Pablo Tostado

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San Diego, CA

Work Experience

2022 — Meta

Research Scientist
Meta - Reality Labs (CTRL-labs)

Worked on wrist-based wearable technology that translates electromyographic signals (EMG) into digital commands.

2018-2019 — UC San Diego

Researcher in ML/AI
Integrated Systems Neuroengineering Lab - Dr. Gert Cauwenberghs

Developed new types of artificial neural networks that owing to their stochastic nature are more resilient in learning and generalizing to complex patterns in big data, while operating at much less energy and complexity than current AI/ML hardware.

2016-2017 — Northwestern Medicine, Feinberg School of Medicine

Researcher in Neural Interfaces
Limb Motor Control Lab - Dr. Lee E. Miller

Monkey BMI-FES project: Developed a wireless interface aimed at restoration of reaching and grasping function following paralysis in Rhesus macaques through intracortically-controlled functional stimulation of upper limb muscles.

2015-2016 — GMV, Innovating solutions

Software Developer
GMV, Innovating solutions

Designed and built a treatment planning and visualization tool to assist with the task of Intraoperative Radiation Therapy in patients with breast cancer. Worked extensively with hospitals to validate prototypes.

Education

2017-2023 — UC San Diego

PhD — Neural Engineering - ML/AI
Translational Neuroeng. Lab - Dr. Vikash Gilja
University of California San Diego

Dissertation: Neural activity-driven vocal prosthesis. Developed state-space analysis, sequence modeling and ML-driven decoders to characterize the neural dynamics underlying vocal production in songbirds and predict vocal behavior from the activity of populations of neurons.

2014-2015 — Imperial College London

MSc - Neurotechnology - ML/AI (Distinction)
Brain & Behavior Lab - Dr. Aldo Faisal
Imperial College London

Thesis: Gaze-Driven Robotic Arm. Built a real-time system for 3D end-point and grasp control of robotic actuators using Motion Capture and Eye-Tracking technology.

2010-2014 — Universidad Carlos III de Madrid

BS — Bioengineering - Medical Devices
University Carlos III Madrid & UC Irvine

Thesis: Skin-On-A-Chip device.

Skills

Programming
Python (Pandas, NumPy, scikit-learn)
Pytorch, TensorFlow
C++, C#(+DevExpress)

Tools
Linux/Unix systems, git, AWS, Docker, Solidworks, 3D printing, Protobuf, Matlab, SQL

Other
Latex, Illustrator, Premier Pro, Photoshop, Sketch, Sketchup

Projects

IEEE Neurotech Enterpreneurs Workshop (2019)

Predicting mutations in influenza virus using LSTMs (2018)

Hack/HLTH hackathon winners: iOS app that uses sequenced genomic data to make personalized predictions on drug metabolism (2018)

Awards

Kavli Institute for Brain & Mind Innovative Research (2021)

Fulbright Fellow (2018)

La Caixa Fellow (2016)

Languages

English, Spanish, French, Italian

Interests

Surfing, photography, climbing, classical guitar

Publications

- **Pablo M. Tostado**, Ezequiel M. Arneodo, Daril E. Brown II, Xavier A. Perez, Adam Kadwory, Lauren L. Stanwicks, Abdullah Alothman, Timothy Q. Gentner, Vikash Gilja. “Neural population dynamics of songbird RA and HVC during learned motor-vocal behavior” - Under review (2023).

- Abdullah Alothman, Chao-li Wei, **Pablo M. Tostado**, Eric Trautmann, Ezequiel Arneodo, Timothy Q. Gentner, Vikash Gilja. “Unsupervised channel compression methods in neural prostheses design” - Under review (2023).

- Tim Sainburg, Trevor S. McPherson, Ezequiel M. Arneodo, Srihita Rudraraju, Michael Turvey, Brad Thielman, **Pablo M. Tostado**, Marvin Thielk, Timothy Q. Gentner. “Context-dependent sensory modulation underlies Bayesian vocal sequence perception” - Under review (2022).

- **Pablo M. Tostado**, Bruno Pedroni, Gert Cauwenberghs. “Performance Trade-offs in Weight Quantization for Memory-Efficient Inference” - IEEE Artifical Intelligence Circuits and Systems (AICAS) (2019).

- Filipe O. Barroso, Bryan Yoder, David Tentler, Josephine J. Wallner, Amina A. Kinkhabwala, Maria K. Jantz, Robert D. Flint, **Pablo M. Tostado**, Evonne Pei, Ambika D. R. Satish, Sarah K. Brodnick, Aaron J. Suminski, Justin C. Williams, Lee E. Miller, Matthew C. Tresch. “Decoding neural activity to predict rat locomotion using intracortical and epidural arrays” - Journal of Neural Engineering (2019).

- Filipe O. Barroso, Bryan Yoder, Josephine Wallner, Maria Jantz, **Pablo M. Tostado**, Evonne Pei, Vicki Tysseling, Lee E. Miller, Matthew C. Tresch. “Cortically controlled FES for restoration and rehabilitation of function following SCI in rats” - International Conference on NeuroRehabilitation (ICNR) (2018).

- **Pablo M. Tostado**, William W. Abbott, A. Aldo Faisal. “3D gaze cursor: continuous calibration and end-point grasp control of robotic actuators”. IEEE International Conference of Robotics and Automation (ICRA) (2016).
  Video: https://www.dropbox.com/s/s5kme267zpccg5c/My%20Movie%201.mp4?dl=0

Conference Presentations

- “Population dynamics during skilled vocal behavior in songbirds” - SfN 2022.
- “Unsupervised channel compression methods in neural prostheses design” - SfN 2022.
- “Generalized decoding of vocal elements in Zebra finch” - SfN 2022.
- “Single trial reconstruction of vocal sequences in freely moving songbirds” - SfN 2022.
- “The neural dynamics of vocal behavior” - SfN 2021.
- “Latent state dynamics describe multiunit activity in premotor region of songbirds” - SfN Global Connectome 2021.
- “Performance Trade-offs in Weight Quantization for Memory-Efficient Inference” - IEEE AICAS 2019.
- “Biologically-inspired neural networks for efficient inference” - Joint Symposium on Neural Computation 2019.
- “Training a decoder on low-dimensional population dynamics in M1 produces stable control signals" - SfN 2017.
- “Development of cortically-controlled muscle stimulation to restore treadmill locomotion and overground navigation in spinal cord injured rats." - SfN 2016.