Felipe Felix Arias

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EDUCATION

University of Illinois at Urbana-Champaign — Urbana, IL
Ph.D. in Computer Science **GPA: 4.0** — *May 2024*
Advisor: *Nancy M. Amato*

University of Illinois at Urbana-Champaign — Urbana, IL
B.S. in Computer Science **GPA: 3.8** — *May 2019*

RESEARCH EXPERIENCE

Stanford University - Hazy Research — Stanford, CA
Research Assistant - Advisor: Christopher Ré — *June 2018 - March 2019*

- **Weak Supervision for Cross-sentence Relation Extraction**: Worked on Snorkel, a system for rapidly creating, modeling, and managing training data. Concentrated on enabling context beyond the single sentence for natural language processing applications.
- Developed a dynamic algorithm that generates cross-sentence candidates without duplicates efficiently and enables cross-sentence n-ary relation extraction.
- Dramatically improved performance of cross-sentence relation extraction by implementing an algorithm that looks for keywords in the smallest path between mentions in a custom dependency graph.
- Explored various discriminant model architectures such as bi-LSTM, graph LSTM, multi-task learning, and ensembles to find the model that best benefits from the correlations between single and cross-sentence relation extraction.
- Studied the effects of Snorkel's new multi-task system (Metal) by treating relation extraction across a varying number of sentences as dependent sub-tasks.

University of Illinois at Urbana-Champaign - IGL — Urbana, IL
Research Assistant - Advisor: Richard Sowers — *January 2018 - December 2018*

- **Video as a Sensor**: Used existing object detection systems (e.g., YOLO by Redmon et al.) to understand the context and risk associated with the urban environment surrounding roadways.
- Successfully detected compound objects (e.g., a cyclist from a person and a bicycle detection) and scenes by using off-the-shelf video object detections as data streams.
- Improved the performance and robustness of the system by implementing a graphical model that assigns probability values to an object's presumed past detections by storing information about previous frames' detections and encoding heuristics based on object permanence and the nature of dashcam footage.
- Used weak supervision (Snorkel) to improve performance and expedite the creation of classifiers by using computer vision, pose, object-specific, and cross-temporal heuristics in noisy classifiers.

University of California, Berkeley - AMP Lab — Berkeley, CA
Research Assistant - Advisor: David Culler — *June 2017 - Aug 2017*

- **Event Reporting Using Participatory Phone Sensing**: Designed, implemented, and tested an incident reporting system on Android and iOS that works by detecting shake gestures when a user's location is changing (binary classification).
- Substantially decreased the false-positive rate and increased robustness by implementing signal processing algorithms and other improvements.
- Wrote code that activates background sensing, data storage, and data analysis once user location changes beyond a threshold and prompts the user to label incidents detected as true or false positives.
- Designed a process to improve a support vector machine over time by using the user's ground truth, location, velocity, and method of transportation.

Work Experience

MyHangr   Urbana, IL
Android Developer   *October 2016 - February 2017*
- Designed, implemented, and tested core features and user interface using Android Studio.
- Debugged and improved the application's performance by introducing a new unit testing system.
- Helped with the initial design of the application and proposed multiple features.

College of DuPage   Glen Ellyn, IL
Tutor/Teacher Assistant   *January 2015 - August 2016*
- Acted as a teacher assistant and led one-on-one and small group tutoring sessions on programming, math, physics, and chemistry.
- Explained complex concepts using easy-to-understand terms and, in turn, received positive reviews in evaluations by superiors and students.
- Worked effectively with students with diverse learning needs and cultural backgrounds.

Skills

- **Programming Languages/Other**: Python (Expert), C (Proficient), Java (Proficient), R (Prior Experience), C++ (Prior Experience), Haskell (Prior Experience), Javascript (Prior Experience), LaTeX (Proficient), Snorkel (Expert), TensorFlow (Prior Experience), Pytorch (Prior Experience), Scikit-learn (Proficient), SQL (Prior Experience)
- **Version Control**: Git, Subversion   **Operating Systems**: Linux, OS X, Windows 10
- **Languages**: English (fluent), Spanish (fluent)

Projects

- **ML/AI**: Have implemented and used libraries for neural networks, SVMs, PCA, vector quantization, EM algorithm, mean-field approximation, q-learning, decision trees/random forests, naïve bayes, clustering, pattern mining, and other ML/AI/data-mining algorithms for projects, assignments, and research.
- **I&M Wardrobe**: Work on an android application that uses weather data, outfit compatibility, and comfort feedback to suggest clothing. Currently working on allowing users to add their clothing and clustering similar clothing items.
- **College Helper**: Helped develop a website to store student academic information and suggest school schedules based on need and interests as well as provide comprehensive solutions to college-related problems.
- **MyMalloc**: Implemented a memory allocator in C that performed at the top 10% of class implementations and outperformed GNU's malloc in some tests.

Affiliations

- Tau Beta Pi - Illinois Alpha
- Leadership Alliance
- Society of Hispanic Professional Engineers
- Hispanic Scholarship Fund
- **Clubs**: Digital Signal Processing, Android Application Development

Awards & Scholarships

- **Awards**: C. S. Larson Transfer Student Award, Tau Beta Pi Induction (Top 12.5% of College of Engineering Junior Class), Dean's/Honors List at University of Illinois at Urbana-Champaign and College of DuPage, 1st place at Embark on Excellence by Morrill Engineering Program, College of DuPage Student Spotlight, President's Award for Educational Excellence
- **Scholarships/Fellowships**: Computer Science Excellence Fellowship (2019), C. S. Larson Transfer Student Scholarship (2019), Engineering Pathways (2016-2019), Hispanic Scholarship Fund (2018), Carol Stream Community College (2016), S.C. Reed (2016), H.J. Kleemann (2015), Rotary Club of Naperville (2015)