

## Harjeet Singh

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House 51, Surrey court, GU2 7JN, UK

## PLC, HMI, SCADA, IoT

Artificial Intelligence, Machine Learning

Industry Automation 4.0

**MSc Artificial Intelligence, University of Surrey, United Kingdom**

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## Professional Summary

Innovative IoT, PLC, SCADA Engineer with 14 years of experience in application design, development, and testing. Specialized in delivering over 20 projects in industry automation, automobile testing automation, utilizing machine learning and artificial intelligence. Proficient in Python, Influx DB, SQL, MQTT, and edge devices, with a dedicated focus on advancing AI technology. Strong knowledge of process industry and powertrain test beds. Excellent communication and leadership skills.

## Employment

**Direk Limited, Principal IoT Consultant**, product owner, United Kingdom, Jan-2024 – Working

- Automation platform integration with power, Environmental, Gas, vibration and Industry 4.0 modules.
- Embedded and python communication protocol LoRaWAN, NB-IoT, BLE, RTU, Zigbee, WiFi, BMS Integration.

**Armfield Limited, Software Engineer**, United Kingdom, Mar 2023 - Dec 2023

- Products development using Machine learning, PLC, SCADA, HMI, Raspberry Pi, Arduino programming.
- Software development using python and Node-Red integrated with Svelte app software for standalone SPM machines.

**AVL India, Subsidy AVL Austria, IoT and utility applications Manager**, India, 2019-2023

- Designed, conceptualized and implemented Industry 4.0 factory automation 6+ projects.
- Delivered projects for automation, control philosophy, network architecture for 10+ automobile OEMs.
- Implemented data acquisition, storing, retrieval for OEE, plant maintenance and production reporting.
- Tools : Python, InfluxDB, SQL, Linux , MQTT, Grafana, Node-Red, Raspberry-pi, Arduino.
- Packages: Scikit-Learn, NumPy, Pandas, Matplotlib, Pytorch, Tensor Flow, Open-CV.
- Statistics/ML/DL/AI: Statistical Analysis, Linear/Logistic Regression, CNN, transformers, vision based projects.
- Projects: Cummins (UK , China), Daimler, Mahindra & Mahindra, Perkins, Maruti Suzuki, iCAT.
- Products developed: Coolant condition unit, Oil conditioning unit, Engine starting system.

**AVL India, Subsidy AVL Austria, System Designer**, IoT and utility applications, 2014-2019

- Team member of 10+ engineers for AVL powertrain test bed utilities control system designing, PLC, SCADA, HMI, programming and commissioning.
- Developed AVL PUMA2 communication driver for testbed and coolant conditioning systems, special purpose.
- Automated BMS / BACS includes HVAC, Fuel, Battery testing, Building access, Power Monitoring & reporting.
- Engineered automobile OEMs testbed automation for engine R&D and production lines.

**AVL India, Subsidy AVL Austria, Engineer**, India, 2011-2014

- Managed 8+ engineers team for AVL powertrain test bed utilities control system designing and programming.
- Hands on experience on AI, ML, DL, PLC, HMI, SCADA, E-Plan, Auto CAD, PCB design.
- BMS / BACS automation includes HVAC, Fuel, Building access, Power Monitoring etc.
- Successfully developed industry communication protocols drivers in python language.

**Punj Lloyd Limited, Engineer**, Doha Qatar, 2008-2011

- PLC programming in ladder logic, robotics, automatic oil and gas refinery operations automation.
- Hydrocarbon fuel management programming, maintaining. Monitoring by fire and gas system.

## Education

- **Master of Science in Artificial Intelligence**, University of Surrey, United Kingdom, 2023-2024

Majors: Vision, speech and signal processing, Machine learning, AI Health, Natural language processing (NLP), Deep learning, AI programming. Percentage 76%.

Dissertation title: Implementation of AI techniques to simulate the Proton Exchange Membrane (PEM) water electrolyser behavior for green hydrogen production.

- **Bachelor of Technology in Electrical and Electronics Engineering**, Guru Gobind Singh IP University India, 2005-2008, Percentage 76%.

- **Diploma in Electrical Engineering**, Board of Technical Education, India, 2001-2005 Percentage: 75%.

## Value to Employer

- Machine learning ML, Deep learning DL, Artificial Intelligence AI, conceptualization, designing of system, project deployment, execution and testing.

- Providing technical support and leadership to cross functioning teams working to improve product and project.

- Refine workflow processes within software development environment.

## Additional projects completed

- Natural language processing involved sentiment analysis of sentences using both supervised and unsupervised methods in Python.

- Identification of heart murmurs from .wav files, including model training and testing in Python.

- Implementation of an image retrieval project in Matlab based on image descriptors.

- Knife classification in real-world images using various architectures, including EfficientNet, MobileNetV2, ResNet, SResNet, DenseNet, RegNet, ViT (Vision Transformer), Swin Transformer, MixNet, and ResNeSt.

- Utilizing AI techniques to simulate the behavior of Proton Exchange Membrane (PEM) water electrolysis in green hydrogen production, employing methods such as KNN, linear regression, decision tree, random forest, and ensemble techniques (Similar to physical fuel cell models). Digital Twin / Digital Thread, in an engineering environment.

## Competition participation

- Successfully won the Santander Propeller Fund UK award of the year 2023 for the best business idea and implementation based on sustainable AI and IoT industry 4.0.

- Successfully completed the development of NLP sentiment analysis based on machine learning models.

## Software knowledge

**PLC Automation:** TIA portal, Wincc, Studio 5000 Logix Designer, GX Works, Automation Studio.

**Software:** Python, Java Script, SQL, Influx DB, C, C++, Foxpro. Mysql, DBMS, RDBMS, Matlab, Multisim, Circuit maker, E-TAB, Power Factory (DIgSILENT), Auto CAD, E-Plan, EasyEDA.

**Communication protocol:** Profinet, Profibus, Bacnet, Modbus TCP/RTU, OPC, CCLink, EtherNet/IP, DeviceNet, ControlNet, Profisafe, AK protocol etc.

**Artificial Intelligence:** Pytorch, Tensor flow, Keras, Scikit-learn, NLTK (Natural Language Toolkit).

## Certification

- Siemens PLC certification on fail safe programming.

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