

DAFTAR PUSTAKA

- [1] R. Robianto, “Kerentanan Kawasan Permukiman Rawan Banjir Kampung Kolam Kelurahan Tanjungpinang Barat Tanjungpinang,” *J. Rekayasa Sipil*, vol. 16, no. 1, pp. 25–37, 2020, doi: 10.25077/jrs.16.1.25-37.2020.
- [2] H. S. Putri, A. Sagita, and H. Ulvia, “Responsivitas Badan Penanggulangan Bencana Daerah (BPBD) Dalam Menangani Keluhan Bencana Banjir Di Kota Tanjungpinang,” *Publ. Tek. Inform. dan Jar.*, vol. 2, no. 2, pp. 27–39, 2024, doi: 10.62951/repeater.v2i2.45.
- [3] D. C. Siregar, B. W. Kusuma, and V. P. Ardah, “Analisis variabilitas curah hujan dan suhu udara di tanjungpinang,” *Mater. dan Energi Indones.*, vol. 09, no. 02, pp. 53–60, 2019, doi: 10.24198/jmei.v9i2.23834.
- [4] M. Tumanda, T. Jr, and M. E. Loretero, “Innovative Configuration Design of Two - Wire Tip Mechanisms for a Tipping - Bucket Rain Gauge,” *Int. J. Eng. Technol. Innov.*, vol. 10, pp. 156–164, 2020, doi: 10.46604/ijeti.2020.4772.
- [5] N. A. Dervos and E. A. Baltas, “Development of Experimental Low-Cost Rain Gauges and their Evaluation During a High Intensity Storm Event,” *Environ. Process.*, vol. 6, pp. 1–13, 2024, doi: 10.1007/s40710-024-00686-7.
- [6] E. Safaah and R. Anwar, “Rancang Bangun Sistem ATS (Automatic Transfer Switch) dan AMF (Automatic Main Failure) 1 Fasa Secara Otomatis,” *ProTekInfo*, vol. 9, no. 2, pp. 44–51, 2022, doi: 10.30656/PROTEKINFO.V9I2.5260.
- [7] A. K. Utama, M. Shofwan, D. Cahyono, and L. S. Budi, “Analisa Ketidakpastian Pengukuran Sensor Curah Hujan Tipe Tipping Bucket,” *Telekontran*, vol. 10, no. 1, pp. 63–68, 2022, doi: 10.34010/telekontran.v10i1.7410.
- [8] T. N. Nizar, D. A. Jatmiko, R. Hartono, and Y. Y. Kerlooza, “Analisa Ketidakpastian Pengukuran Sensor Curah Hujan Tipe Tipping Bucket,” *Komputika*, vol. 13, pp. 277–287, 2024, doi: 10.34010/komputika.v13i2.13949.
- [9] R. E. Dunn, H. J. Fowler, A. C. Green, and E. Lewis, “bucket rain gauges : a review of the undercatch phenomenon , and methods for its reduction and correction,” *Weather*, vol. 80, no. 6, pp. 196–205, 2024, doi: 10.1002/wea.7736.
- [10] A. Pratiwi, A M Irawan, D. Akbar, and R. M. Taruna, “Prediksi Hujan Ekstrem Di Zona Musim (Zom) 69 Provinsi Jawa Barat Menggunakan Jaringan Saraf Tiruan,” *Semin. Nas. Fis.*, vol. 5, pp. 103–115, 2021, [Online]. Available: <https://proceeding.unesa.ac.id/index.php/snf/article/view/4336/892>
- [11] D. A. R. Oktaverina, E. Suhartanto, and S. Wahyuni, “Validasi Data Curah Hujan Satelit TRMM (Tropical Rainfall Measuring Mission) dengan Pos Stasiun Hujan pada Sub DAS Keduang,” *Teknol. dan Rekayasa Sumber Daya Air*, vol. 2, no. 1, pp. 265–276, 2022, [Online]. Available: <https://jtresda.ub.ac.id>

- [12] D. A. Segovia-Cardozo, Rodríguez-Sinobas, Carlota Bernal-Basurco, and Leonor, "Tipping Bucket Rain Gauges in Hydrological Research: Summary on Measurement Uncertainties, Calibration, and Error Reduction Strategies," *sensors*, vol. 23, no. 12, pp. 1–20, 2023, doi: 10.3390/s23125385.
