

# Nathan Kim

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## EDUCATION

### Stanford University

BS, Computer Science

GPA: 3.99, Co-curricular involvement: KZSU 90.1 FM, Stanford ACM Lab

Relevant Coursework: CS224N – NLP w. Deep Learning (Best Project), CS229 – Machine Learning (Best Project)

Stanford, CA

Expected June 2024

## RESEARCH

### How Does Context Arise in Contextual Embeddings Geometry?

In Preparation

Nathan Kim\*, Isabel Papadimitriou, Dan Jurafsky

While broad and expressive linguistic capabilities of contextual word embeddings (CWE's) are widely attributed to the *contextualization* induced by encoder self-attention, a clear link between contextualization and the embedding space itself has yet to be precisely articulated. We find word-type and context to be opposing attractors in CWE vector spaces and discuss some simple geometric manipulations to allow context-level features to be more accessible for downstream tasks.

### GLARE: Infilling Language Models for Textual Adversarial Attacks

In Preparation

Nathan Kim\*, Ryan Chi\*, Ethan Chi

Textual adversarial examples can expose an NLP model's vulnerabilities by illustrating where small perturbations in input texts can drastically alter their predictions. We find that the GPT-2 adapted to perform non-causal infilling (Donahue et al. 2020) outperforms existing adversarial example generation methods in fluency, semantic preservation and attack success rates.

## WORK EXPERIENCE

### Elevated Interest

April 2021 – June 2021

Student Intern

- Designed core schema for a multimodal online lesson delivery platform now in use by students at East Palo Alto schools
- Ported a legacy Ruby on Rails backend API in MongoDB & Express to assist migration to MERN stack

### Centre for Global Health Research

July 2019

Student Intern

- Wrote & maintained internal software packages in R to process mortality data of over 1 million people for ongoing research on causes of death
- Created statistical analyses and visualizations of traffic accident data in Tamil Nadu, India as independent research

## PROJECTS & VOLUNTEER WORK

### Stanford ACM

September 2021—

Chair, MLab Reading Group

- Constructed 10-week curriculum for tutorial series designed to expose beginner ML students to major ideas at the foundations and forefronts of AI research and build competencies in finding & interpreting written research
- Recruiting Stanford undergraduate researchers to present to 100+ MLab students on ongoing work in NLP, CV, RL & other topics

### KZSU Stanford 90.1 FM

October 2020—

Disc Jockey, Web Developer

- Producing 1-hour shows to be aired each week to audience of 100's, featuring curated music & promotion for local artists
- Developing modern web interface for KZSU News department at [kzsu.stanford.edu/news](https://kzsu.stanford.edu/news) backed by a PostgreSQL database and served on Flask

## SKILLS/INTERESTS

- Frontend Web Development: HTML, CSS (Tailwind), React.js, Vue.js, Flask, Node.js
- Data Science/Machine Learning: Pytorch, Keras, Pandas, R, Pyro
- Mobile Development: Java, React Native, C++
- Other Interests: Natural Language Processing, Synthetic Chemistry, Oto-Manguean Languages, Jazz Percussion, Short Fiction