Felipe Felix Arias

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EDUCATION

University of Illinois at Urbana-Champaign May 2024
Doctor of Philosophy (Ph.D.) in Computer Science
Advisor: *Nancy M. Amato*

University of Illinois at Urbana-Champaign May 2019
Bachelor of Science in Computer Science **GPA: 3.79/4.00**

RESEARCH EXPERIENCE

University of Illinois at Urbana-Champaign - Parasol Urbana, IL
Research Assistant - Advisor: Nancy M. Amato *June 2019 - Present*

- Design and implement a general algorithm for motion planning in dynamic environments with arbitrary external constraints (e.g., fuel scarcity)

- Enable motion planning to account for constraints that are not encoded in the roadmap by procedurally generating locally sub-optimal paths to find a globally optimal solution

- Overcame the limitations of safe interval path planning (Phillips et al.) by generating optimal paths for robots that are incapable of waiting in place

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

- Worked on enabling context beyond the single sentence for natural language processing applications in Snorkel, a system for rapidly creating, modeling, and managing training data

- 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

- Assessed the performance of Snorkel's multi-task model (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*

- Adapted existing image 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

- 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*

- 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)

- 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 conceived 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), C (Proficient), Java (Proficient), R (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
- **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)