- [13] A. Kurniawan, "Evaluasi Pengukuran Curah Hujan Antara Hasil Pengukuran Permukaan (AWS , HELLMAN , OBS) dan Hasil Estimasi (Citra Satelit)," *J. Geogr. Edukasi dan Lingkung.*, vol. 4, no. 1, pp. 1–7, 2020, doi: 10.29405/jgel.v4i1.3797.
- [14] D. Z. Rohmah and B. S. Utomo, "Development of an Automatic Portable Calibrator for Tipping Bucket Rain Gauge (TBRG) Using a Load Cell and Simple Water Sensor," *J. Penelit. Pendidik. IPA*, vol. 10, no. 9, pp. 6746–6755, 2024, doi: 10.29303/jppipa.v10i9.7634.
- [15] R. Suryawanshi, V. Patil, and J. Tivarekar, "AI in Sensor Calibration," *Int. J. Res. Appl. Sci. Eng. Technol.*, vol. 13, no. 4, pp. 1197–1200, 2025, doi: 10.22214/ijraset.2025.68432.
- [16] H. Fan, J. Wang, Q. Feng, Q. Hu, S. Zuo, and V. Hall, "Detection techniques of biological and chemical Hall sensors," *R. Soc. Chem.*, vol. 11, no. 13, pp. 7257–7270, 2021, doi: 10.1039/d0ra10027g.
- [17] P. Wiyono and H. Hartoyo, "Simulation of Automatic Train Doorstop using Hall Effect A3144 Sensor Based on Arduino Uno," vol. 4, no. 2, pp. 69–78, 2021, doi: <https://search.crossref.org/?q=2614-4867>.
- [18] M. A. Basil and H. Afrisal, "Perancangan Automatic Transfer Switch Pada Inverter Dengan Monitoring Baterai Berbasis Mikrokontroler," vol. 10, no. 4, pp. 566–571, 2021, doi: 10.14710/transient.v10i4.566-571.
- [19] R. Pakpahan, D. N. Ramadan, and S. Hadiyoso, "Rancang Bangun Dan Implementasi Automatic Transfer Switch (ATS) Menggunakan Arduino Dan Relay," *J. Elektro Telekomun. Terap.*, vol. 3, no. 2, pp. 332–341, 2016, doi: 10.25124/jett.v3i2.302.
- [20] R. Rizaldi and S. U. Djufri, "Perancangan ats (automatic transfer switch) satu phasa menggunakan kontrol berbasis relay dan time delay relay (tdr)," *J. Electr. Power Control Autom.*, vol. 1, no. 2, pp. 59–64, 2018, doi: 10.33087/jepca.v1i2.12.
- [21] L. Patan, "Enhancing Reliability in Distributed Systems : A Comprehensive Approach to Telemetry and Monitoring," *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.*, vol. 10, no. 5, pp. 661–667, 2024, doi: 10.32628/CSEIT241051051.
- [22] R. Rakhim *et al.*, "Identification Of Changes In Seasonal Patterns And Frequency Distribution Of Raainfall In Manokwari," *Bul. Meteorol. KLIMATOLOGI, DAN Geofis.*, vol. 3, no. 5, pp. 35–43, 2022, doi: 10.3451/buletinmkg.v2i6.33.
- [23] Y. Ro, K. Ho, C. Hyunjun, H. Minhoo, K. Joo, and W. Cha, "disdrometer , tipping - bucket rain gauge , and weighing," *Nat. Hazards*, vol. 120, no. 3, pp. 2829–2845, 2024, doi: 10.1007/s11069-023-06308-z.
- [24] D. Dunkerley, "Uncertainty of Tipping-Bucket Data May Hamper Detection and Analysis of Secular Changes in Short-Term Rainfall Rates," *Water*, vol. 17, no. 11, pp. 1–14, 2025, doi: 10.3390/w17111623.
