Ansel Blume

blume5@illinois.edu
https://github.com/AnselBlume

Education

University of Illinois at Urbana Champaign **2020–Present**
Ph.D. Candidate in Computer Science (Advised by Heng Ji, Derek Hoiem)
Recipient of Gene Golub Fellowship

Research: Vision-language models and decomposable object recognition.

My research is broadly on vision-language models and decomposable object recognition. I am currently investigating deficiencies of vision-language representations.

Recently, I developed symbolic representations with knowledge-graphs for image recognition, emphasizing interpretability via part decomposition, attribute recognition, and attention visualizations. I led the development of demo systems for a multi-school, multi-million-dollar research effort, serving as both the primary individual contributor in the first iteration and the system designer and de facto project manager for the second. I presented our systems to DARPA at all stages of development. We applied this framework's methods to few-shot object detection in a paper recently accepted at CVPR.

On the language side, I have recently worked on text simulation in latent space as a more general form of reasoning than text-based paradigms like chain of thought (e.g. those used by recent reasoning models like DeepSeek-r1). This has been applied to structured robotics data, but I am working to make this a more general method.

My past work in NLP focused on attribute extraction from text and multimodal data.

Université Jean Moulin Lyon 3, France **2019**
Semester abroad studying humanities

University of California, San Diego **2015–2019**
B.S. Computer Science
B.S. Applied Mathematics

Honors: Tau Beta Pi, Phi Beta Kappa, Magna Cum Laude

Publications

Blume, Ansel*, Jeonghwan Kim*, Hyeonjeong Ha, Elen Chatikyan, Xiaomeng Jin, Khanh Duy Nguyen, Nanyun Peng, Kai-Wei Chang, Derek Hoiem, and Heng Ji. "PARTONOMY: Large Multimodal Models with Part-Level Visual Understanding."

Mankeerat Sidhu, Hetarth Chopra, **Ansel Blume**, Jeonghwan Kim, Revanth Gangi Reddy, Heng Ji. "Search and Detect: Training-Free Long Tail Object Detection via Web-Image Retrieval." CVPR 2025.

Ansel Blume*, Khanh Duy Nguyen* et al. "MIRACLE: An Online, Explainable Multimodal Interactive Concept Learning System." ACM MM 2024 Technical Demo.

Michal Shlapentokh-Rothman*, **Ansel Blume***, Yao Xiao, Yuqun Wu, Sethuraman TV, Heyi Tao, Jae Yong Lee, Wilfredo Torres, Yu-Xiong Wang, and Derek Hoiem. "Region-Based Representations Revisited." CVPR 2024.

Ansel Blume, Nasser Zalmout, Heng Ji, and Xian Li, "Generative Models for Product Attribute Extraction." EMNLP 2023 Industry Track.

Zhenhailong Wang, **Ansel Blume**, Sha Li, Genglin Liu, Jaemin Cho, Zineng Tang, Mohit Bansal, and Heng Ji, "Paxion: Patching Action Knowledge in Video-Language Foundation Models." NeurIPS 2023.

Louis F. DeKoven, Audrey Randall, Ariana Mirian, Gautam Akiwate, **Ansel Blume**, Lawrence K. Saul, Aaron Schulman, Geoffrey M. Voelker, and Stefan Savage, "Measuring security practices and how they impact security." In *Proceedings of the Internet Measurement Conference* (pp. 36-49).

Research Experience

Research Assistant (Advisors: Heng Ji, Derek Hoiem) **2021–Present**

- Researching methods for interpretable, decomposable visual concept recognition
- Studying new methods of vision-language model reasoning for applications in embodied domains

Amazon: Applied Scientist Intern (Mentor: Nasser Zalmout) **2022**

- Demonstrated the efficacy of generative models and prompting for product attribute extraction
- Showed generative models outperform SOTA sequence-tagging models, especially in low-data regime
- Published *Generative Models for Product Attribute Extraction* at EMNLP Industry Track 2023

Amazon: Applied Scientist Intern (Mentors: Jie Feng, Xiang He) **2021**

- Explored the limits of domain-pretrained multimodal models for attribute extraction
- Implemented a novel combination of pretraining tasks for CLIP-based and transformer architectures

Research Assistant (Advisor: Dr. Matus Telgarsky) **2020**

- Studied convergence rates of policy gradient methods

Network Security Research Group (Advisors: Dr. Geoffrey Voelker, Dr. Stefan Savage) **2018–2019**

- Extracted device configurations to predict at-risk users based on device and network telemetry
- Author in IMC 2019 paper *Measuring Security Practices and How They Impact Security*

General Work Experience

Teaching Assistant (Instructor: Dr. Matus Telgarsky) **2021**

- Teaching assistant for UIUC's CS446 Machine Learning course
- Constructed theoretical and programming homework assignments
- Helped students understand course material during office hours and on the class forum
- Commended by instructor for going above and beyond

Amazon: Software Development Engineer Intern **2019**

- Constructed web form for automatic ingestion of data into DynamoDB using Angular and Spring
- Built a provider management, editing, and promotion framework using Angular and Spring
- Drastically streamlined the existing provider onboarding pipeline

IBM: Software Development Intern **2018**

- Created PII-detecting machine learning model using Scikit-learn and Word2Vec
- Developed a precise PII location extractor prototype using the Apache UIMA framework
- Wrote a patent application paper for the PII detection system

Monster Worldwide: Software Development Intern **2016**

- Created Java web application that optimized the QA testing workflow
- Application parsed, indexed, and presented searchable statistics for QA test runs

Projects and Activities

AlphaZero for Chess **2021**

- Reimplemented the AlphaZero and AlphaGo papers in Python and C++ for chess
- Built an online, interactive Jupyter notebook where one can play against the engine

Web-based Pokemon Stat Optimizers **2013–Present**

- Utilized Java and GWT to create three calculators used to determine optimal stat distribution
- Released NPM package written in Typescript (https://www.npmjs.com/package/survivalcalc)
- Only calculators of their kind—frequently messaged for new features and updates

Second Place Team at Teradata AI and Cognitive Services Hackathon **2017**

- Developed simulation for optimal placement of storage cylinders using OpenAI Gym
- Created backend framework interfacing between data and GUI in Python

Leadership Experience

President and Vice President of Tau Beta Pi Engineering Honor Society at UCSD **2017–2019**

- Led board of 19 officers to ensure smooth operation of volunteer, professional, and social events
- Represented UCSD chapter at national and regional conventions
- Worked with engineering school to submit an accepted major appeal to national organization
- Received prestigious Chapter Excellence Award from national organization

Technical Skills

Proficient: Python, Java

Experience: Typescript, C, C++, PyTorch, Haskell, OCaml, Prolog, Lisp, Angular, React, React Native, Javascript, Bash Scripting, Django, Spring Boot, JSP, Elasticsearch, Apache UIMA, Firebase, Apache Hive, and Android Development.

Language Proficiency

English**:** Native
French**:** Level B1
Chinese**:** Intermediate