

# Dylan Lewis

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San Antonio, TX

## EDUCATION

### Massachusetts Institute of Technology

Master of Engineering in Electrical Engineering and Computer Science; GPA: 5.0/5.0

Thesis: *Towards Automated Assessment of Crowdsourced Crisis Reporting for Enhanced Crisis Awareness and Response*

Cambridge, MA

May 2022

Concentration: AI

Bachelor of Science in Electrical Engineering and Computer Science; GPA: 4.3/5.0

May 2020

**Relevant Coursework:** Software Studio (TA); Software Construction; Data Structures & Algorithms; Computer Systems Engineering; Statistics, Computation, & Applications; Machine Learning; Advanced Natural Language Processing; Machine Learning & Data Science in Politics

## SKILLS

- **Programming Languages:** Expert:{ JavaScript, Python }; Proficient:{ Java, R }
- **Technologies:** AWS, Docker, Git
- **Libraries & Frameworks:** NumPy, pandas, Matplotlib, PyTorch, scikit-learn, SciPy, TypeORM, NestJS, Vue.js, React, Redux

## EXPERIENCE

### MIT Urban Risk Lab

Research Assistant

Cambridge, MA

September 2020 - July 2022

- Designed system and constructed the backend for a web app which assists crisis managers during crisis events by leveraging machine learning models to classify crowdsourced crisis text and image data using TypeORM, PostgreSQL, RDS, NestJS, Docker, Terraform, and AWS namely S3, ECR, Lambda, API Gateway, and SageMaker
- Utilized insights from crisis managers in the US and Fukushima (FC), Japan to develop the Human Risk/No Human Risk classification task and determined a performance metric that strongly aligned with their priorities; achieved a 92.8% F2 score on a test set of past flood event Japanese text data in FC with a SVM model and pretrained BERT embeddings
- Built pipeline and visualization tool for experimenting with various featurizations of Japanese crisis text data, dimensionality reduction techniques, and clustering algorithms, in order to yield human-interpreted labels from the documents found in each cluster; uncovered 9 human-interpreted labels from past flood event data in FC
- Led annotation effort forming a ground-truth test image dataset from past flood events in FC; achieved a 82.5% weighted F1 score on the test dataset using a trained CNN image Flood/Not Flood classification model
- Developed an open-source [Python package](#) for training, testing, and predicting with pretrained CNNs for classifying crowdsourced crisis image data; developed an open-source [Python package](#) for featurizing crisis text data, training and testing with a variety of classification machine learning models, and visualizing clusters of featurized text data
- Defined and supervised 8 undergraduate research projects adjacent to thesis research
- Presented main findings from research to key stakeholders from a wide range of technical backgrounds

### Southwest Research Institute

Software Engineering Intern

San Antonio, TX

June 2020 - August 2020

- Developed a full-stack web application with React, Redux, TypeScript, Google Protocol Buffers, CouchDB, and Docker to enable a more intuitive and usable interface for performing experiments, iterating on feedback from peer review

### Isobar

Front-end Development Intern

Boston, MA

May 2019 - August 2019

- Implemented business logic and user stories for a popular car rental company website UI using React

## PROJECTS

- **[Supervised & Unsupervised Methods for Evidence Synthesis in International Development Gray Literature](#):** Python NLP project that used supervised & unsupervised methods to optimize the manual evidence synthesis process in International Development Gray Literature
  - Evaluated various text inputs and pretrained SpaCy Named Entity Recognition (NER) models against a simple baseline model to extract the Country of Study (CoS) associated with each international development paper in a collection of 244 documents
  - Enabled automated & accurate filtering by CoS of an unlabeled collection of documents; achieved 91.0% accuracy on the entire document collection for CoS extraction using only the title and abstract as input to a pretrained Transformer NER model
- **[Evolution of the U.S. TV News Narrative on Climate Change](#):** Data Science & NLP project in Python that investigated the evolution of climate change coverage frequency & content between U.S. TV News Networks CNN, Fox News, and MSNBC over Jul. 2009-Jan. 2020
  - Investigated how climate change coverage content differed between the networks over time by computing the cosine similarity between document embeddings (TF-IDF)
  - Determined that, with the exception of 4 years, CNN & MSNBC have had increasingly similar climate change coverage content from 2009 (0.81) to 2019 & 2020 (0.95)
- **[Boomerang](#):** Full-stack web application where users can efficiently and reliably borrow items from others within their communities
  - Drafted UI/UX wireframes and implemented full-stack functionality for login page and sign up flow in Express.js and Vue.js