

DIEGO HIDALGO

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Languages: Spanish (Native), English (C2), German (C1), Chinese Mandarin (B1)



Education



Master in Mechanical and Automation Engineering National Taipei University of Technology (Taipei, Taiwan)

GPA: 4.00

09.2015 - 07.2017

- Implemented a metal bending track-follow system, using a **6-DOF robot**, for **FOXCONN Technology Group**.
- Developed an automatic accuracy tuning methodology for **five-axis CNCs**.



Bachelor in Mechatronics Engineering University of the Armed Forces - ESPE (Quito, Ecuador)

GPA: 3.32 (18.13 points out of 20)

03.2009 - 09.2014

- Engineered a universal **re-programmable plate cam system** (complete mechatronics development).
- Built, modeled and controlled **mechatronics systems** (pneumatic, hydraulic, electric).



Working Experience



Research Associate Technical University of Munich (Germany)

09.2019 - Present

- Developed controllers for **in-hand manipulation** with **multi fingered robot hands** and **7-DOF robot arms**.
- Devised algorithms to analyze **human-object interactions** and applied results into **robotic grasping**.
- Designed anthropomorphic **robot hands and arm prosthetic devices**.
- Taught and coordinated the Cyathlon Challenge course.
- Cooperated with the TU Dresden for FPGA-accelerated algorithms for **human in the loop** control of robot hands.
- Supervised 3 Master's theses, 1 Bachelor's thesis, 4 Forschungspraxis, and 80+ students (Cyathlon course).
- Published 8 scientific articles, reviewed 3 journal articles (IEEE RA-L).



Part time scientific and academic tutor Gjun - 巨匠線上真人 (Taiwan)

10.2018 - 07.2019

- Tutored peers on scientific technical writing and academic reports in both English and Spanish.



Independent Researcher XII Latin American Botanical Congress (Ecuador)

05.2018 - 10.2018

- Revised and assessed scientific articles related to **mechatronics-related botanical technologies**.
- Developed **algorithms** to classify scientific articles and deuplicate **databases**.



Research and Project Assistant National Chung Hsing University (Taiwan)

09.2017 - 02.2018

- Built a tool **interpolation simulation software** for the HEIDENHAIN TNC-640 controller for **five-axis CNCs**, achieving a real-world accuracy resemblance of 80%.
- Devised a servomotors' **parameter identification** method using **Particle Swarm Optimization**, guaranteeing an accurate five-axis system simulation.
- Supervised 3 Master's students' theses related to **system identification** and **multiple axis control**.



Assistant Engineer Industrial Technology Research Institute (Taiwan)

03.2016 - 11.2016

- Created an algorithm for the circularity value of tool center points using **machine learning** (precision of 10um).
- Tuned automatically **control gains of servomotors** of a five-axis CNC, enhancing its overall accuracy by 87%.
- Enhanced **five-axis CNC contouring accuracy**, achieving an improvement on circularity values of 80%.



Maintenance Analyst

Reybanpac C.A. - Reyleche (Ecuador)

11.2014 - 07.2015

- Coordinated **maintenance programs** for Tetra Pak Machines.
- Designed an **automatic milk bags packing system (control using ladder logic)**.
- Coordinated administrative procedures for the maintenance department.

Assistant Engineer

Public Metropolitan Company for Water Treatment (Ecuador)

03.2014 - 09.2014

- Improved the **visualization** and **programming structure of HMIs** to **monitor and control** one of the piping systems of water distribution in Quito, Ecuador.



Professional Skills

Robotics

Robot Operating System (ROS)
Motion planning in **robot hands**
Dynamics simulation with **Copelia and Mujoco**
Synergistic control of robot hands
Position and velocity control for UR5 and Panda robots
Real time interface with **VICON Motion Capture System**

Machine Learning

Linear and Logistic Regression / Neural Networks

Programming

Software Development
Python / C# / C++ / Matlab / Labview

Microcontrollers

Flowcode(PIC and AVR) / MPLab / PICC / BASCOM / Arduino

Image and Point Cloud Processing

Classical vision: Sharpening / Smoothing / Feature Extraction / Noise Filtering
3D point cloud registration (**3D Scanners**)
3D mesh processing

Mechatronics Design

Mechanical **design** and **documentation** / drawings
Development and programming of control systems / **simulation and real world systems**
Development of mechanical and electronic hardware / **monitoring**

Control Systems

Classic / Fuzzy logic / Neural Networks

CAD/CAM/CAE

SolidWorks / Autocad(3D, P&ID, Plant) / Ansys / Siemens NX6

Electronic Design

Isis Proteus Professional (Schematics and PCB design)

Industrial Automation

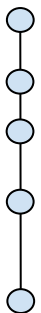
Programmable Logic Controller (PLC)
Step 7 / Concept / RSLogix

Data Acquisition

National Instruments (**DAQ**)



Awards and Community



Awarded with the **Excellence Recognition for The First Place on Academic Honor Roll** in the academic year 2016-2017 at National Taipei University of Technology.