- [25] U. S. G. Survey and L. Vegas, "A New Method for Automated Dynamic Calibration of Tipping-Bucket Rain Gauges," *J. Atmos. Ocean. Technol.*,

- vol. 14, no. 1, pp. 1513–1519, 1997, doi: 10.1175/1520-0426.
- [26] World Meteorological Organization, *Guide to Instruments and Methods of Observation*, 2024th ed., vol. I, no. 8. Switzerland: Chair, 2024.
- [27] C. K. Amuzuvi and E. Addo, “A Microcontroller-Based Automatic Transfer Switching System for a Standby Electric Generator *,” *Ghana Min. J.*, vol. 15, no. 1, pp. 85–92, 2015, [Online]. Available: https://www.academia.edu/32008213/A_Microcontroller_Based_Automatic_Transfer_Switching_System_for_a_Standby_Electric_Generator
- [28] D. Paul, S. Islam, S. K. Rahman, S. Islam, and M. Mohiuddin, “Performance evaluation and operation of Auto Load transfer switch,” *Int. J. Renew. Sustain. Energy*, vol. 2, no. 6, pp. 205–211, 2013, doi: 10.11648/j.ijrse.20130206.13.
- [29] M. A. J. Hidayat and A. Z. Amrullah, “Sistem Kontrol Dan Monitoring Tanaman Hidroponik Berbasis Internet Of Things (IoT) Menggunakan NODEMCU ESP32[1] R. R. Putra, H. Hamdani, S. Aryza, and N. A. Manik, ‘Sistem Penjadwalan Bel Sekolah Otomatis Berbasis RTC Menggunakan Mikrokontroler,’ J. Media,” *Saintekom*, vol. 12, no. 1, pp. 23–32, 2022, doi: 10.33020/saintekom.v12i1.223.
- [30] M. Babiuch, P. Foltyniek, and P. Smutny, “Using the ESP32 Microcontroller for Data Processing,” *IEEE*, pp. 88–93, 2021, doi: <https://doi.org/10.1109/CarpathianCC.2019.8765944>.
- [31] R. N. Hidayatullah, N. A. Ramdhan, and A. Khamid, “Pengembangan Kendali Lampu Menggunakan Mikrokontroler NODEMCU ESP32 dan Arduino Ide Berbasis Internet Of Things (IoT),” *J. Mhs. Tek. Inform.*, vol. 8, no. 4, pp. 7762–7767, 2024, doi: 10.36040/jati.v8i4.10461.
- [32] R. R. Putra, H. Hamdani, S. Aryza, and N. A. Manik, “Sistem Penjadwalan Bel Sekolah Otomatis Berbasis RTC Menggunakan Mikrokontroler,” *J. Media Inform. Budidarma*, vol. 4, no. 2, p. 386, 2020, doi: 10.30865/mib.v4i2.1957.
- [33] M. Crescentini, S. F. Syeda, and G. S. Member, “Hall-Effect Current Sensors : Principles of Operation and Implementation Techniques,” *IEEE Sens. J.*, vol. 22, no. 11, pp. 10137–10151, 2022, doi: 10.1109/JSEN.2021.3119766.
- [34] L. Y. Waruwu, A. Rahmi, and M. Anaperta, “Rancang Bangun Alat Ukur Medan Magnet Berbasis Arduino Uno Menggunakan Sensor Efek Hall,” *Semesta Tek.*, vol. 24, no. 2, pp. 129–139, 2021, doi: /10.18196/st.v24i2.12938 Rancang.
- [35] H. V. Putri, Y. Radiyono, I. B. Setiawan, J. Materi, and F. Jmpf, “Pengembangan Alat Percobaan Induksi Magnetik Pada Kawat Melingkar Berarus dengan Hall Effect Sensor UGN3503,” *J. Mater. dan Pembelajaran Fis.*, vol. 12, pp. 44–50, 2022, doi: 10.20961/jmpf.v12i1.61193.
