

# Katyayani G. Raman

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## EDUCATION

**University of California, Santa Barbara**  
Bachelor of Science, Computer Science

June 2024

## EXPERIENCE

### Student Researcher

*Cheadle Center of Biodiversity and Ecological Restoration at UCSB*

- Led a computer vision and machine learning project under Professor Katja Selmann, Director of the Cheadle Center for Biodiversity and Ecological Restoration at UCSB, to automate wing landmark detection using geometric morphometrics and demonstrate the efficacy of wing based models for species classification over full-body imaging approaches.
- Developed a fully automated pipeline combining object detection and shape prediction, enabling instant landmark predictions and automated landmark marking in images.

Jan 2024 – June 2024

Santa Barbara, California

### H2O.ai

*Software Engineer Intern*

- Developed a web app to visualize real-time sales metrics with interactive graphs using pandas, Salesforce data and h2o-wave. Deployed to the company app store and adopted by employees for daily analytics.
- Created automated test pipelines for LLM evaluation with Postgres data retrieval and FastAPI endpoints.
- Designed robust test sets, benchmarks, and prompts across diverse categories including jailbreak detection.

June 2023 – Sep 2023

Mountain View, California

## PROJECTS

### Logs - Versatile Journal App

- Developed an intuitive SwiftUI app for detailed daily logging and planning with customizable entries (fonts, backgrounds, stamps), folders, tags, and seamless event and reminder syncing for integrated organization.
- Implemented a robust Core Data stack for efficient data management, secure import/export, selective iCloud sync, and bio-authentication for enhanced data privacy.
- Integrated diverse multimedia support (GIFs, PDFs) with asynchronous loading, added entry replies for conversational interactions, and incorporated AI-driven Journaling Suggestions for guided reflection. Currently in TestFlight beta with a full release planned soon.

### LessWrong iOS App

- Designed an iOS app for interacting with the LessWrong community blog, enabling users to read, bookmark, and share posts/comments using dynamic GraphQL queries based on search text and tags.

### Anidex - Animal Classification App

- Developed Anidex, an offline animal cataloging app using CoreML for multi-model image classification across 2222 species, featuring MapKit integration to allow users to map their animal sightings.
- The model schema features a top-level Chordata classifier that routes images to specialized class-models (e.g., reptiles), enabling focused learning on relevant features within constrained compute resources.

### LLM-Chat - Local and Remote Language Model Chat App

- Developed LLM-Chat, a macOS application with an iMessage-inspired interface, using SwiftUI+AppKit for the front-end and FastAPI for the back-end.
- Enables seamless interactions with various language models, with a focus on locally-run models optimized for Apple Silicon.

### Ensemble of CNN models for Image Classification

- Engineered an ensemble of Convolutional Neural Networks (CNNs) achieving 93% accuracy in classifying 10 clothing categories, combining model predictions weighted on individual training accuracies and losses, trained on a 60,000-image dataset.

### Scalable Cognitive Simulations with Hybrid LLM Integration

- Extended the generative agent simulation framework from Generative Agents: Interactive Simulacra of Human Behavior (Park et al., 2023) by integrating both local open-source and cloud-based LLMs using an adaptive cognitive architecture that dynamically routes tasks based on complexity to improve the simulation's computational efficiency.
- Overall, these enhancements reduced cloud dependency in extended multi-agent simulations while preserving both individual and emergent agent behaviors.

### Named Entity Recognition using Conditional Random Field

- Built a custom-featured Conditional Random Field (CRF) model for Named Entity Recognition (NER) on bilingual (Spanish/English) Twitter data.
- Utilizes contextual windows, capitalization cues, gazetteer lists, and several unique Boolean features for precise entity detection.

### Advanced Compiler with Full Functionality in C++

- Developed a robust compiler that supports abstraction, inheritance, memory management, and data structures.
- Uses Flex for input tokenization, Bison for AST translation, and incorporates type checking and x86 assembly code generation for effective compilation.

## SKILLS

**Languages:** C++, Swift, Python, C, Objective-C, C#, Java, JavaScript, HTML, CSS, SQL, GraphQL

### Tech Stack:

- Data & ML: Numpy, Pandas, Tensorflow, PyTorch, openCV
- Web: FastAPI, RestAPI, React
- iOS: SwiftUI, UIKit, CoreML, CoreData, ARKit, HealthKit, CloudKit, MapKit

**Tools:** Xcode, Git, Emacs, Docker, Unix/Shell, Visual Studio Code