NIPUN THENNAKOON

Software Engineer · Full-Stack | Mobile | Computer Vision

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WORK EXPERIENCE

Graduate Research Assistant

Washington State University (Biological Systems Engineering & AgWeatherNet)

Pullman, WA — May 2024 – Aug 2026

- Led a two-person team in developing AWN CropAI, a mobile app that uses thermal imaging to monitor and forecast crop heat stress, reaching 460+ downloads and receiving ASABE's 2026 AE50 Outstanding Innovations Award.
- Owned end-to-end development of the AWN CropAI application, spanning native Android and iOS apps, backend, database, DevOps, and maintenance.
- Made thermal image processing over 8x faster (3 s to 0.35 s) by redesigning the app's computer vision pipeline, providing growers near real-time results in the field.
- Produced more precise apple segmentation boundaries in AWN CropAI by modifying the YOLO11 architecture, raising mask mAP@50-95 from 73.6% to 75.8% (mean of four random seeds, $p < 0.05$).
- Integrated USB and wireless FLIR thermal cameras into AWN CropAI and built an opt-in pipeline that has crowdsourced 2,000+ field images to train segmentation and fruit temperature forecasting models.
- Collaborated with five commercial growers to beta test AWN CropAI and incorporate their feedback, conducted training sessions on the app and thermal imaging, and presented the app at grower outreach events.
- Built scheduled pipelines that ingest third-party weather data to extend AgWeatherNet's station coverage, and integrated USDA soil survey data (SSURGO) into its nutrient management system.
- Redesigned SNOWI, a system that measures snow depth from live weather station cameras, with a worker pool architecture that improved its performance and fault tolerance.
- Built frontend features for the AgWeatherNet portal revamp, and fixed bugs and added responsive layouts in AWN Smart Farms.
- Identified and reported authentication vulnerabilities, leading to fixes that protected AgWeatherNet user accounts and data.

Tech Stack: Python, TypeScript, Kotlin (Jetpack Compose), Swift (SwiftUI), FastAPI, React, PostgreSQL, Redis, PyTorch, OpenCV, pytest, Docker, AWS

Software Engineer

WSO2

Colombo, Sri Lanka — May 2022 – Jan 2024

- Implemented OAuth 2.0 client credentials authentication for callChoreo, an adaptive authentication function in WSO2 Identity Server (WSO2 IS) and Asgardeo that lets login flows securely call external APIs.
- Designed and developed React user interfaces for the SMS OTP and Identity Verification Provider features, including dynamically generated UIs that adapt to each provider's configuration.
- Maintained the Asgardeo and WSO2 IS client SDKs across web, mobile, and server platforms, used by developers to add authentication and authorization to their apps.
- Handled customer tickets and resolved Asgardeo production incidents as part of maintenance and L1/L2 on-call rotations.
- Resolved bugs in the B2B capabilities introduced in the major WSO2 IS 7.0 release.
- Conducted feasibility analyses for integrating third-party consent management providers with WSO2 Identity and Access Management (IAM) products to help customers meet privacy compliance requirements.

Tech Stack: Java, TypeScript, React, Redux, Spring, OSGi, Azure, Jenkins, Docker, Kubernetes

Software Engineer

DirectFN

Colombo, Sri Lanka — Jun 2021 – May 2022

- Implemented new features for the Order Management System (OMS) of DirectFN's Next Generation Trading Platform (NTP), including parent and child order cancellation for advanced orders.
- Developed the NTP API test framework with Cucumber, providing reusable test steps that let the QA team write their own automated API tests.

- Refactored the Back Office Server's front-end services and the OMS test client, and fixed bugs across both systems.

Tech Stack: Java EE, TypeScript, Angular, JBoss, Infinispan, Oracle Database, FIX Protocol, Cucumber

TECHNICAL SKILLS

- **Languages:** Python, TypeScript, JavaScript, Java, Kotlin, Swift, Dart, SQL
- **Backend:** FastAPI, Flask, Spring, Java EE, Node.js, OAuth 2.0, OpenID Connect, SAML
- **Frontend:** React, Redux, Astro, Angular, HTML, CSS
- **Mobile:** Android (Jetpack Compose), iOS (SwiftUI), Flutter, FLIR Mobile SDKs
- **ML & Computer Vision:** PyTorch, YOLO, OpenCV, TensorFlow, scikit-learn, NumPy, Pandas, Roboflow
- **Databases:** PostgreSQL, MySQL, Oracle Database, Redis
- **Cloud & DevOps:** Google Cloud (GCP), AWS, Azure, Docker, Kubernetes, Git, GitHub Actions, Jenkins, Grafana
- **Testing:** pytest, JUnit, Mockito, TestNG, Cypress, Cucumber, JMeter
- **Edge:** NVIDIA Jetson, Raspberry Pi
- **AI Agents & Tooling:** Claude Code, GitHub Copilot, OpenAI Codex, MCP
- **Certifications:** Architecting with Google Kubernetes Engine, Machine Learning on Google Cloud

EDUCATION

M.Sc. in Biological and Agricultural Engineering

Washington State University, Pullman, WA

May 2024 – Aug 2026 | GPA: 3.77/4.00

B.Sc. (Hons.) in Software Engineering

University of Kelaniya, Colombo, Sri Lanka

Mar 2017 – Mar 2021 | GPA: 3.90/4.00 (First Class)

PUBLICATIONS

- **N. Thennakoon**, D. Bhalekar, M. Keller, and L. Khot, "A computationally efficient pipeline for smartphone-based fruit surface temperature estimation in apples and grapes." Under review, *Precision Agriculture*, 2026.
- **N. Thennakoon**, S. Jarugula, D. Bhalekar, R. Naidu, and L. Khot, "Early detection of grapevine leafroll disease in Merlot using hyperspectral imaging, salient wavelength selection, and random forest." Under review, *American Journal of Enology and Viticulture*, 2026.
- K. Dadallage, A. Brees, **N. Thennakoon**, and L. R. Khot, "Real-time RGB imagery-based snow-depth monitoring for water resource management: An IoT and deep learning framework for regional mesonet deployments." Under review, *IEEE Internet of Things Journal*, 2026.

ACHIEVEMENTS

AE50 Outstanding Innovations Award - 2026

American Society of Agricultural and Biological Engineers (ASABE)

AWN CropAI was named one of 2026's best innovations in agricultural, food, and biological systems, alongside products from industry leaders John Deere, Case IH, and CLAAS.

Digital AgATHON Winners - 2025

AgAID Institute, Washington State University

Won the Crop Residue Prediction Challenge with a mobile app that estimates crop residue cover from ground-level field images.

PROJECTS

API Security Engine
Anomaly detection prototype developed in Python (scikit-learn, Pandas, Flask) that runs alongside a web server and learns normal API traffic patterns to detect DoS, DDoS, and token hijacking attacks. Published at AI-Cybersec 2021.

Elixir — Volunteer Software Developer, Lanka Software Foundation
Medical donation matching platform developed with the Sri Lanka Red Cross to address critical medicine shortages during the 2022 economic crisis, using React, TypeScript, Ballerina, and WSO2 Choreo and Asgardeo. The platform facilitated nearly USD 1 million in aid.

E-Pollbook — Volunteer Software Developer, Lanka Software Foundation
Real-time voter turnout platform for the Election Commission of Sri Lanka, with live analytics such as peak voting hours and turnout demographics. Built with Flutter, Ballerina, MySQL, and Grafana. Piloted in the 2020 parliamentary election.