

# Patrick Soga

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## EDUCATION

### University of Notre Dame

B.S. Computer Science, B.A. Philosophy

GPA: 3.85

Notre Dame, IN

May 2023

## 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-Fall 2021

- Working under Prof. Nitesh Chawla to build apps for HIMFG, a premier hospital in Mexico City.
- Writing a web app for uploading and managing patient medical information and assessing cancer patient risk using ReactJS (TypeScript), Flask, SQLAlchemy, Redis, and PostgreSQL.
- Writing a cross-platform mobile app using Flutter to facilitate communication between the hospital and its cancer outpatients.

### FloWaste, Inc.

Torrance, CA (remote)

*Software Engineer*

Summer 2021

- Working on using transfer learning to tune CNN architectures (MobileNetV2) for recognizing and classifying images of food with TensorFlow.
- Writing scripts (Python) and infrastructure for ML ops, pipelining annotation data from Sama and deploying jobs to GCP.
- Wrote features and fixed bugs for analytics dashboards with ReactJS, Redux, Cube.js, and Recharts.

### 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.

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- 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).

## 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

Python, JavaScript, TypeScript, Dart, Go (less experience),  
Rust (less experience) C++ (coursework)

## TOOLS/TECHNOLOGIES

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