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Mario Alberto Mata Soto

Mechatronics Engineer

Education

2016–2022 **Mechatronics Engineering**, Instituto Politécnico Nacional (IPN) - UPIITA.
Ave. Instituto Politécnico Nacional 2580, Gustavo A. Madero, Mexico City.

2013–2016 **Technician in Digital Systems**, Instituto Politécnico Nacional (IPN) - CECyT 9.
Mar Mediterráneo 227, Miguel Hidalgo, Mexico City.

Experience

December 2015-June 2016 **Maintenance Assistant**, Sistema de Transporte Colectivo (STC) - PCC II.
Delicias 67, Cuauhtémoc, Mexico City.
Maintenance and development of infrastructure and electromechanical equipment; capture and updating of maintenance reports and organization of technical documents; identification, analysis and solution of points of failure in the electronic equipment.

Professional Skills

Computing

- Structured and object-oriented programming.
- Program analysis and design.
- Microcontroller programming.

Languages: C, C++, Java, Python, HTML, CSS, JavaScript.

Scientific software: MATLAB, Simulink, Mathematica, LabVIEW.

Other: Microsoft Office, Visual Studio Code, GeoGebra, LATEX, Adobe Premiere Pro, Adobe Photoshop.

Electronics

- Design of electrical and electronic circuits, and components selection.
- Design and manufacture of PCBs.
- Design and implementation of control and automation systems.
- Interpretation and analysis of electrical diagrams.
- Handling and operation of tools and equipment for the implementation and diagnosis of electrical and electronic systems.

Software: Proteus Design Suite, Multisim, EAGLE, MPLAB.

Mechanics

- Design and selection of mechanical elements.
- Interpretation and analysis of drawings.
- Handling and operation of tools and equipment for the implementation and diagnosis of mechanical systems.

Software: SolidWorks, ANSYS Workbench, COMSOL Multiphysics.

Aptitudes & Attitudes

- Adaptability.
- Creativity.
- Team worker.
- Leadership.
- Time management.
- Communication effective.
- Self-taught.
- Analytical thinking.
- Initiative.
- Committed.
- Patient.

Languages

Spanish (Native speaker) English (B1) German (60 hrs course/ Non-certified)

Hobbies

Playing the guitar and keyboard
Music composition and production
Videogames
Photography and video
Audiovisual content editing
Walking

Projects

January 2020-August 2021 **Design and implementation of a tortilla machine head to control the tortilla forming parameters**

A mechatronic system designed to produce corn tortillas, with 3 commercial sizes and thickness from 1 to 3 millimeters, using a GUI to control the production and obtain its most relevant statistics. The tortilla machine head presents an improvement in energy consumption compared to commercial models.

Tasks performed:

- Image processing using MATLAB and Python.
- Design and selection of mechanical elements (SolidWorks, ANSYS Workbench).
- PCBs design and sensor/actuator selection and conditioning (Proteus Design Suite).
- Design of the algorithms for system control using Simscape.

November 2020-December 2020 **Design of an application in MATLAB for the recognition of dominoes**

Machine vision application capable of recognizing dominoes, using Hu invariant moments and neural networks.

Tasks performed:

- Calculation of the invariant moments of Hu for each domino.
- Neural network and image processing programming.

May 2020-July 2020 **Design and simulation of a 2 DOF robot using SolidWorks and Simulink**

Modeling and simulation of a 2 DOF robot to implement different control laws and test its performance in trajectory tracking.

Tasks performed:

- Use of SolidWorks with Simscape for simulation and validation.
- Programming of control laws and trajectory generators (MATLAB, Simulink).

August 2019-December 2019 **Design of an automatic system for efficient cleaning of photovoltaic arrays**

A mechatronic, intelligent and autonomous cleaning system, designed to remove dirt by means of microfiber to prevent deterioration and loss of efficiency in solar panel arrays.

Tasks performed:

- Programming of the control algorithms in STM32F446 system (C++).
- Design and selection of mechanical elements (SolidWorks).
- PCBs design and sensor/actuator selection and conditioning (Multisim, EAGLE).

January 2017-July 2017 **Modeling and implementation of a 4-bar mechanism**

Modeling and implementation of a 4-bar mechanism to verify the kinematic and dynamic model using Simulink.

Tasks performed:

- Obtaining the kinematic and dynamic model of the mechanism.
- Mechanism control implementation using Simulink and Arduino.

January 2016-July 2016 **Design and implementation of a system for T-shirt folding**

A system designed to simplify the task of folding T-shirts.

Tasks performed:

- Programming of the control algorithm in a PIC16F877a microcontroller (MPLAB).
- Design and implementation of the PCBs for power supply and control of the system (Proteus Design Suite).