Husnul Amri

Instrument and Control Engineer

Highly motivated engineer who is effective at designing work schedules, maintaining desired outcomes, and always ready to learn new things. Hardworking and passionate team player with a strong will and knowledge in instrumentation and control systems.

amrihusnul@ymail.com | (+62) 85273622404 | Salatiga, Central Java, Indonesia

SKILLS & ABILITIES

- Development Board Programming (Arduino, ESP, ATMega Minimum system)
- Single Board Computer Programming (RaspberryPi, NanoPi, Ev3 Mindstorm, Jetson AGX Xavier NX, Intel NUC)
- PLC Programming (WAGO, using Structure programming language)
- Robot Operating System (ROS)
- Android Programming (using MIT App Inventor)
- AI/Machine Learning Frameworks: TensorFlow, Keras, Scikit-Learn
- Programming language: Python, C, Matlab
- Programming Tools: Node-Red, VS Code, Git, PuTTY
- Drawing Tools: Eagle PCB Layout, Corel Draw, OnShape (Novice), OneCNC ToolPath (Novice)
- Office Tools: MS Office, LaTEX, Trello, Google Docs
- HAZID/HAZOP scriber

EDUCATION

INSTITUT TEKNOLOGI BANDUNG (2019 - 2021)
Instrumentation and Control (M.Eng)

- GPA: 3.83/4.00
- Master Thesis: Design of Autonomous Vehicles Decision Making Algorithm on Egoistic/Cooperative Vehicle Interaction Based on Trajectory Planning and Game Theory
- Awardee of Indonesia Endowment Fund for Education, 2019-2021

UNIVERSITAS NEGERI YOGYAKARTA (2012 - 2016)
Physics - Electronics and Instrumentation (B.Sc)

- GPA: 3,63/4,00
- Bachelor Thesis: Temperature Control System On The Paddy Dryer Machine Based On ATMega 8
- Bidikmisi Scholarship, 2012-2016

WORKING EXPERIENCE

SYSTEM INTEGRATION ENGINEER
PT PROMANUFACTURE INDONESIA (FORMULATRIX)

JUN 2023 – Present

- Working on CELL project (integration of multi-instrument)
- Analyze and test every integration process of the project, and make sure every issue/bug is known immediately before the DAT process
- Test the instrument and sub-instrument based on request/issue
- Collecting project documentation and supporting the process engineer team in terms of production documents (QC, QA, testing, and calibration documents)

LEAD ENGINEER, PT SIBERNETIKA TEKNOLOGI INDUSTRI

JAN 2022 – MAY 2023

- Propose working timeline based on work items
- Lead and manage 1-4 engineers in project work
- Project Experience: Autonomous car (simulation to real-world implementation), IoT system (hardware and software), artificial intelligence (palm fruit ripeness classification), process hazard analysis (HAZID/HAZOP), Multi-Use and Multi-User Ventilator, etc.

ENGINEER, PT SIBERNETIKA TEKNOLOGI INDUSTRI

DEC 2019 – DEC 2021

- Work under direction of lead engineer and project manager
- Prepare and propose project Bill of Material (BoM)
- Test and integrate project equipment/material (electronic/mechanic assembly)

FIELD ENGINEER, PT LAYSANDER TECHNOLOGY

MAR 2017 – NOV 2018

- Perform maintenance and service routines based on customer's problems
- Install and upgrade customer's machines
- Provide operator training.

ELECTRICAL AND MECHANICAL ENGINEER, AL-AADIYAT ROBOTIC TEAM (UNIVERSITAS NEGERI YOGYAKARTA)

2014 – 2016

- As a mechanic: Electronic assembler and maintenance
- As a programmer: OS maintenance (Linux and Windows) Motion maker using C# programming language GUI (Graphical User Interface) on Windows and motion programming using Darwin OP Robotics on Linux

PROJECT EXPERIENCE

AUTOMATED CELL CULTURE SYSTEM (2023)

Company Project

Role: System Integration Engineer

- Analyze and test every integration process of the project, and make sure every issue/bug is known immediately before the DAT process
- Test the instrument/sub-instrument based on request/known issue
- Analyze and learn every aspect of the project automation, raise every possible issue that may be occur in the future
- Collecting project documentation, make sure that every engineer knowledge is accessible and can be used for future reference
- Support the Process Engineer team in terms of production documents (QC, QA, testing, and calibration documents)

AUTONOMOUS COMBINED TERMINAL TRACTOR (2021 - 2023)
#2nd year research
Research project supported by Indonesia Endowment Fund for Education RISPRO
Role: Lead Engineer

- Design and implement navigation and control system (hardware and software architecture) of autonomous combined terminal tractor (CTT)
- Coordinate with PT INKA and PT BIMA team to implement wiring and schematic modification design from CTT ECU to drive-by-wire (DBW) and high level controller (HLC) system
- Integrate sensor data (camera, IMU, LiDAR, ultrasonic, encoder, and GNSS) and PLC data to HLC using Robot Operating System frameworks (Python)
- Build and test the system from architecture to limited environment test (PT INKA) to real environment test (docking area PT TTL)
- Implement autonomous algorithm (Stanley control, point stabilization control, docking and undocking control) to HLC and tested at docking area PT TTL