- [36] M. Limbong, R. Imanuel, and O. Karundeng, “Pengembangan Alat Ukur Fluks Magnetik berbasis Mikrokontroler menggunakan Sensor Hall Effect,” *J. Phys. Educ. Appl. Phys.*, vol. 7, no. 1, pp. 1–9, 2025, [Online]. Available: <https://jurnal.unsil.ac.id/index.php/Diffraction/article/view/15170>
- [37] B. Ayuningtyas *et al.*, “Prototype of an IoT-Based Height Sorting Conveyor using ESP32, HC-SR04, and IR Sensors,” *J. Ilm. Tek.*, vol. 5, no. 1, pp. 223–237, 2026, doi: 10.56127/juit.v5i1.2532.

- [38] Y. Tambing, M. Muhallim, and R. Suppa, "Prototype Sistem Kontrol Lampu Berbasis Internet of Things (IoT) Menggunakan NODEMCU," *J. Inform. dan Tek. Elektro Terap.*, vol. 12, no. 1, pp. 266–274, 2024, doi: 10.23960/jitet.v12i1.3702.
- [39] A. Jalil, "Sistem Kendali Perangkat Elektronik Jarak Jauh Berbasis Jaringan Nirkabel Menggunakan Secure Shell (SSH) Dan Robot Operating System (ROS)," *J. Teknol. Inf. dan Ilmu Komput.*, vol. 7, no. 6, pp. 1205–1212, 2020, doi: 10.25126/jtiik.202072737.
- [40] A. Kiswanto, A. R. F. Syah, and M. A. M. A, "Revitalisasi Sistem ATS : Integrasi Smart Relay dan Teknologi," *J. FORTECH*, vol. 4, no. 2, pp. 56–63, 2023, doi: 10.56795/fortech.v4i2.4201.
- [41] S. Subandi, M. A. Novianta, and D. F. Athallah, "Rancang Bangun Pembatasan Pemakaian Air Minum Berbasis Arduino Mega 2560 Pro Mini Dengan Sensor Water Flow Yf-S204," *J. Elektr.*, vol. 8, no. 492, pp. 1–9, 2021, [Online]. Available: <https://ejournal.akprind.ac.id/index.php/elektrikal/article/view/3734>
- [42] A. B. Pulungan and D. S. Goci, "Penggunaan Sistem Data logger Dalam Pencatatan Data Parameter Panel Surya berbasis Mikrokontroler," *JTEV (Jurnal Tek. Elektro dan Vokasional)*, vol. 7, no. 2, pp. 337–344, 2021, doi: 10.24036/jtev.v7i2.115052.
- [43] N. R. Ratri, J. Kuswanto, and W. M. Ashari, "Perancangan Perangkat Modul Konektivitas Bluetooth Pada Valvetronic Knalpot Racing Mobil," *J. Infomedia*, vol. 7, no. 2, pp. 50–57, 2022, doi: 10.30811/jim.v7i2.3063.
- [44] W. R. Pratama, S. M. Bakti Yulianti, and S. M. Agus Sugiharto, "Prototipe Smart Parking Modular Berbasis Internet Of Things," *J. Teknol. Ind.*, vol. 11, no. 2, pp. 52–60, 2022, doi: 10.35968/jti.v11i2.954.
- [45] S. Samsugi, Z. Mardiyansyah, and A. Nurkholis, "Sistem Pengontrol Irigasi Otomatis Menggunakan Mikrokontroler Arduino Uno," *J. Teknol. dan Sist. Tertanam*, vol. 1, no. 1, pp. 17–22, 2020, doi: 10.33365/jtst.v1i1.719.
- [46] R. D. Mahardi and A. Shodiqin, "Smart Relay Based Automatic Transfer Switch in Internet Server Room Automatic Transfer Switch Berbasis Smart Relay Pada Ruang Server Internet," vol. 2, no. 1, pp. 42–47, 2021, [Online]. Available: <https://jurnal.sttp.ac.id/index.php/eduelektromatika/article/view/42/160>
- [47] D. Daniel and D. S. A. Sianturi, "Uji Performa Baterai Untuk Beban Utama Motor Dc Perahu Pulang Hari Battery Performance Test for Main Load of 'One Day Fishing' Boat," *J. Kelaut. Nas.*, vol. 8, no. 2, pp. 90–100, 2013.
