

Ariel Cornelius Sitorus

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Professional Experience

Fourthirty RC - Software Engineer Associate

Feb 2025 – Present

Fourthirty RC is a community-based sports initiative focused on running, combining regular athletic activities with the development of sportswear products such as apparel and hydration gear.

- Built a full e-commerce platform with product catalog, variant system, session-based cart, and real-time JNE shipping cost calculation via RajaOngkir API, using Laravel 9, MySQL and PHP 8.
- Built and refined key interface elements such as navigation bars, dashboard views, and reusable UI components to improve usability and overall user experience.
- Owned the full design-to-production pipeline by designing in Figma and building responsive Blade templates, so shipped UI matched specs without a handoff layer.
- Contributed to the design of sports apparel, including running shirts and activewear, aligning visual concepts with the brand identity and target audience.

Akasadipha - ML and Robotic Software Developer

Jan 2025 – Present

Akasadipha is a part of Aksantara ITB which is a organization focused on the development of UAV (Unmanned Aerial Vehicle) systems, particularly for long endurance and low altitude missions. As part of Team Akasadipha, the work centers on integrating hardware and software to support autonomous aerial operations.

- Developed a real-time hotspot detection system using OpenCV and YOLO-based object detection, including training and fine-tuning models on custom aerial data to improve detection performance under varying conditions.
- Implemented communication between onboard systems and the flight controller using MAVLink, enabling the UAV to receive mission data and respond to detected targets.
- Designed and integrated a payload drop mechanism connected to the autopilot (Matek) and controlled via a Raspberry Pi, allowing automated actuation based on detection results.
- Utilized Mission Planner for telemetry monitoring and mission data integration, supporting system testing and validation during flight operation.

Education

Institut Teknologi Bandung - B. Sc in Informatics

Sep 2024 - Aug 2028

- **Activities** : Robotic Software Control of Aksantara ITB

GPA : 3.51

Volunteer

KAT ITB 2026 - Back End Developer

July 2026 – Present

SPARTA HMIF 2026 - Quality Assurance & Front End Developer

July 2026– Present

Wisuda April HMIF - Front End Developer

Oct 2025 – Feb 2026

Aku Masuk ITB is ITB's annual nationwide outreach program introducing prospective students to campus life, culminating in ITB Day

Projects & Achievements

- **[NATIONAL] FINALIST in The Great Data Heist: Organized by Universitas Bina Nusantara Des 2025**
- **[INTERNATIONAL] CONTESTANT in ICPC Asia Jakarta**
- **[NATIONAL] FINALIST and BEST SPIRIT Award in Kompetisi Robot Terbang Indonesia (KRTI)**
- **Online Gambling Detector**
Chromium extension (TypeScript, Vite, Chart.js, Tesseract.js) that scans any webpage for gambling content using five detection algorithms: Aho-Corasick, KMP, Boyer-Moore, Rabin-Karp, and a fuzzy Weighted Levenshtein matcher to catch leet-speak variants. Matches get highlighted in-DOM, flagged regions are blurred, and images go through Tesseract.js OCR to catch embedded gambling graphics. The popup shows keyword frequency, per-algorithm stats, and execution times, and reruns automatically on page updates via MutationObserver.
- **DOM Tree Traversal & Visualization Platform**
Web platform (TypeScript, Express, Docker, Azure) for querying and visualizing the DOM tree of any URL. Parses raw HTML using a hand-built tokenizer, then lets users traverse it with BFS or DFS through a custom CSS selector engine that handles all standard combinators including child, sibling, and descendant. Also includes Binary Lifting for O(log n) LCA queries and splits large traversals across Node.js Worker Threads for trees with 500+ nodes. Deployed on Azure with Docker Compose, with animated traversal on the frontend.
- **32-bit x86 Kernel Implementation in C and Assembly**

32-bit OS kernel built from scratch in C and x86 Assembly, starting from the bootloader all the way to a working interactive shell. Covers GDT/IDT setup, PIC-managed interrupt handling, paging-based virtual memory, a round-robin process scheduler, system calls, and a FAT32 file system driver. Built and tested on QEMU.

- **Proactive Phishing URL Detector**

ML pipeline (Python, XGBoost, LightGBM, CatBoost) for classifying phishing URLs without any DNS lookups or external databases, purely from raw URL structure. Uses 70+ hand-crafted lexical features combined with TF-IDF character n-gram SVD embeddings (150 components) fed into a weighted ensemble trained with 5-fold stratified CV. Hit 0.9941 ROC-AUC and 98.1% accuracy on the held-out test set.

- **E-Library Search Engine**

Digital library web app (Go, Tailwind CSS) with text, document upload, and book cover image search. Text search runs Latent Semantic Analysis built from scratch, TF-IDF term-document matrix, truncated SVD via power iteration with deflation to extract the top-k singular vectors, then cosine similarity in the reduced latent space for ranking. Cover search uses the same SVD core for PCA-based image similarity (eigenfaces approach), matching uploaded covers to the catalog by Euclidean distance in the projected space. Book recommendations are also similarity-driven.

- **FMCG Market Demand Forecasting & Cannibalization Analysis**

Forecasting project (Python, scikit-learn, Prophet, statsmodels) on 1M+ FMCG transactions across 15 SKUs over five years. Built 30+ features covering price elasticity, promo lift, and lag/rolling variables, then benchmarked five models with Shapiro-Wilk, Breusch-Pagan, Durbin-Watson, and VIF validation. Also ran Source of Volume analysis to measure product cannibalization and came away with concrete recommendations on pricing strategy and inventory planning.

Certificate

- [CERTIFICATE] CLAUDE 101
- [CERTIFICATE] AI Fluency: Framework & Foundations

Skills

Languages: Python, TypeScript, JavaScript, Go, C, C++, Java, Haskell, SQL

Frontend: React, Next.js, Tailwind CSS, Framer Motion, Zustand, TanStack Query

Backend & Cloud: FastAPI, Hono, PostgreSQL, Drizzle ORM, Supabase, Docker, Vercel

AI/ML: PyTorch, Hugging Face Transformers, scikit-learn, SHAP, Pandas, NumPy

Others: Git, Nginx, Linux, REST API, WebSocket, CI/CD