David G. Shatwell

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Summary

I am a Peruvian electrical engineer with 4 years of research experience in computer vision. In the past, I have worked in mining and health companies, developing algorithms using a wide variety of cameras to solve industry-related problems. These experiences have led me to write scientific papers and filed a patent. In the future, my goal is to pursue a PhD in computer vision and have the opportunity to work on challenging problems with top researchers in the field.

Education

2015 - 2020 **Universidad de Ingenieria y Tecnologia - UTEC** (GPA: 16.33/20)
Bachelors degree in Electrical Engineering
Class ranking: 1st place

2008 - 2014 **Santa Maria Marianistas School** (GPA: 17/20)
Class ranking: top 10th

Research & Work Experience

Hochschild Mining - R&D Engineer/Junior R&D Engineer/R&D Intern Mar 2019 - present

- Developed a computer vision algorithm for automatic mineral classification using color analysis, texture analysis and neural networks. The algorithm has an accuracy of 95% and a maximum processing time per image of 44 ms.
- Improved existing mineral classification algorithm by adding hyperspectral images to the classification pipeline, which increased accuracy to 97%.
- Designed a machine to test new classification algorithms, consisting of a conveyor belt, a line-scan color camera, a 3D profiling camera and two industrial LED bars. Developed software to synchronize the images acquired by both cameras.
- Wrote papers and patents, presented projects to the board of the company and in conferences, supervised the ore sorting research lab, created and managed budgets for the project.

Work & Health - Computer Vision Consultant Sep 2020 - Sep 2021

- Developed an algorithm leveraging OpenPose's keypoint and segmentation models to estimate anthropometric measurements from patient images.
- Developed an algorithm to detect temperature anomalies in different regions of patients' backs, as a proxy for detecting muscle injuries, using OpenPose and fusing color and thermal sensor images.

Jicamarca Radio Observatory - R&D Intern Jan 2019 - Mar 2019

- Developed a data transmission system to receive data from a radar and send it to a remote computer using Gigabit Ethernet. The system consisted of custom hardware components implemented on an FPGA and a program written in C running on the microprocessor.

UTEC - Teaching Assistant of Digital Circuits Lab Mar 2018 - July 2018

- Assisted Dr. Jimmy Tarrillo in designing lab activities, supervising students and grading lab reports. The lab activities consisted on using FPGAs to implement digital circuits with increasing levels of complexity: from logic gates to finite state machines.

Projects

Classification of Satellite Images based on their Type of Terrain GitHub

– Developed a satellite image analysis algorithm based on terrain classification that is able to identify up to five classes of terrain.
– The algorithm works by classifying small regions with local color and texture using machine learning.
– After evaluating five different classification algorithms, we found that convolutional neural networks achieved the best accuracy.

2-DOF PID Control of the Angular Position of an Industrial Plant Emulator GitHub

– Compared the performance of using traditional PID and 2-DOF PID controllers on a plant with a rotary load.
– When subjected to several disturbances, the 2-DOF PID controller has lower steady state error and settling time.
– Paper presented in IEEE conference.

Awards & Achievements

UTEC First Class Honors: Awarded to students with the highest GPA of their class on graduation.

UTEC Undergraduate Thesis Honors: Achieved the highest possible grade on thesis dissertation.

UTEC Undergraduate Thesis Competition: Achieved second place on competition that seeked to reward thesis projects with the potential to be published in high-impact scientific journals.

UTEC Academic Achievement Scholarship: Granted each term to the two students with the highest GPA of the program.

TOEFL: 115/120 (reading: 30, listening: 28, speaking: 27, writing: 30)

Preprints

[1] D. Shatwell, V. Murray, and A. Barton, "Real-time mineral classification using color and texture analysis,"

[2] D. Shatwell, A. Weston, and O. Ramos, "Classification of satellite images based on their terrain,"

Publications

[1] D. Shatwell, F. Salazar, and A. Rojas–Moreno, "2–dof pid control of the angular position of an industrial plant emulator," in *2020 IEEE XXVII International Conference on Electronics, Electrical Engineering and Computing (INTERCON)*, IEEE, 2020, pp. 1–4.

Patents

[1] A. Barton, V. Murray, and D. Shatwell, *Method and system for the automatic classification of rocks according to their minerals*, US patent application 17/774,492, EU patent application EP22173223.3, 2022.

Skills

Programming	MATLAB, Python, C++
Technologies	Linux, microcontrollers, FPGAs, 3D modelling
Languages	Spanish (native), English (advanced)