Architectures, Applications, and Potential Utility in Bioinformatics. <https://onlinelibrary.wiley.com/doi/full/10.1111/exsy.70091>.
- Agung IK, Nizar F, Lety E, Puspita I. 2023. LoRaWAN for Smart Street Lighting Solution in Pangandaran Regency. 7 December:2452–2459.
- Agung Premananda IG, Tjahyanto A, Mukhlason A. 2022. Design Science Research Methodology and Its Application to Developing a New Timetabling Algorithm. *Proc - 2022 IEEE Int Conf Cybern Comput Intell Cybern 2022.*, siap terbit.
- Ahmed SK. 2024. The pillars of trustworthiness in qualitative research. *J Med Surgery, Public Heal*. 2 January:100051. <https://doi.org/10.1016/j.glmedi.2024.100051>.
- Aji Nugraha, Diana Alia, Eddi Eddi. 2024. Rancang Bangun Kendali Kapal Jarak Jauh Berbasis LoRa. *Globe Publ Ilmu Tek Teknol Kebumian, Ilmu Perkapalan*. 2(4):56–74. <https://doi.org/10.61132/globe.v2i4.567>.
- Akbar LASI, Misbahuddin M, Iqbal MS, Wiriasto GW, Rachman AS, Budiman DF, Jumarip J. 2024. IMPLEMENTASI STATIC ROUTING PADA JARINGAN MESH PERANGKAT LoRa. *Pros SAINTEK*. 6 November 2023:192–199. <https://doi.org/10.29303/saintek.v6i1.936>.
- Alayyanur, Ramdhan, Tejamaya. 2023. Infografik: Ancaman Keselamatan Bagi Nelayan. <https://unair.ac.id/infografik-ancaman-keselamatan-bagi-nelayan/>.
- Aris Sarjito. 2023. The Role of Technology in Indonesia's Maritime Development. *J Lemhannas RI*. 11(4):219–236.
- Atthoyib LH, Irsyadi F, Baskoro HR. 2024. Rancang Bangun Sistem Komunikasi Sensor Nirkabel Pada Perangkat Pertanian Menggunakan Lora Dengan Topologi Mesh. *J Keteknikan Pertan Trop dan Biosist*. 12(1):35–45. <https://doi.org/10.21776/ub.jkptb.2024.012.01.04>.

Azari

- DH, Christin M. 2024. Peran Komunikasi Interpersonal Pemilik Kapal Dalam Meningkatkan Semangat Kerja Anak Buah Kapal Di Pelabuhan Kota Tegal ( Studi Kasus Pada Koloman Cat Putih ). *e-Proceeding Manag.* 11(2):1870–1876.
- Badan Pusat Statistik. 2025. KEADAAN PEKERJA DI INDONESIA (Laborer Situation in Indonesia) Februari/February 2025.
- Balachander T, Ramana K, Mohana RM. 2024. Cooperative Spectrum Sensing Deployment for Cognitive Radio Networks for Internet of Things 5G Wireless Communication. 29(3):698–720.
- Dewi IM. 2023. Literasi Maritim Di Era Digital.
- Durand TG, Booysen MJ. 2025. Performance Evaluation of a Mesh-Topology LoRa Network. *Sensors.* 25(5):1–24. <https://doi.org/10.3390/s25051602>.
- Elgharbi SE, Iturralde M, Dupuis Y, Gague A. 2024. OSR: Advancing Multi-Hop Routing for LoRaWAN Mesh Networks in Maritime Scenarios. *Proc 2024 20th Int Conf Netw Serv Manag AI-Powered Netw Serv Manag Tomorrow's Digit World, CNSM 2024.*, siap terbit.
- Enda D, Kurniati R, Kumara IMS. 2024. Desain Jaringan LoRa Mesh Pada Sistem Monitoring Pelanggaran Zona Tangkap Ikan Oleh Kapal Nelayan Tradisional (Studi. *Semin Nas Ind dan Teknol (SNIT), Politek Negeri Bengkalis.* 3 Lcm:478–486.
- Farej ZK, Adel AY. 2024. Review on LoRa Communication Technology, Its Issues, Challenges and Applications in Healthcare System. *Eur J Comput Sci Inf Technol.* 12(8):1–17. <https://doi.org/10.37745/ejcsit.2013/vol12n8117>.
- Firmansyach HW, Kongtungmon M, Yulianingsih N. 2025. KONEKTIVITAS : Jurnal Pengabdian kepada Masyarakat Conferences Deep and Machine Learning in Artificial Intelligence about Diabetics for Student Indonesia-Thailand. 1(1):28–36. <https://doi.org/10.65818/konektivitas.v1i1.26>.
- Hartono R, Manuhutu MA, Wahyono BT, Raafi'udin R, Seta HB, Theresiawati, Sumah J, Tuhuteru H, Pakka HM, Prabu HK, *et al.* 2024. *Dasar-Dasar Jaringan Komputer.* <https://repository.penerbitwidina.com/media/publications/585348-dasar-dasar-jaringan-komputer-26acf80e.pdf>.
- Hosseinzadeh S, Ashawa M, Owoh N, Larijani H, Curtis K. 2024. Explainable Machine Learning for LoRaWAN Link Budget Analysis and Modeling. *Sensors.* 24(3). <https://doi.org/10.3390/s24030860>.
- Imanudin M, Kinanda R, Falih N, Arman A, Sembiring E, Supangkat S. 2024.