PROCESS HAZARD ANALYSIS - HAZID|HAZOP|MHA (2022 - 2023)
Client: PT Pertamina (Zona 10) | PT Pertamina EP: Bunyu & Tarakan Field
HAZID|HAZOP|MHA & SECE for Bunyu Field, Tarakan Field and Sembakung Area
Role: Scriber

- Serve as the scribe for HAZID/HAZOP/MHA sessions.
- Analyze plant risks using P&ID, Plot Plant, PFD, and other as-built drawing data during workshops with the PT Pertamina Team.
- Highlight the HAZOP nodes based on the process category.
- Write the PHA worksheet and workshop report.
- Conduct a site survey to examine the facility and identify possible hazard scenarios.
- Assist the PHA leader during the workshop process.

IOT DENGUE SURVEILANCE (2021 - 2023)
#2nd year research
Research project supported by Indonesia Endowment Fund for Education RISPRO
Role: Lead Engineer

- Design and implement mosquito detection system using low cost ESP camera
- Implement researcher algorithm (sound classification using convolutional neural network - CNN) to server backend system (node-red)
- Update Egg Counting system with image sharpness threshold feature
- Assist and lead field team in low level device (node device) issue and problem
- Developing new product: low cost OviTrap IoT node which cost only 30% of first prototype product (on stress test process) from design and architecture to real implementation
- Develop Android apps using MIT App Inventor for first prototype to make the maintenance process easier

- Update automated charging feature for first prototype from hourly schedule to battery percentage based schedule, make the battery last longer and avoid overheating

PALM OIL FRUIT RIPENESS CLASSIFICATION (2021)
Client: PT SeMAI Raya Internasional
Role: Machine Leaning Engineer

- Design object detection algorithm to classify palm oil fruit ripeness (overripe, underripe, etc)
- Develop the object detection and classification model using transfer learning method and deploy the model to Android (TFLite)
- Develop the training server with built-in Jupyter Notebook for training and test purpose, and built in image annotator
- Develop farmer tracking system using GNSS data (develop precise positioning algorithm by comparing smartphone GNSS with RTK GNSS data)
- Develop palm fruit tracking system using Google Mediapipe

STUDY OF AUTONOMOUS RAIL RAPID TRANSIT (ART) IMPLEMENTATION IN SEVERAL BIG CITY IN INDONESIA (2021)
Role: Autonomous Technology System Assistant

- Assist the Technology System Expert in the study process
- Analyze the current development process of ART product in China
- Analyze the gap of ART implementation in Indonesia
- Study the technology-related regulation about ART implementation based on China regulation
- Study the technology-related system and needs to implement the ART in Indonesia
- Create formal document and report, then present it in weekly progress report
- Suggest regulation item to support ART implementation in Indonesia

BACNET: AIR CONDITIONING MONITORING SYSTEM (2021)
SCADA Course Final Project

- Design and simulate BACNet communication of Air Conditioning (AC) Device using BACnet simulator
- Collect the data using python node and node-red back end system, then send the data to Google Cloud Platform

MULTI-USE AND MULTI-USER VENTILATOR (2020 - 2021)
Research project supported by Institut Teknologi Bandung (PM CoViD-19 Program)
Role: Electrical Engineer

- Design critical care ventilator based on bag-valve-mask (volume control)
- Design and implement electrical architecture system and integrate it with mechanical system
- Develop ventilator using Raspberry Pi as high level controller (node-red as backend) and Arduino as low level controller, the system has IoT System advantage, which allows the user to monitor the ventilator status as long as the ventilator is connected to the networks

- Support and coordinate with team leader in development phase
- The ventilator prototype has been passed the functional test on Badan Pemeriksa Fasilitas Kesehatan (BPFK)
- The ventilator has undergo the pra-clinical test on Pusat Rehabilitasi (PusRehab) Kementerian Pertahanan (KemenHan)

SMART SPEAKER (2020 - 2021)
Client: PT Telkom Indonesia
Role: Electrical Engineer

- Design smart speaker electrical system based on mic array and single board computer (Raspberry Pi, NanoPi)
- Implement PT Telkom voice recognition to smart speaker prototype
- Test the microphone and speaker on the anechoic laboratory (ITB)
- Develop recognition and action algorithm based on voice command

STUDY OF AUTONOMOUS ELECTRIC VEHICLE IMPLEMENTATION AT THE NEW NATIONAL CAPITAL CITY OF INDONESIA (2020-2021)
Role: Technology System Assistant

- Assist the Technology System Expert in the study process
- Analyze the current development process of Autonomous Electric Vehicle worldwide
- Study the autonomous vehicle technology and implementation regulation from another country
- Summarize the technology benchmark of the autonomous electric vehicle
- Create formal document and presentation and then present the study progress in every week

WATER LEVEL MONITORING SYSTEM (2020)
Corporate Social Responsibility Program
Role: Lead Engineer