Granted with the National Taipei University of Technology's **Foreign Student Scholarship** in 2016 and 2017.

Awarded with a **Medal of Honor** for having achieved the highest graduation score in the faculty of Mechatronics during the Academic Year 2013-2014 at the University of the Armed Forces - ESPE.

Accelerated Basic Training, 2012

Taught 80 hours of Math and Geometry to 64 students with social problems and prone to dangerous behaviors. Students were able to solve multivariable systems of equations and understand basic properties about regular polygons.

Un Techo para mi país (A roof for my Country), 2010

Our team (6 people) collected ~1500 USD in a period of 15 days to build houses for homeless people from rural areas of the highlands of Ecuador.



Publications

- Hidalgo-Carvajal, D., Chen, H., Bettelani, G., Jung, J., Zavaglia, M., Busse, L., Naceri, A., Leutenegger, S., & Haddadin, S. (2023). **Anthropomorphic Grasping with Neural Object Shape Completion**. IEEE Robotics and Automation Letters. (Final publication stage)
- Hidalgo-Carvajal, D., Naceri, A., & Haddadin, S. (2023). **From Human Hand to Grasp Surface Detection, Tracking & Analysis**. In 2023 45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE. (Final publication stage)
- Groß, S., Hidalgo-Carvajal, D., Breimann, S., Stein, N., Ganguly, A., Naceri, A., & Haddadin, S. (2023, May). **Soft Sensing Skins for Arbitrary Objects: An Automatic Framework**. In 2023 IEEE International Conference on Robotics and Automation (ICRA) (pp. 12507-12513). IEEE.
- Hidalgo-Carvajal, D., Valle, C. M. C., Naceri, A., & Haddadin, S. (2022, November). **Object-Centric Grasping Transferability: Linking Meshes to Postures**. In 2022 IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids) (pp. 659-666). IEEE.
- Hidalgo-Carvajal, D., Herneth, C., Naceri, A., & Haddadin, S. (2022). **End-to-End From Human Hand Synergies to Robot Hand Tendon Routing**. IEEE Robotics and Automation Letters, 7(4), 10057-10064.
- Naceri, A., Boccardo, N., Lombardi, L., Marinelli, A., Hidalgo, D., Haddadin, S., ... & De Michieli, L. (2022). **From human to robot grasping: force and kinematic synergies: Close comparison between human and robotic hands in both force and kinematic domain**. In Tactile Sensing, Skill Learning, and Robotic Dexterous Manipulation (pp. 133-148). Academic Press.
- Seppich, N., Tacca, N., Chao, K. Y., Akim, M., Hidalgo-Carvajal, D., Pozo Fortunić, E., ... & Haddadin, S. (2022). **CyberLimb: a novel robotic prosthesis concept with shared and intuitive control**. Journal of NeuroEngineering and Rehabilitation, 19(1), 41.
- Aßmann, U., Chen, L., Ebert, S., Göhringer, D., Grzelak, D., Hidalgo, D., ... & Podlubne, A. (2021). **Human-robot cohabitation in industry**. In Tactile Internet (pp. 41-73). Academic Press.
- Solarte-Pardo, B., Hidalgo, D., & Yeh, S. S. (2019). **Cutting insert and parameter optimization for turning based on artificial neural networks and a genetic algorithm**. Applied sciences, 9(3), 479.
- Book:** Hidalgo, D., & Céspedes, J. (2018). **Levas Electrónicas: Evolucionando el diseño mediante la Mecatrónica**. Editorial Académica Española.
- Hidalgo, D., & Yeh, S. S. (2018). **Development of an analyzing and tuning technology for improving circularity of cone-frustum motions of five-axis CNC machine tools**. The International Journal of Advanced Manufacturing Technology, 97, 3283-3297.
- Hidalgo, D., Yeh, S. S., & Lee, J. I. (2017). **A frequency domain approach for tuning control parameters of CNC servomotors to enhance its circular contouring accuracy**. Procedia CIRP, 63, 372-377.
- Lin, H. I., & Carvajal, D. H. (2016, November). **Automatic following in a sheet metal bending process**. In 2016 International Automatic Control Conference (CACS) (pp. 137-142). IEEE.