*Enhancing Urban Waste Management: An IoT and LoRa-Integrated Smart Bin System for Volume Monitoring and Analysis.*

- Ishak RM, Kartiasih F. 2025. Peran Teknologi Informasi dan Komunikasi serta Kondisi Sosial Ekonomi terhadap Kemiskinan Indonesia. *J Ekon Indones.* 13(3):193–213. <https://doi.org/10.52813/jei.v13i3.496>.
- Jegelka S. 2023. Theory of graph neural networks: representation and learning.
- Jiang W, Han H, He M, Gu W. 2022. Graph Neural Networks for Routing Optimization: A Survey.
- Jiang W, Han H, Zhang Y, Wang J, He M, Gu W, Mu J, Cheng X. 2024. Graph Neural Networks for Routing Optimization: Challenges and Opportunities. *Sustain.* 16(21):1–34. <https://doi.org/10.3390/su16219239>.
- Jianping W, Guangqiu Q, Chunming W, Weiwei J, Jiahe J. 2024. Federated learning for network attack detection using attention-based graph neural networks. *Sci Rep.* 14(1):1–16. <https://doi.org/10.1038/s41598-024-70032-2>.
- Kementrian Kelautan dan Perikanan. 2025. Registrasi Kartu Pelaku Usaha dan Pelaku Pendukung Sektor Kelautan dan Perikanan (Kusuka) Hingga Triwulan I-2025.
- Khan MAA, Ma H, Farhad A, Mujeeb A, Mirani IK, Hamza M. 2024. When LoRa meets distributed machine learning to optimize the network connectivity for green and intelligent transportation system. *Green Energy Intell Transp.* 3(3):100204. <https://doi.org/10.1016/j.geits.2024.100204>.
- Kumar K, Kumar V, Seema. 2022. Security and Privacy Preservation for Data Communication Network. *Procedia Comput Sci.* 215(2022):1–7. <https://doi.org/10.1016/j.procs.2022.12.001>.
- Lin Z, Zhang X, Gong S, Li L, Su Z, Gu B. 2025. Matching-Driven Deep Reinforcement Learning for Energy-Efficient Transmission Parameter Allocation in Multi-Gateway LoRa Networks. *IEEE Trans Veh Technol.* 74(2):3283–3295. <https://doi.org/10.1109/TVT.2024.3477985>.
- Lippe P. 2025. UvA DL Notebooks Release v1.2.
- Maudet S, Andrieux G, Chevillon R, Diouris JF. 2021. Refined node energy consumption modeling in a LoRaWAN network. *Sensors.* 21(19). <https://doi.org/10.3390/s21196398>.
- Mousavi SM, Khademzadeh A, Rahmani AM. 2022. Toward a Versatile IoT Communication Infrastructure. *Int J Inf Commun Technol Res.* 14(1):25–37. <https://doi.org/10.52547/itrc.14.1.25>.

nsnam.

