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Ricardo Abel Espinosa Loera, MSc.

Profile

Associate professor and researcher in Artificial Intelligence and Computer Vision topics. Lecturer in different subjects as Machine Learning, Web Development and Advanced Programming. Leader in several industrial projects applying computer vision techniques with machine learning algorithms in industrial production lines. I am currently interested on research in deep learning-based vision with different implementations.

Work Experience

Assistant Professor – Universidad Panamericana (2018 > Present)

Bachelor of Engineering (BEng) Artificial Intelligence Director.
Lecturer in topics: Algorithms and Data Structures, Artificial Intelligence, Web Programming.

Project manager & cofounder – Smart App Software Technologies (2017 > 2019)

Project Leader in computer vision implementation for Nissan Mexicana Power Train Engine Plan 1 Aguascalientes Mexico.
Project Leader in a Correct Click Sound Detection system for Jatco Plant 1 Aguascalientes Mexico **(Mexican patent approved by IMPI)**.

Software Engineer & Project Manager – Backtrend (2015 > 2017)

Solution Architect, Project Manager and Software in the implementation area working with clients (John Deere, American Express, Ban Regio, Keysight, etc.) developing digital invoice systems implementing agile methodologies as Scrum and mobile technologies as .Net Frameworks, Xamarin and web technologies (ReactJS, PHP, NodeJS, Angular).

Education

Bachelor of Engineering (BEng) Artificial Intelligence. (2008 > 2014)

Universidad Panamericana campus Aguascalientes

Strong skills in data structures and algorithms, digital image processing and machine learning.

MSc in Computer Science. (2018-2020)

Universidad Panamericana campus Aguascalientes

Researcher in project for HAR (Human Activity Recognition) focusing in a fall detection system using Deep Learning Techniques CNN (Convolutional Neural Networks) to detect falls with a multicamera approach and a public multimodal data set released by our research group named "UP-Fall detection dataset" implementing computer vision techniques and deep learning-based approach. ***Second place in best master thesis award "José Negrete" 2020 by Mexican Society for Artificial Intelligence.***

Ph.D. in Computer Science. (2021-Present)

Co-mentorship Centre de Recherche en Automatique de Nancy / Universidad Panamericana.

Ph.D. student at (CRAN) with name of thesis "Endoscopic View Enhancement using Deep Learning-based 3D Reconstruction Techniques in colonoscopy applications". Exploring deep learning-based and classical computer vision techniques in order to improve the 3D reconstruction of the colon cavities.
Supervisors: Prof. Christian DAUL (CRAN) and Prof. Gilberto Ochoa (UP).

Projects

- Band gap prediction with 3 RGB planes images on organic crystal structures.

  Band gap prediction on a large-scale public data set of crystal structures using 3 RGB images from planes xy, xz, and yz from 3d reconstruction of organic crystal structures applying computer vision techniques and deep learning CNN to regression the band gap.

- Fall detection system using images from multiples cameras.

  Fall detection and Human activity recognition system deep learning-based with optical flux algorithm as feature extraction preprocessing technique on "UP Fall Detection DataSet".

- Quality assurance vision-based system on production line assembly.

  Vision-based system to detect Ok or NG assemblies on production line of car engines applying different computer vision techniques over different materials and surfaces using machine learning techniques to ensure quality.

Software Skills

- Machine Learning-Data Science.

  Python, Machine Learning Libraries (SciKit Learn, Numpy, Matplotlib, Pandas, Tensorflow , Keras, PyTorch).

- Image Processing, Computer Vision.

  OpenCV, Python, Matlab.

- Programming Languages.

  C++, C#, .Net Frameworks (2.0 to 4), Java, Python, JavaScript, ReactJS, HTML5.

- Data bases engines.

  MySQL, Firebase, SQLServer, MongoDB.

- Graphics engine.

  Unity.

Publications

R. Espinosa, H. Ponce, S. Gutiérrez, L. Martínez-Villaseñor, J. Brieva, and E. Moya-Albor, **"A vision-based approach for fall detection using multiple cameras and convolutional neural networks: A case study using the UP-Fall detection dataset,"** Comput. Biol. Med., vol. 115, 2019.
R. Espinosa, H. Ponce, S. Gutiérrez, L. Martínez-Villaseñor, J. Brieva, and E. Moya-Albor, **"Application of Convolutional Neural Networks for Fall Detection Using Multiple Cameras,"** in Challenges and Trends in Multimodal Fall Detection for Healthcare, H. Ponce, L. Martínez-Villaseñor, J. Brieva, and E. Moya-Albor, Eds. Cham: Springer International Publishing, 2020, pp. 97–120.
R. Espinosa, H. Ponce, S. Gutiérrez **"Click Event Sound Detection Using Machine Learning in Automotive Industry"** in Mexican International Conference on Artificial Intelligence.R. Espinosa, H. Ponce, J. Hernandez **"A 3D orthogonal vision-based band-gap prediction using deep learning: A proof of concept"** in Computational Materials Science 202, 110967

Extra Courses

Massachusetts Institute of Technology
(Semi-presence course) (2017)
Big Data.

Coursera.
(Online course) (2017)
Deep Learning and Computer Vision A-Z™: OpenCV, SSD & GANs.
Deep Learning Specialization (DeepLeaning.AI)