CH

CARLOS HINOJOSA

COMPUTER SCIENTIST & ENGINEER

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WEB PAGE

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LINKEDIN

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PROFILE

Computer scientist and engineer with over six years of experience in scientific research and software development. I received the B. Sc. and M. Sc. degrees in Computer Science from Universidad Industrial de Santander, Colombia, in 2015 and 2018, respectively. Currently, I am pursuing a Ph.D. in Computer Science at Universidad Industrial de Santander. My research interests are in computer vision, machine learning, computational imaging, sparse representation, and signal processing. I also have developed scientific software for companies like Ecopetrol S.A and my university under distinct research projects. I have experience with different programming languages, including C/C++, Java, C#, Javascript, MATLAB, Typescript, Python, and Bash scripting in Linux-like operating systems. Furthermore, I have experience with Linux system administration and hybrid mobile app development with different frameworks like Ionic, React, and Cordova.

PERSONAL INFORMATION

GIVEN NAME	LAST NAME	AGE
CARLOS ALBERTO	HINOJOSA MONTERO	26

NACIONALITY	IDENTITY DOCUMENT
COLOMBIANA	C.C: 1'065.653.948

RESIDENCE

CRA 25 # 19 - 30 APTO 801, BUCARAMANGA, COLOMBIA

REFERENCES

FULL NAME
PATRICK LLULL

OCCUPATION
OPTICS HARDWARE ENGINEER AT GOOGLE

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315 614 1749

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FULL NAME
HENRY ARGUELLO

OCCUPATION
PROFESSOR AT UNIVERSIDAD INDUSTRIAL DE SANTANDER

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EXPERIENCE

SPECIALIZED PROFESSIONAL, COOPERATION FRAMEWORK AGREEMENT 5222395, UIS-ECOPETROL

UNIVERSIDAD INDUSTRIAL DE SANTANDER (UIS) | JANUARY 2019 – PRESENT

- Design an algorithm for the conversion of 3D RMS time velocities to 3D interval velocities in depth using Image rays.
- Implement the designed algorithm using NVIDIA Cuda.
- Validate the algorithm using 3D real seismic image datasets.

SPECIALIZED TECHNICAL SUPPORT FOR ECOPETROL S.A

COOPERATIVA DE TECNÓLOGOS E INGENIEROS DE LA INDUSTRIA DEL PETRÓLEO Y AFINES (T.I.P.) | JUNE 2018 – DECEMBER 2018

- Technical report and stabilization of a plugin in DecisionSpace Geosciences for 2D interactive picking in time and depth domains.
- Test report of the 2D interactive picking plug-in in DecisionSpace Geoscience.
- Training workshop on the plug-in tool.
- Technical documentation of the productive version of the 2D interactive picking plug-in.

YOUNG RESEARCHER COLCIENCIAS

UIS - COLCIENCIAS | MAY 2017 - MAY 2018

- Determine the distribution of pixels in a coded aperture responsible for saturation of a multispectral sensor and to analyze how these saturated compressed measures affect the reconstruction of the multispectral image.
- Identify the pixels of the coded aperture responsible for saturation in each of the pixels of the sensor used by analyzing the mathematical model of a compressive acquisition system of multispectral images.
- Design and implement an adaptive computational algorithm capable of generating grayscale coded apertures to reduce the saturation in the sensor of a compression acquisition system of multispectral images.
- Validate, employing computer simulation, the grayscale coded apertures generated by the developed algorithm, to analyze its impact on the dynamic range of multispectral image reconstructions.
- Disseminate the results of the research developed by developing a publishable article that exposes the problem addressed, and the algorithm developed to solve it.

RESEARCHER

MS THESIS: CODED APERTURE DESIGN FOR COMPRESSIVE SPECTRAL IMAGING SUBSPACE CLUSTERING | MAY 2016 – DECEMBER 2017

- Design and simulate a set of coded optical apertures for a compressive acquisition system of spectral images to perform unsupervised classification (clustering) directly on compressed measurements.

PROFESSOR

UNIVERSIDAD INDUSTRIAL DE SANTANDER | JULY 2016 – SEPTEMBER 2016

- Taught computer programming using C and C++ language.

SOFTWARE ENGINEER AND RESEARCHER - COLCIENCIAS

RESEARCH PROJECT FINANCED BY COLCIENCIAS | SEPTEMBER 2016 – MAY 2017

PARTICIPATING ENTITIES: ISL SAS, SOCIEDAD AGRONOMOS DE SANTANDER, GRUPO HDSP

- Support in the design of the software architecture for client-server communication of the Qltivo mobile application.
- Support in the design of an algorithm for the extraction of the NVDI and GRVI vegetation indices, chlorophyll content and nitrogen content in RGB images acquired through the mobile phone camera.
- Implementation of the algorithm designed in C/C ++ language, using the OpenCV vision free library for image processing.
- Support in the preparation of scientific documents describing the results obtained by the algorithm implemented.

