# Pranav Talwar

*Novi, MI* | (517) 303-2169 | talwarpr@msu.edu | *https://www.linkedin.com/in/talwarpr/* | *github.com/9r4n4v* | *F1 STEM CPT & OPT (eligible for full-time internship per program rules)*

## Summary

Software Engineering and CS upcoming senior with hands-on **IT and full-stack SWE** experience building internal tools and user-facing features. Delivered **React feature and bug-fix work**, **Python (Flask) APIs**, and **WebSocket-based real-time functionality** backed by **SQL** and **CSV pipelines** and **Firebase**, deployed with **Docker** on **Google Cloud**. Experienced with enterprise identity and support workflows including **Azure AD**, **MFA**, **VPN**, and access and role troubleshooting. Strong in **ticket-driven root cause analysis**, **log and telemetry validation**, **staged rollouts with rollback readiness**, and **runbook and KB documentation**.

## Projects

**Android STEM Club Finder |** ***Android (Java, Kotlin), Firebase, SQL, Google Maps, Calendar Provider, Google Calendar, Sensors, REST APIs***

- Built Android features in **Java and Kotlin**, implementing end-to-end **UI to backend to database** flows with a focus on **bug-fix delivery** and stable user experience.
- Implemented **location and proximity logic** to identify the nearest club and surface it instantly via a **shake to reveal** interaction using the phone accelerometer (gesture detection, compute nearest, update UI).
- Integrated **Firebase** backend services and worked with **SQL-backed data** hosted on **MSU DECS servers** for structured club and event information as needed.
- **Collaborated** in a **team setting** by scoping features, **coordinating** merges on **Git**, documenting repro steps for edge cases, and partnering with **QA style** testing to validate fixes (permissions, location accuracy, calendar writes, offline behavior).

**AR Whiteboard World Anchored Gesture Drawing|** ***Python, OpenCV, MediaPipe, Computer Vision, Homography, Real-Time Systems***

- Built a real-time **AR whiteboard** that anchors a drawing canvas to a user-defined plane in the camera feed using **perspective transforms (homography)**, keeping strokes **fixed in-world** as the camera moves.
- Implemented **one-hand gesture controls** for drawing and mode switching (**index draw, multi-finger commands**) with **debounce logic** and **state management** to prevent accidental triggers during interaction.
- Added **dynamic stroke rendering** with multiple tools (**pen, brush, eraser**), **color cycling**, **pinch-gated brush sizing**, and **on-screen HUD feedback** for tool, size, and color.
- Engineered an efficient **real-time overlay pipeline** by compositing an **RGBA board layer** onto live video each frame, prioritizing **low-latency interaction** and **stable visual output**.

**Personal Portfolio Website|** ***HTML, CSS, PHP, Python (Flask), WebSockets, SQL, CSV, Docker, Google Cloud***

- **Built** a responsive, interactive UI with **authenticated real-time messaging** between users using **WebSockets** (multiple users can create an account) for instant updates and session-based behavior.
- Designed and implemented a **Python (Flask) REST API** for authentication, users, messaging, feedback, and project data, connected to **SQL** for persistence; added **CSV import & export** pipelines with validation for structured ingest and backups.
- Implemented a **feedback submission workflow** with immediate UI confirmation and refreshed state after backend-validated writes.
- **Containerized** the full stack with Docker and **deployed on Google Cloud**, enabling reproducible builds, consistent environments, and production-style testing.
- Delivered **full stack features** end-to-end across **UI**, **Flask APIs**, **WebSockets**, and **SQL**, debugging across layers to ship reliable fixes.

**C++ Game Systems Project ( Multi-Step OOP Build) |** ***C++, OOP, AI, Physics, XML Persistence, Large Codebase***

- Delivered a full C++ game through a **multi-step assignment pipeline** (incremental milestones), steadily expanding the codebase while keeping it clean via **encapsulation, composition, polymorphism**, and disciplined refactoring.
- Built **3 complete levels** with reusable level abstractions and shared gameplay systems, enabling level-specific mechanics without duplicating core engine logic.
- Implemented **save/load + level reload** using **XML persistence**, serializing game/level state and restoring it accurately to resume play and reload levels deterministically.
- Practiced "real" software engineering habits in C++: clear module boundaries (game state, entities, level logic, persistence), reproducible debugging, and iterative bug-fix/feature delivery, resulting in **competition win for best level** based on design + polish.

## Internships and Work Experience

**IT Software Engineering Intern -** ***Michigan Health Information Network (MiHIN), association (MDHHS)*** Aug 2025- Dec 2025

- **Resolved** about **80 issues per week** through **Tier 1/Tier 2 troubleshooting** across **frontend behavior, API responses, SQL data checks, and Azure AD**, driving tickets from initial report through root-cause analysis and final validation.
- **Investigated** user-facing problems involving **account access, role/group mappings, authentication state, and audit visibility**, using structured debugging steps to isolate whether the failure was caused by UI behavior, backend logic, directory configuration, or data inconsistencies.
- **Created** and maintained **KB articles, support runbooks, and reusable SQL verification queries** that helped standardize troubleshooting, reduce repeat escalations, and improve consistency across support and QA workflows.
- **Performed** detailed **pre-fix and post-fix validation** using logs, telemetry, screenshots, and reproducible test cases, ensuring that resolved issues were fully documented and could be confidently handed off to QA or stakeholders.
- **Strengthened** day-to-day support operations by **writing clear ticket notes**, **validation** summaries, and stakeholder updates that linked technical findings to **business impact**, improving communication across users, **QA**, and **engineering teams**.

**IT Software Engineering Intern -** ***U.S. Department of Energy, Facility for Rare Isotope Beams*** Apr 2025 – Sept 2025

- Improved **Windows deployment operations** by enhancing **MDT** and **MECM/SCCM task sequences** with scripted checks and workflow updates, reducing manual setup effort and increasing consistency across about **140 managed devices**.
- Supported **desktop and endpoint administration** by troubleshooting device imaging, software deployment, task-sequence failures, and configuration issues using **logs, reports, and device-state checks**.
- **Contributed** to more reliable endpoint support by **documenting deployment fixes**, refining scripts after **rollout** failures, and helping create a more scalable and supportable device management workflow for the IT team.
- Assisted with operational security workflows related to **BitLocker**, verifying device encryption state, investigating exceptions, and helping ensure systems met internal deployment and compliance expectations.

## Education

**Michigan State University** East Lansing, MI

***Bachelor's in Computer Science, (SWE focused)*** *Graduating Dec 2026'*

**Awards and Honors**: Dean's List, Presidential Scholarships (Top 1% at MSU)

**Relevant Coursework:** Mobile Application Development, Web Application Architecture and Development, Object-Oriented Software Development, Information Management and the Cloud, Algorithms and Data Structures, Computer Graphics

## Technical Skills

**Languages:** Python, JavaScript, TypeScript, SQL, C++, Swift, HTML, CSS | **Mobile Development**: Android Studio, Android SDK, Firebase, Google Maps SDK **Frontend:** React, React Native, Next.js, Tailwind CSS | **Backend / APIs:** Flask, PHP, WebSockets, REST APIs, CSV import & export | **Cloud / DevOps:** Docker, Google Cloud, AWS, Azure DevOps (CI/CD), Git | **Data / ML:** MongoDB, Firebase, TensorFlow, PyTorch | **IT / Enterprise (Platforms/Tools):** Azure AD (IAM), MECM/SCCM, MDT imaging, OSD, BitLocker, Jira, Kayako | **IT / Enterprise (Operations):** ITSM workflows, endpoint provisioning, MFA/VPN support, runbooks/KB documentation