- Design and implement software and hardware architecture system on water monitoring system in only 2 weeks
- Develop the monitoring node using ESP and ultrasonic sensor
- Send the water level data every hour using MQTT protocol
- Display the time series data using Cayenne Dashboard
- The designed system is reliable and maintenance needs is very low

MINI AUTOMATED GUIDED VEHICLE (AGV) CONTAINER (2019 - 2021)
#1st year research
Research project supported by Indonesia Endowment Fund for Education RISPRO
Role: Electrical and Control System Engineer

- Design and implement navigation and control system for mini AGV container (1:4 scale)
- Build drive-by-wire system/low level controller using Arduino and DC motor driver
- Design interlock system for emergency situation

- Integrate sensor data to high level controller (encoder, IMU, gnss, LiDAR, camera and ultrasonic)
- Implement autonomous path following control (Stanley control) and demonstrate it on the limited laboratory environment (POLBAN Bandung area)

IOT DENGUE SURVEILANCE (2019 - 2021)
#1st year research
Research project supported by Indonesia Endowment Fund for Education RISPRO
Role: Machine Learning Engineer

- Develop *Ae. Aegypti* egg counting system using computer vision algorithm
- Develop mosquito sound classification system using *artificial neural network* and MFCC algorithm
- Deploy the egg counting and mosquito classification to cloud server (node-red backend)
- Enhance the algorithm based on researcher needs

ITB TOURISM INFORMATION CENTER PROJECT (2019)
Final project of smart computation and machine learning course

- Develop ITB building classification by using HOG and ANN algorithm
- Combine ANN and DNN algorithm along with HOG extraction feature algorithm to get the best result of ITB building classification
- Manually collect the data by using the smartphone and train the model using the collected data

PROCESS HAZARD ANALYSIS - HAZID|HAZOP|LOPA (2019)
Client: PT Star Energy Geothermal - Wayang Windu
Role: Assistant Scriber

- Help and assist the PHA leader and scriber in the workshop process

PATENTS

- Manual Control to Electric Signal Control Tools on Container Trucks Based on Hydraulic Motors (PCT Patent - PCT/ID2022/000002) - **On Process**
- Alat Pengubah Kontrol Manual Menjadi Sinyal Elektrik Pada Truk Kontainer Berbasis Motor Hidrolik (Paten Dalam Negeri - P00202208885) - **On Process**
- Metode Pelacakan Objek Bergerak Berdasarkan Algoritma Fusi Kamera Stereo Serta Data LiDAR (Paten Dalam Negeri - P00202205584) - **On Process**
- Sistem dan Metode Untuk Mendeteksi Nyamuk yang Masuk dan Keluar Ke dan Dari Dalam Alat Pengumpul Telur Nyamuk (Paten Dalam Negeri - P00202207958) - **On Process**
- Karya Rekaman Video: Panduan Instalasi dan Maintenance OvTrap (**Registered Copyright** - EC00202263836/000379569)

COMMUNITY SERVICE (SEMINAR/ TRAINING SERVICE)

DUTA PRO TRAINING & CONSULTING PUBLIC TRAINING: MACHINE LEARNING (2022)
Client: Eni Muara Bakau B.V. (Private Training)
Role: Trainer

VIRTUAL WORKSHOP: FOCUS GROUP DISCUSSION (FGD) IMPLEMENTASI PENGGUNAAN OVITRAP SEBAGAI SALAH SATU MONITORING DBD DI DAERAH ENDEMIS (2022)
Role: Keynote Speaker

SIK 2021 WORKSHOP: DEVELOPMENT OF AUTONOMOUS VEHICLES (2021)
Client: Public Training (All of the training participant is a lecturer)
Role: Workshop technical leader and hands-on trainer

ARTIFICIAL INTELLIGENCE (AI) IN PRACTICE FOR BEGINNER (2020)
Client: Komunitas Migas Indonesia Member (Private Invitation)
Role: Hands-On Trainer
Subject: Hands-On Object Detection System, Face Recognition System

PHYSICS SEMINAR WORKSHOP (2016)
Client: Undergraduate Physics Student of Universitas Negeri Yogyakarta
Role: Student Trainer

LICENSES & CERTIFICATIONS

- **General Occupational Health and Safety Expert (Ahli Keselamatan dan Kesehatan Kerja Umum/AK3U) BNSP** (SKT.01/1079/LSP-K3N/IV/2023)
- **Introduction to Self-Driving Car, Part of Self-Driving Car Specialization** (https://coursera.org/verify/3YYZPEF85LFS)
- **Google Data Analytics Professional Certification** (https://coursera.org/verify/professional-cert/TKH6JC3HGVKZ)

LANGUAGE PROFICIENCY

INDONESIAN LANGUAGE (NATIVE)

ENGLISH (UPPER INTERMEDIATE)

- ELPT ITB Score: **126** or (**563-570**) if converted to TOEFL PBT Score (Listening: 39, Structure and Written Expression: 46, Reading: 41) **test taken March 29th 2019**
- TOEFL ITP Score: **537** (Listening: 55, Structure and Written Expression: 50, Reading Comprehension: 56) **test taken March 16th 2017**