Carlos Torres | Electrical Engineering | Ph.D.

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PROFILE SUMMARY

Driven machine learning and data science researcher with +11 years' experience in industry and academia, planning, managing, and executing technologically ambitious projects. Applications include: insurability risk estimation and smoker likelihood, time-series workflow forecasting, small-object detection, multiple-object tracking, image classification, behavior representation and analysis, edge computing (IoT), and multimodal latent systems. Mentor and manager of engineers and researchers and Principal investigator in DoD research grants.

EDUCATION

- **Doctor's of Philosophy (Ph.D.), University of California, Santa Barbara (UCSB), 2017** in Electrical and Computer Engineering: Computer Vision, Machine Intelligence, Multimodal Distributed Systems, and Healthcare. **Advisor:** B. S. Manjunath. **Thesis:** Multimodal Analytics for Healthcare. Design, fusion, and analysis of multimodal sensor data in natural healthcare environments. – Press Coverage: **MESH**
- **Master's of Science (M.S.) UCSB, 2012** Electrical and Computer Engineering: Signal Processing (M), Control Systems (m), & Machine Intelligence (m).
- **Dual Bachelor's of Science (B.S.) San Jose State University, 2009** in Electrical Engineering: Digital and Analog Circuits and Bioengineering: Chemistry and Biochemistry.

RELEVANT WORK & RESEARCH EXPERIENCE

Mayachitra, Inc., (Santa Barbara, CA) (Mayachitra's site)

Principal Investigator & Senior Researcher (Aug2018 – Present)

- Design, implement, and deploy algorithms and systems for various Department of Defense (DoD) agencies that combine machine learning, signal processing, statistics, and computer vision methods with deep learning.
- Principal Investigator (PI) & author: National Geospatial-Intelligence Agency (NGA) Phase I and II: "Deriving uncertainty estimates for automated observations in aerial imagery".
- Principal Investigator (PI) & author: Officer of Naval Research (ONR) Phase I project: "Multimodal Sentiment-Evolution Analysis for Latent-Risk Estimation".
- Present and submit production grade solutions to the DoD clients (RIFs and STTRs/SBIRs).

Procore Technologies (Carpinteria, CA) (Procore's site).

Senior Lead Data Scientist & Machine Learning Researcher (Nov2016 – Aug2018)

- Devised highly accurate timeliness and response predictive models and systems for Procore's construction management platform.
- Developed internal churn, revenue, and performance forecasts.
- Deployed technical drawings and workflow analysis processes using computer vision and Natural Language Processing, producing two patents.

Carpe Data (Santa Barbara, CA) (Carpe's site)

Chief Data Scientist (Nov2015 – Nov2016)

- Developed and deployed methods to process unstructured and highly uncertain data to estimate insurance risk levels. The methods use NLP/NLU and machine learning principles.
- Designed and prototyped new methods to estimate auto-loss, smoker, and false-claim likelihoods from web-footprint data, resulting in continued revenue-producing services.

UC Santa Barbara, Vision Research Laboratory (Santa Barbara, CA) (VRL's site)
Post-Doctoral Researcher / Specialist, Vision Research Laboratory (Sep 2018–Oct2019).

- Manage projects: (1) methane plume detection via large area hyperspectral overhead imagery and deep learning and (2) behavior analysis on weakly labeled data via Actor Centered Activation Maps.
- Mentor of Masters and Doctoral students in computer vision and deep learning research.

UC Santa Barbara, Vision Research Laboratory (Santa Barbara, CA) (VRL's site)
Graduate Student Researcher (2010–2015)

- Developed methods and algorithms for multimodal sensor fusion for behavior analysis.
- Deployed a multimodal temporal analysis monitoring: healthcare workflows and interactions.

SELECTED GRANTS, AWARDS & FELLOWSHIPS

- **US-NAVY ONR SBIR Phase I Grant. Awarded Mayachitra, Inc., Santa Barbara. Author and PI:** Multimodal Sentiment-Evolution Analysis for Latent-Risk Estimation, Phase I: October 2019 - September 2020.
- **US-NGA SBIR Phase I Grant. Awarded Mayachitra, Inc., Santa Barbara. PI***:* Improving Uncertainty Estimation with Neural Graphical Models, Phase I: September 2018–June 2019.
- **US-ARMY Seed Grant. University of California Santa Barbara. Author:** Multimodal Sensor Network, December 2013–May 2015.
- **National Science Foundation (NSF). University of California Santa Barbara.** Fellowship Recipient, LSAMP Bridge-to-the-Doctorate, September 2009–September 2011.
- **National Institutes of Health (NIH). San Jose State University.** Fellowship Recipient, Maximizing Access to Research Careers (MARC), May 2007–May 2009.