SOFTWARE ENGINEER AND RESEARCHER
UIS - ECOPETROL ALLIANCE AC. 09 | APRIL 2016 – MARCH 2017

- Support in the design and implementation of an image ray method, in Java programming language, for the development of a module, in the DecisionSpace Geoscience software, for the seismic velocity estimation and conversion from time to depth.

SOFTWARE ENGINEER AND RESEARCHER
UIS - ECOPETROL ALLIANCE AC. 04 | NOVEMBER 2014 – DECEMBER 2015

- Design and implementation of an algorithm for the detection and elimination of Ground Roll noise in Seismic Images using the Curvelet transform.
- Development of a module, in C / C ++ programming language, for the SeisSpace ProMAX software that implements the developed algorithm.

RESEARCHER
ENGINEERING DEGREE THESIS: COMPRESSIVE SENSING OF MULTISPECTRAL IMAGES USING DETECTORS BASED ON ARRANGEMENTS OF OPTICAL FILTERS AND A DISPERSIVE ELEMENT | JUNE 2015 – NOVEMBER 2015

- To model and analyze a system of compressive sampling of multispectral images using detectors based on arrays of optical filters and a rotating dispersive element.

RESEARCHER
HIGH DIMENSIONAL SIGNAL PROCESSING GROUP (HDSP) | ENERO 2014 – PRESENTE

- Active member of the HDSP group.

EDUCATION

PH.D. (C) IN COMPUTER SCIENCE

UNIVERSIDAD INDUSTRIAL DE SANTANDER | 2018 – PRESENT

- Ongoing studies.

M.SC. IN COMPUTER AND SYSTEMS ENGINEERING

UNIVERSIDAD INDUSTRIAL DE SANTANDER | 2016 – 2018

- Weighted average cumulative: 4.57.

COMPUTER AND SYSTEMS ENGINEER

UNIVERSIDAD INDUSTRIAL DE SANTANDER | 2011 – 2015

- Weighted average cumulative: 4.33.

PROFESSIONAL SKILLS

- Scientific documents writing in LaTEX
- Linux operating system administration
- Scientific computing tools: MATLAB, R, Python
- Knowledge in the use of seismic signal processing and interpretation software: SeisSpace ProMAX, DecisionSpace
- Bash scripting Linux operating systems
- Knowledge in relational and non-relational database
- Development of hybrid and non-hybrid mobile applications
- Front-End and Back-End Development

PROGRAMMING LANGUAGES

- C/C++
- Java
- C#
- MATLAB
- R
- Python
- Javascript (JS)
- JS Frameworks: Ionic, Angular, Meteor
- Typescript
- HTML & CSS

PUBLICATIONS

JOURNALS

- Carlos Hinojosa, Jorge Bacca, Henry Arguello, **"Coded aperture design for compressive spectral subspace clustering"**. *IEEE Journal of Selected Topics In Signal Processing*, 2018, vol. 12, no 6, p. 1589-1600. (DOI): 10.1109/JSTSP.2018.2878293.
- Nelson Diaz, Carlos Hinojosa, Henry Arguello, **"Adaptive grayscale compressive spectral imaging using optimal blue noise coding patterns"**. *Optics & Laser Technology*, 2019, vol. 117, p. 147-157. (DOI): 10.1016/j.optlastec.2019.03.038.
- Karen Sanchez, Carlos Hinojosa, Henry Arguello, **"Supervised spatio-spectral classification of fused images using superpixels"**. *Applied Optics*, 2019, vol. 58, no. 7, p. B9-B18. (DOI): 10.1364/AO.58.0000B9.
- Claudia V. Correa, Carlos A. Hinojosa, Gonzalo R. Arce, Henry Arguello, **"Multiple snapshot colored compressive spectral imager",** *Optical Engineering* 56(4), 041309 (21 December 2016). (DOI): 10.1117/1.OE.56.4.041309.

