Patrick Soga

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EDUCATION

University of Notre Dame — Notre Dame, IN
Bachelor of Science, Bachelor of Arts | Computer Science, Philosophy — May 2023
Current GPA: 3.85

RELEVANT COURSES

Abstract Algebra	Data Science	Operating Systems Principles
Data Structures	Linear Algebra & Diff. Equations	Probability & Statistics for Data Science

EXPERIENCE

Interdisciplinary Center for Network Science and Applications (iCeNSA) — Notre Dame, IN
Undergraduate Research Assistant — Summer 2021

- Working under Prof. Nitesh Chawla to build apps for a Mexican hospital.
- Refactoring web application for uploading and managing patient medical information using Flask, SQLAlchemy, and PostgreSQL.
- Writing a cross-platform mobile app using Flutter to facilitate communication between the hospital and its cancer outpatients.

Million Marker — Palo Alto, CA
Software Engineering Intern — Spring 2021

- Developed OCR functionality using Google's Tesseract and Amazon's Textract for recognizing ingredients from product labels using Python and libraries OpenCV, pytesseract, and boto3.
- Wrote algorithms for extracting specific ingredients from OCR-retrieved text.
- Wrote AWS Lambda functions to trigger on user-uploaded images to S3, extract ingredients, send those ingredients to a database, and upload an overlay image depicting bounding boxes for each of the ingredients.

RJ Reliance — Torrance, CA (remote)
Software Development Intern — Winter 2020/2021

- Wrote Python scripts to generate random datasets detailing job requisitions, job applications, and other data pertaining to HR according to weights assigned to parameters such as ratio of managers to workers, proportions of worker ages, etc.
- Wrote a Flask REST API to interface with a MongoDB database (Atlas) to access the data.
- Helped write with 2 other interns a ReactJS app using Facebook's `create-react-app` for viewing sample data and manipulating proportions of the data in the MongoDB Atlas database.

Notre Dame Department of Computer Science and Engineering — Torrance, CA (remote)
REU Participant — Summer 2020

- Participated in an NSF-funded research program for developing software for drones assigned to emergency response missions.
- Trained computer vision models using scikit-learn and curated image data with OpenCV to classify weather conditions (foggy, low daylight, etc.) based on video provided by the drones.
- Wrote Python scripts to deploy the models to process video data and send assessments to a Node.js socket.io server.
- Wrote socket.io endpoints receiving weather data, and presented the data in an Angular app.

CS for Good — Notre Dame, IN
Non-profit Service Project, Team Member — Fall 2019 - Fall 2020

- Worked in a team of 4 to create a database and dashboard for Guate Te Incluye, a non-profit organization helping recently deported migrants in Guatemala reintegrate into the labor force.
- Wrote API endpoints in Node.JS interacting with a Firebase backend for over 1100 workers.
- Helped design and integrate various frontend features with Embedded JavaScript (EJS).

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The Idea Center at the University of Notre Dame Notre Dame, IN
Full Stack Web Development Intern Summer 2019

- Built SPAs for student-led startups using AngularJS for the web interface and Node.JS (Express) for writing REST API endpoints.
- Designed database schemas and configurations on the Parse Platform (Back4App).
- Wrote cloud functions interfacing with Typeform and Zapier webhooks for database operations.

PROJECTS

Mask Recognition with CNNs Notre Dame, IN
Data Science Club Project Spring 2021

- Collaborated with local company Aunalytics on detecting masks on images of persons and whether they are worn correctly.
- Curated and cleaned Kaggle image dataset of over 800 samples.
- Trained models using Fast-RCNN and RetinaNet for detection and ResNet50 for classification with PyTorch.
- Helped write algorithms for calculating confusion matrix metrics (TP, FN, etc.) on predicted and ground truth bounding boxes.

Predicting Congressional Party Flips with Binary Classification Notre Dame, IN
Course Project for Data Science Fall 2020

- Used congressional district demographic data from 1978-1998 to predict whether congressional districts would “flip” party control.
- Trained binary classification models using scikit-learn and processed/cleaned data using pandas.
- Achieved 87.4% accuracy and 93.1% F1 score using AdaBoost, the most performant of the trained and hyperparameter-tuned models.

ACTIVITIES/GROUPS CS for Good Club, *Member*
Notre Dame Computer Club, *Member*
Data Science Club, *Member*
Philosophy Club, *Member (President in Fall 2020)*

PROGRAMMING LANGUAGES JavaScript, TypeScript, Dart, Python, C++ (coursework)

TOOLS/TECHNOLOGIES HTML/CSS, Node.JS, Express, socket.io, AngularJS, Angular, ReactJS, MongoDB, Parse, Firebase, AWS (S3, Lambda), Scikit-learn, Pandas, OpenCV, Git, Flask, SQLAlchemy, PostgreSQL, Flutter