SELECTED PUBLICATIONS, PROJECTS & OUTREACH [Complete List]

Journals

- **Carlos Torres**, Jeffrey C. Fried, and B. S. Manjunath. "Healthcare Event and Activity Logging". In IEEE / EMBS Journal of Translational Engineering in Health and Medicine. 2018. [**pdf**]
- **Carlos Torres**, Kenneth Rose, Jeffrey C. Fried, and B. S. Manjunath. A Multiview Multimodal System for Monitoring Patient Sleep. In IEEE Trans. on Multimedia. 2018. [**pdf**]

Conferences

- S. Paul, **Carlos Torres**, S. Chandrasekaran, and A. Roy-Chowdhury "Complex Pairwise Activity Analysis Via Instance Level Evolution Reasoning". In IEEE Int'l Conf. on Acoustics Speech and Signal Processing (ICASSP) 2020. [**preprint**]
- **Carlos Torres**, T. Nanjundaswamy, and S. Chandrasekaran. "Uncertainty and Robustness Estimation Methods for Graphical Neural Networks: Understanding Performance". In IEEE Winter Conf. on Applications of Computer Vision (WACV) 2020. [**preprint**]
- **Carlos Torres**, S. Kumar, O. Ulutan, A. Ayasse, R. Dar, and B.S.Manjunath. "H-mrcnn: Deep Remote Sensing Methods for Methane Detection in Overhead Hyperspectral Imagery". In IEEE Winter Conf. on Applications of Computer Vision (WACV) 2020. [**pdf**]
- O. Ulutan, **Carlos Torres**, S. Rallapalli, M. Srivatsa, and B. S. Manjunath. "ACAM: Actor Conditioned Attention Maps for Video Action Detection". In IEEE Winter Conf. on Applications of Computer Vision (WACV) 2020. [**pdf**]
- **Carlos Torres**, A. J. Bency, J. C. Fried, and B. S. Manjunath. "RAM: Role Representation and Identification from combined Appearance and Activity Maps". In ACM Int'l Conf. on

Distributed Smart Cameras (ICDSC) 2017. Invited paper. [**pdf**]

- **Carlos Torres**, K. Rose, Jeffrey C. Fried, and B. S. Manjunath. "DECU: Summarization of Patient Motion in the ICU". In ACM European Conf. on Computer Vision (ECCV) 2016. [**pdf**]
- **Carlos Torres**, V. Fragoso, J. C. Fried, S. D. Hammond, and B. S. Manjunath "Eye-CU: Sleep Pose Classification for Healthcare using Multimodal Multiview Data". In IEEE Winter Conf. on Applications of Computer Vision (WACV) 2016. [**pdf**]

Projects

- **Relational RNN (r-RNN) for Complex Activity Representation and Analysis**. Devised pair-wise relational information and recursive neural networks (r-RNNs) to represent object-pair behavior (interactions) sequences overtime. Developed using OpenCV, PyTorch, Relational RNNs, and Deep-SORT.
- **Uncertainty Methods for Robust Activity Recognition in Satellite Imagery**. Developed activity and scene representation and detection methods that use patterns in the uncertainty of predictions made by existing neural networks using novel object grouping and group aggregation techniques. Developed using OpenCV and PyTorch.
- **Behavior Analysis Aerial and Oblique Imagery**. Detection, tracking, and interaction representation and analysis of maritime scenes. Developed using Mask-RCNN and SORT.

Outreach: Technical Reviewer

- IEEE/CVF Conf. on Computer Vision and Pattern Recognition [CVPR-20]
- IEEE-PAMITC's Winter Conf. on Applications of Computer Vision [WACV-17,- 19, -20].
- ACM's Conf. on Intelligent User Interfaces [IUI-16 and -17].

SKILLS [GitHub]

- **Programming**: Bash, C/C++, LATEX, Matlab/Octave, R, Python, SQL, and SSH.
- **Expertise**: Data Sciences, Deep Learning, Machine Vision & Learning, Multimodal Analytics, Distributed Sensor Networks. Object Detection, Tracking, Reidentification, and Interaction (Action, Activity, and Event) Analysis.
- **Tools**: AWS, Docker, Git, TF/Keras, NLP, OpenCV, Pandas, PySpark, PyTorch, Sklearn, Virtual environments, Jupyter, and XGB.