CONFERENCE PAPERS

- Carlos Hinojosa, Jorge Bacca, Edwin Vargas, Sergio Castillo, Henry Arguello. "**Single-pixel camera sensing matrix design for hierarchical compressed spectral clustering**". I*EEE International Workshop on Machine Learning for Signal Processing (MLSP) 2019*.
- Carlos Hinojosa, Juan Marcos Ramirez, Henry Arguello. "**Spectral-spatial classification from multi-sensor compressive measurements using superpixels**". *IEEE International Conference on Image Processing (ICIP) 2019. p. 3143-3147.* (DOI): 10.1109/ICIP.2019.8803266.
- Carlos Hinojosa, Jorge Bacca, Henry Arguello. **"Spectral imaging subspace clustering with 3-D spatial regularizer"**. *Digital Holography and Three-dimensional Imaging. Optical Society of America, 2018. p. JW5E. 7.* (DOI): 10.1364/3D.2018.JW5E.7.
- Karen Sanchez, Carlos Hinojosa, Henry Arguello. **"Supervised classification of hyperspectral images using side information"**. *Laser Applications to Chemical, Security and Environmental Analysis. Optical Society of America, 2018. p. JW5E. 5*. (DOI): 10.1364/3D.2018.JW5E.5.
- Jorge Bacca, Carlos Hinojosa, Henry Arguello. **"Kernel Sparse Subspace Clustering with Total Variation Denoising for Hyperspectral Remote Sensing Images"**. *In Mathematics in Imaging (pp. MTu4C-5). Optical Society of America, 2017.* (DOI): 10.1364/MATH.2017.MTu4C.5.
- Carlos Hinojosa, Claudia V. Correra, Henry Arguello. **"Compressive spectral imaging using multiple snapshot colored-mosaic detector measurements"**. *In Proc. SPIE-Computational Imaging, 2016, vol 9870, page 987004*. (DOI): 10.1117/12.2224369.
- Carlos Hinojosa, Hoover Rueda, Henry Arguello. **"Analysis of Matrix Completion algorithms for spectral image estimation from compressive coded projections"**. *20th Symposium on Signal Processing, Images and Computer Vision (STSIVA), Bogota, 2015, pp. 1-7*. (DOI): 10.1109/STSIVA.2015.7330441.

ACCOMPLISHMENTS

NEURAL NETWORKS AND DEEP LEARNING | NOVEMBER 2019 – DECEMBER 2019

- Coursera
- Duration: 40 hours.

MIMETIC DISCRETIZATION METHODS | AUGUST 2017

- XI Colombian Congress of Numerical Methods
- Duration: 3 hours.

THE WAVE EQUATION IN GEOPHYSICS | AUGUST 2017

- XI Colombian Congress of Numerical Methods
- Duration: 3 hours.

APPLICATIONS OF INFORMATICS: GOOGLE FOR COLLABORATIVE LEARNING | JULY 2016 – SEPTEMBER 2016

- CEDEDUIS, Universidad Industrial de Santander.
- Duration: 30 hours.

CCNA ROUTING & SWITCHING: INTRODUCTION TO NETWORKS | SEPTEMBER 2014 – NOVEMBER 2014

- CISCO Networking Academy.
- Duration: 70 hours.

CCNA ROUTING & SWITCHING: ROUTING AND SWITCHING ESSENTIALS | MAY 2014 – JULY 2014

- CISCO Networking Academy.
- Duration: 70 hours.

USE OF CLASSES, OBJECTS, METHODS AND SEQUENTIAL FILES IN POO WITH PROGRAMMING LANGUAGE C++ LEVEL III | APRIL 2010 – MAY 2010

- Colombian National Learning Service (SENA)
- Duration: 40 hours.

MODULES, STORAGE STRUCTURE AND POO USING THE PROGRAMMING LANGUAGE C++ LEVEL II | NOVEMBER 2009 – DECEMBER 2009

- Colombian National Learning Service (SENA)
- Duration: 40 hours.

DISTINCTIONS

ACADEMIC EXCELLENCE AS A RESEARCH HOTBED

HDSP group, Universidad Industrial de Santander | December 2016

ASSOCIATIONS

IEEE COMPUTER SOCIETY - STUDENT MEMBER

IEEE SIGNAL PROCESSING SOCIETY - STUDENT MEMBER

OPTICAL SOCIETY OF AMERICA (OSA) – STUDENT MEMBER

EXTERNAL LINKS

- Colciencias CVLAC: https://rebrand.ly/Carlos_Hinojosa_CVLAC
- Personal webpage: http://carloshinojosa.me/
- Linkedin: https://linkedin.com/in/phdcarloshinojosa
- Google Scholar: https://scholar.google.com/citations?hl=es&user=KP02_jwAAAAJ
- ResearchGate: https://www.researchgate.net/profile/Carlos_Hinojosa2
- ORCID: https://orcid.org/0000-0001-9286-9587