- [48] F. Ahmad, M. Y. Hariyawan, and N. Posma, "Perancangan Dan Implementasi Passive Emi Filter Pada Switching Mode Power Supply (SMPS)," *J. Politek. Caltex Riau*, vol. 5, no. 1, pp. 29–38, 2019, doi: 10.35143/elementer.v5i1.2519.
- [49] M. Evita, H. Mahfudz, and M. Djamal, "Alat Ukur Curah Hujan Tipping-Bucket Sederhana dan Murah Berbasis Mikrokontroler," *J. Otomasi, Kontrol, dan Instrumentasi*, vol. 2, no. 2, pp. 69–77, 2010, doi: 10.5614/joki.2010.2.2.1.
- [50] M. A. A. Santana, Guimarães, and L. G. Lanza, "Development of procedures for calibration of meteorological sensors. Case study: calibration of a tipping-bucket rain gauge and data-logger set," *J. Phys. Conf. Ser.*, vol. 975,

- no. 9, pp. 1–7, 2018, doi: 10.1088/1742-6596/975/1/012006.
- [51] D. Chicco, M. J. Warrens, and G. Jurman, “The coefficient of determination R-squared is more informative than SMAPE , MAE , MAPE , MSE and RMSE in regression analysis evaluation,” *PeerJ Comput. Sci.*, vol. 12, no. 2, pp. 1–24, 2021, doi: 10.7717/peerj-cs.623.
 - [52] M. D. Humphrey and J. D. Istok, “A New Method for Automated Dynamic Calibration of Tipping-Bucket Rain Gauges,” *Sci. a Chang. world*, vol. 14, no. 1, pp. 1513–1519, 1997.
 - [53] D. Harmel and L. C. Brown, “Assessment of Measurement Errors and Dynamic Calibration Methods for Three Different Tipping Bucket Rain Gauges,” *elsevier*, vol. 674, no. 2, pp. 1–38, 2016, [Online]. Available: <https://www.elsevier.com/open-access/userlicense/1.0/>
 - [54] J. Kingman and M. K. Dymond, “Fused filament fabrication and water contact angle anisotropy : The effect of layer height and raster width on the wettability of 3D printed polylactic acid parts,” *Chem. Data Collect.*, vol. 40, pp. 1–8, 2022, doi: 10.1016/j.cdc.2022.100884.
 - [55] P. Mercedes, G. Medina-s, and D. Carou, “Surface Quality Enhancement of Fused Deposition Modeling (FDM) Printed Samples Based on the Selection of Critical Printing Parameters,” *Materials (Basel).*, vol. 11, no. 8, pp. 1–13, 2018, doi: 10.3390/ma11081382.
 - [56] M. Paun, J. Sallese, and M. Kayal, “Hall Effect Sensors Design , Integration and Behavior Analysis,” *J. Sens. Actuator Networks*, vol. 2, no. 1, pp. 85–97, 2013, doi: 10.3390/jsan2010085.
 - [57] O. Aiello, “Hall-Effect Current Sensors Susceptibility to EMI : Experimental Study,” *electronics*, vol. 8, pp. 1–14, 2019, doi: 10.3390/electronics8111310.
 - [58] T. Chai, R. R. Draxler, and C. Prediction, “Root mean square error (RMSE) or mean absolute error (MAE)? – Arguments against avoiding RMSE in the literature,” *Geosci. Model Dev.*, vol. 7, no. 3, pp. 1247–1250, 2014, doi: 10.5194/gmd-7-1247-2014.
 - [59] C. Res, C. J. Willmott, and K. Matsuura, “Advantages of the mean absolute error (MAE) over the root mean square error (RMSE) in assessing average model performance,” *Clim. Res.*, vol. 30, no. 3, pp. 79–82, 2005, [Online]. Available: <https://www.int-res.com/articles/cr2005/30/c030p079.pdf>
 - [60] A. Coccia *et al.*, “Biomechanical Effects of Using a Passive Exoskeleton for the Upper Limb in Industrial Manufacturing Activities : A Pilot Study,” *Sensors*, vol. 24, no. 5, pp. 1–19, 2024, doi: 10.3390/s24051445.