2025. NS-3. [diakses 2025 Okt 20]. <https://www.nsnam.org/>.
- Nurjannah, Tjahjono B, Veronica Siregar S, Basyarewan H. 2025. Artificial Intelligence dan Aplikasi IoT Pada Smart Homes: Wawasan Strategis Untuk Pengambilan Keputusan. *Forum Ilm.* 22(1):58. <https://ejurnal.esaunggul.ac.id/index.php/Formil/article/download/9014/4361>.
- Padriyana F, Nusuwars FMS, Hiron N. 2021. Komunikasi Data Pada Sistem Pelaporan Kecelakaan Perahu Nelayan Berbasis Lora. *J Energy Electr Eng.* 2(2):6–11. <https://doi.org/10.37058/jeee.v2i2.2669>.
- Pahlevi SM. 2023. *Kecerdasan Buatan dengan Deep Learning*. <https://elexmedia.id/produk/detail/komputer/dr-eng-said-mirza-pahlevi/kecerdasan-buatan-dengan-deep-learning/9786230049682>.
- Pasolini G. 2022. On the LoRa Chirp Spread Spectrum Modulation: Signal Properties and Their Impact on Transmitter and Receiver Architectures. *IEEE Trans Wirel Commun.* 21(1):357–369. <https://doi.org/10.1109/TWC.2021.3095667>.
- Peres FF. 2026. Effect sizes for nonparametric tests. 36(1):1–12.
- Petar Veličković. 2023. Everything is connected: Graph neural networks. *Curr Opin Struct Biol.* 79 April 2023.
- Pham VD, Kisel V, Kirichek R, Koucheryavy A, Shestakov A. 2022. Evaluation of A Mesh Network based on LoRa Technology. *Int Conf Adv Commun Technol ICACT.* 2022-Febru:1280–1285. <https://doi.org/10.23919/ICACTION53585.2022.9728830>.
- Pospisil J, Fujdiak R. 2023. Increasing data rate of LoRa technology using frequency division multiplex. *ACM Int Conf Proceeding Ser.*, siap terbit.
- Rabil M, Putri SEA, Maharani SH. 2024. “Fisherman’S Sos” Untuk Keamanan Berlayar Berbasis LoRa.
- Rahman R, Nurninawati E, Pipin SJ, Sutanto A, Nazal MA, Rusdiana L, Tonyjanto C. 2024. *Jaringan Komputer : Teori dan Penerapan Berbagai Bidang*. [https://www.researchgate.net/profile/Sio-Pipin/publication/379190427\\_Jaringan\\_Komputer\\_Teori\\_dan\\_Penerapan\\_Berbagai\\_Bidang/links/65febc4f3b56b5b2d258439/Jaringan-Komputer-Teori-dan-Penerapan-Berbagai-Bidang.pdf?\\_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1Ymx](https://www.researchgate.net/profile/Sio-Pipin/publication/379190427_Jaringan_Komputer_Teori_dan_Penerapan_Berbagai_Bidang/links/65febc4f3b56b5b2d258439/Jaringan-Komputer-Teori-dan-Penerapan-Berbagai-Bidang.pdf?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1Ymx).
- Raya D, Gorontalo K, Putri CFILD, Pakaya M, Usaman SR, Kama NF. 2022. Pola Komunikasi Masyarakat Nelayan Di Era Teknologi Informasi ( Studi

Deskriptif Di Kelurahan Leato Selatan , Kecamatan Dumbo Raya, Kota Gotontalo). *J Ilmu Komun.* V I:299–309.

Rekha D, Pavithra L. 2025. TSCH in Edge IoT: A Comprehensive Survey of Research Challenges. *Emerg Telecommun Technol.* 36(3).

Sa’adah N, Pratiarso A, Nadziroh F, Muna N, Nisa’ K, Astawa IGP, Santoso TB, Yulianto SS. 2024. Analisa Performansi Komunikasi LoRa (Long Range) pada Sistem Monitoring Buoy di Laut. *Indones J Comput Sci.* 13(6):284–301. <http://ijcs.stmikindonesia.ac.id/ijcs/index.php/ijcs/article/view/3135>.

