

Shubham Jakhete

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RESEARCH INTERESTS

Human-Centered AI and accessibility, focusing on AI systems that interpret and act on digital interfaces for blind and low-vision people. I want to study how these systems can detect interpretations that look valid but are wrong, decide which errors a user needs to hear about, and confirm important actions without interrupting every step.

EDUCATION

California State University, Fullerton

Fullerton, CA

MS in Computer Science GPA 3.89

May 2026

Capstone project (CPSC 597): CrossAssist, an iOS navigation aid for low-vision pedestrians, advised by Dr. Duy H. Ho

Coursework: Advanced Neural Networks, Advanced Algorithms, Knowledge Representation and Reasoning

Savitribai Phule Pune University

Pune, India

MSc in Computer Science

May 2021

Savitribai Phule Pune University

Pune, India

BSc in Computer Science

Dec 2018

RESEARCH EXPERIENCE

ContextLabeler · Independent research

2026

Mentored by Richard Ladner (University of Washington)

[nvda_reader](#)

- Built an NVDA screen reader add-on that labels unlabeled UI elements for blind users. An LLM (Claude Haiku) proposes each label, and SPARQL ASK queries check it against an RDF/Turtle ontology before NVDA speaks it. Speech gives the confirmed category first so users can judge how far to trust the label.
- Reached 90.9% category accuracy with zero ontology-invalid outputs, against an 83.6% failure rate with the ontology gate removed. Median latency was 0.82 s (1.48 s at p95), and a fingerprinted label store kept labels 98.4% consistent across 550 calls.
- Found a soundness and completeness trade-off in ontology gating through a VS Code tree-item failure case, and showed that app-specific ontologies extend the vocabulary from 17 to 22 categories with no code change.

CrossAssist · MS capstone, California State University, Fullerton

2026

Advised by Dr. Duy H. Ho

[cross_assist](#)

- Built an on-device iOS navigation aid for low-vision pedestrians that runs three YOLO models through Core ML, two of them custom-trained to classify pedestrian signals and find crosswalks. The app is Swift 6 concurrency safe and has no third-party dependencies.
- Read walk-signal countdowns with Vision OCR and turned them into crossing recommendations that speak "cross" only after a number is confirmed. Estimated distance with Depth Anything V2, with a pinhole camera model between depth frames.
- Ran a pilot with three low-vision participants. All three read the walk-signal state correctly within 10 m. One struggled with the countdown, and the cause was small display text rather than OCR error.

Plan First · Independent prototype

2026

Builds on Spellburst (Angert et al., UIST 2023)

[spellburst-prototype](#)

- Built a human-in-the-loop checkpoint for AI creative coding. Before any generated p5.js code runs, the artist sees the model's reading of an ambiguous request such as "make it more dramatic" as editable Change and Preserve lists, and nothing changes until they approve it.
- After each change, the system compares motion and dominant hue before and after without another model call, then marks each preserved item as kept, changed anyway, or not checked. It reports only properties it can measure.
- In 60 automated test cases with no human participants, naming a property in Preserve cut unwanted changes from 25/60 to 6/60. Most of the effect came from color and "make it calmer" requests, and it was weak when a request asked to change and keep motion at once.

Explainable Used Car Recommendation System · Course project (CPSC 583), team of three

2025

[esdt_project](#)

- Built an explainable recommender over 5,181 vehicles merged from Kaggle listings, NHTSA crash ratings and NHTSA complaint data.
- Combined Prolog expert rules with an RDF/OWL knowledge graph queried by SPARQL, plus propositional filtering and a probabilistic reliability estimate, so each result names the rule categories it meets.

- Served it through a FastAPI backend and web prototype, and stated data limits openly: about 36% of vehicles had safety ratings and 22% had complaint records.

MANUSCRIPTS

1. **Shubham Jakhete. *ContextLabeler: Ontology-Constrained AI Labeling for Blind Users in NVDA*.** Demo paper, 2026.
2. **Shubham Jakhete. *An AT-Native Voice Agent for Independent Computer Use by Blind Users*.** Research proposal, 2026.
3. **Shubham Jakhete. *CrossAssist: The Digital Shield for Independent Low-Vision Mobility*.** MS project report (CPSC 597), California State University, Fullerton, 2026. Supervisor: Dr. Duy H. Ho.

INDUSTRY EXPERIENCE

One Community Inc.

Sep 2026 - Present

Volunteer Software Engineer

- Added deactivated volunteers' final week to the Weekly Summaries Reports page of the Highest Good Network, the React and Node.js/MongoDB app the organization runs its time tracking and weekly reporting on.
- Built a notice that prompts users to refresh after Dev-to-Main merges, and fixed dark mode, date/time selection and scheduling bugs in the Mastodon post scheduler.
- Reviewed and documented 25+ pull requests in a codebase shared by 95 dev teams, then moved to the Development Team three weeks in.

Beaver Ecoworks

Aug 2025 - Dec 2025

Software Development Engineer Intern

- Replaced an HMI-to-CSV ingestion path that dropped data intermittently with a Python OPC UA client that polls 14 PLC tags every minute and writes straight to Supabase.
- Built a SCADA monitoring dashboard for an industrial effluent treatment skid as a static Next.js export, moving query logic into locked-down PostgreSQL functions that return gap-filled history from 12 hours to 1 year.
- Traced a chart offset to an API that labeled Eastern local time as UTC, and corrected a four-way rotation in the PLC's water-quality columns through a database view, leaving raw rows untouched.

Beaver Ecoworks

Jun 2023 - Jul 2024

Full Stack Engineer

maintained since

- Built a monitoring dashboard for a wastewater treatment plant covering 17 sensor channels, including water quality, flow and three electrical panels.
- Wrote PHP REST APIs over MySQL with SQL rollups that turn 1-minute readings into 15-minute, weekly, monthly and yearly trends.
- Rebuilt a copy-pasted HTML page as a config-driven Next.js app and replaced manual FTP uploads with GitHub Actions deploys.

SELECTED PROJECTS

SmartSky · AI flight booking platform

2025

- Full-stack flight booking platform built with React, Node.js, and MongoDB, with a prototype LLM layer that turns natural-language travel queries into structured search parameters.

Blockchain Disk Space Rental · Decentralized storage marketplace, team of four

2025

- Built a dApp where users list and rent disk space through Ethereum smart contracts, using a Solidity factory contract that deploys a rental contract per listing, a React and Next.js frontend with Web3.js and MetaMask, and Truffle and Ganache for local deployment and testing.

SKILLS

Languages

Python, TypeScript, JavaScript, Swift, SQL, PHP

AI and ML

LLM integration and evaluation, Core ML, YOLO, Depth Anything V2, TensorFlow

Knowledge Representation

RDF/OWL/Turtle, SPARQL, RDFLib, SWI-Prolog

Accessibility

NVDA add-on development, VoiceOver, ARIA, WCAG

Systems

React, Next.js, SwiftUI, Node.js, FastAPI, REST APIs, PostgreSQL, Supabase, MySQL, Docker, AWS, GitHub Actions