Sambasivan N, Highfl H, Akrong D, Aroyo L. 2021. “ Everyone wants to do the model work , not the data work ”: Data Cascades in High-Stakes AI.

Sarang S, Member GS. 2023. Machine Learning Prediction Based Adaptive Duty Cycle MAC Protocol for Solar Energy Harvesting Wireless Sensor Networks. 11 January. <https://doi.org/10.1109/ACCESS.2023.3246108>.

Semtech. 2024. AN1200.86: LoRa® and LoRaWAN®. *Data Sheet.* March:0–28.

Shakibajahromi B, Kim E, Breen DE. 2024. RIMeshGNN: A Rotation-Invariant Graph Neural Network for Mesh Classification. *Proc - 2024 IEEE Winter Conf Appl Comput Vision, WACV 2024.*, siap terbit.

Sianturi R. 2025. TEST NORMALITY AS A CONDITION OF HYPOTHESIS TESTING. 11(1):1–14.

Smith MJ de, Goodchild MF, Associates PAL&. 2025. *Geospatial Analysis 7th Edition, 2025 - de Smith, Goodchild, Longley and Colleagues.*

Sri M, Maman H BW, Belyamin. 2025. Teknologi Komunikasi Nirkabel Berbasis Lora : Uji Stabilitas Koneksi Di Pelabuhan Perikanan Karangantu Lora-Based Wireless Communication Technology : Connection. *J Penelit Perikan Indones.* 31 September:118–124.

Su Z, Adam A, Nasrudin MF. 2025. Adaptive Focal Loss for Keypoint-Based Deep Learning Detectors Addressing Class Imbalance. *IEEE Access.* 13 December 2024:31842–31856. <https://doi.org/10.1109/ACCESS.2025.3538917>.

The Things Network. 2025. RSSI and SNR. [diakses 2025 Okt 20]. <https://www.thethingsnetwork.org/docs/lorawan/rssi-and-snr/>.

Tuunanen T, Winter R, vom Brocke J. 2024. Dealing With Complexity in Design Science Research: a Methodology Using Design Echelons1. *MIS Q Manag Inf Syst.* 48(2):427–458. <https://doi.org/10.25300/MISQ/2023/16700>.

Udugampola N, Ai X, Li B, Gong H, Seneviratne A. 2025. A Position- and Energy-Aware Routing Strategy for Subterranean LoRa Mesh Networks.

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**OPTIMASI ROUTING BROADCAST MENGGUNAKAN GRAPH NEURAL NETWORK PADA JARINGAN LORA MESH UNTUK KOMUNIKASI DARURAT KAPAL NELAYAN**

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- Vermesan O, vorm Walde K, Bahr R, Conrady C, Judvaitis J, Gaigals G, Karlsen T, Coppola M, Sand HE. 2023. Edge AI LoRa mesh technologies. *Adv Edge Artif Intell Syst Context.*, siap terbit.
- Vinod A, Harigovind M, Abraham JP, Midhunkrishna KS. 2022. Fishermen Rescue System with LoRa Module. 7(7):140–144.
- Wei H, Zhao Y, Xu K. 2023. G-Routing: Graph Neural Networks-Based Flexible Online Routing. *IEEE Netw.* 37(4):90–96. <https://doi.org/10.1109/MNET.012.2300052>.
- Widianto MH. 2022. Journal of Software Engineering , Information and Communication Technology ( SEICT ) Systematic Literature Review : LoRa and LoRaWAN Projects in Practice. 3(1):25–34.
- Xiao W, Kaneko M, Rachkidy N El, Guitton A, Xiao W, Kaneko M, Senior I, Rachkidy N El. 2023. Integrating LoRa Collision Decoding and MAC Protocols for Enabling IoT Massive Connectivity Integrating LoRa Collision Decoding and MAC Protocols for Enabling IoT Massive Connectivity.
- Yasa AAR. 2025. IMPLEMENTASI WEBSITE JARINGAN IOT MENGGUNAKAN LORA POINT-TO-POINT (P2P) UNTUK PEMANTAUAN RADIASI LINGKUNGAN PADA RADIATION PORTAL MONITOR. Universitas Pembangunan Nasional Veteran Jakarta. <https://repository.upnvj.ac.id/39583/>.