



# PHASUWUT CHUNNAPIYA

## Full Stack Developer & AI Developer

### Summary

Full Stack Developer with over 6 years of experience building scalable web applications, APIs, and AI-powered systems. Experienced in developing end-to-end solutions using modern frameworks such as React, Next.js, NestJS, and FastAPI. Strong background in Artificial Intelligence, Computer Vision, and Large Language Models, with hands-on experience in object detection, multimodal retrieval, and RAG-based systems. Passionate about designing intelligent systems that combine modern AI with robust backend architectures.

### Education

- **Master of Science Program in Computer Science** 2021-2024  
King Mongkut's University of Technology North Bangkok. GPA 3.85
- **Bachelor of Science Program in Computer Science** 2016-2019  
King Mongkut's University of Technology North Bangkok. GPA 2.71

### Work Experience

- **TechFlow Solution, Co., Ltd.** April 2025 - Present  
(Full stack developer)
  - **E-commerce marketplace:** Developed a responsive multi-vendor e-commerce platform using Next.js, featuring user authentication, store management, and dynamic storefronts. Built product listing and search features, integrated company data for onboarding, and implemented role-based access with location-based services.
  - **Media Service (File Management API):** Developed a centralized file management service with AWS S3 integration, supporting secure uploads, pre-signed URLs, and automated image processing for scalable media handling.
- **Ogilvy & Mather** July 2021- April 2025  
(Software Developer)
  - **Real Estate Websites:** Developed a responsive real estate platform using Next.js, Node.js, and LoopBack, delivering continuous improvements based on client feedback. Built key pages and dynamic land listing features, including Google Maps integration with custom boundary drawing. Integrated analytics (GA3/GA4), UTM tracking, and lead systems with automated notifications, while using cron jobs to optimize performance and reduce server load.
  - **Automotive Websites (China & Japan):** Developed responsive automotive websites using Next.js, Laravel, and Nest.js, covering multiple vehicle models and promotion platforms. Focused on dynamic content, test drive features, and user engagement tools including chatbot integrations.
  - **Insurance Website:** Developed a content-driven website using Next.js, featuring article pages, search, bookmarks, and a structured global layout for compliance.
  - **Campaign Websites (Coffee & Gaming):** Built interactive campaign websites using Next.js and React, including multi-step forms, reward systems, quizzes, and analytics integration for performance tracking.
  - **Banking Websites (Bank A & B):** Delivered responsive websites for banking clients, including customer-facing platforms and corporate sites, with interactive UI, forms, and content-driven pages.
- **Adesso Technology Co.,LTD** July 2020 - July 2021  
(Full stack developer)
  - **Video Streaming Platform Websites:** Built a responsive website using React.js, Node.js, Express.js, GraphQL, and Sequelize. Built video browsing, authentication, and subscription pages.
  - **E-Commerce Book Platform Websites:** Built a responsive website using Next.js, Node.js, Express.js, Sequelize, and Material-UI. Developed product listings and authentication pages.

### Contact

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### AI & Multimodal Systems

- Large Language Models (LLMs)
- RAG Systems
- Vector Search (FAISS, Qdrant)
- Cross-Modal Retrieval & Alignment (Text-Image-Video)
- Embeddings (Text & Image)
- Vision-Language Models (CLIP, BLIP)
- Multimodal AI
- Semantic Search & Retrieval Systems
- Speech-to-Text, Summarization & Conversational Q&A Systems

### Computer Vision & Deep Learning

- Object Detection
- Multi-Object Tracking
- Instance Segmentation
- Video & Image Analysis

### Computer Language

- TypeScript
- JavaScript
- HTML
- Python
- CSS
- Solidity

### Framework & Tool

- React.js
- Next.js
- FastAPI
- Vector DB
- Tailwind CSS
- Vite
- React Native
- Nest.js
- Node.js
- Ant Design
- LoopBack
- Express
- Mantine
- Expo

### Library

- Prisma
- TypeORM
- Sequelize
- Jest
- GSAP

### DevOps

- AWS (EC2)
- Cloudflare
- Docker
- Ubuntu
- Grafana
- DigitalOcean (Droplet)
- Nginx
- Jenkins
- Heroku

## Analytics Tools

- Google Tag Manager
- Google Analytics

## Development Tools

- Postman
- Jmeter

## Chat Bot

- n8n
- Discord chat
- Telegram Bot API
- Line Messaging API
- Dialogflow
- Line OA
- Facebook Messenger API

## Data & Messaging

- Kafka

## The Siam Cement (Ta Luang) Co., Ltd.)

May 2019 – August 2019

(Full stack Developer Intern)

- **Warehouse Management System (WMS):** Built a WMS using HTML, CSS, JavaScript, jQuery, and Bootstrap. Built features for inventory tracking, data management, and user interaction with a responsive UI for improved efficiency.

## Project

### Master's Degree Projects

- **Electric Vehicle Charger Socket Detection:** Built machine learning models using YOLO V5-V8 and OpenCV to detect Electric Vehicle charger socket types.
- **Electric Vehicle Charger Socket Detection Web Application:** Built a web application to detect charger socket types using Next.js, YOLO, and TensorFlow.
- **Indoor Furniture Detection:** Built machine learning models using YOLO to classify indoor furniture types.
- **Movie Review Sentiment Analysis:** Built a natural language processing model to analyze movie reviews and predict user sentiment, using Python, scikit-learn, pandas, and NumPy.
- **Heart Disease Prediction:** Developed a heart disease prediction model using Python, Scikit-learn, Pandas, DecisionTreeClassifier and NumPy.
- **Blockchain-based Lottery Trading Platform:** Developed a decentralized lottery trading platform using React, Web3, and Solidity, integrating smart contracts and building responsive UI for secure user transactions.

### Bachelor's Degree Projects

- **Warehouse Management System (WMS):** Built a WMS for SCG Saraburi using HTML, CSS, JavaScript, jQuery, and Bootstrap.
- **Face Mask Detection:** Developed a machine learning model to detect faces with masks, using Python, YOLOv3, and OpenCV.

### Personal Projects

- **AI Document QA System (RAG + LLM):** Built a document question answering system using RAG architecture with semantic search (FAISS + embeddings) and LLMs. Developed a full-stack solution (FastAPI + React) for real-time document querying with contextual responses.
- **AI Resume Assistant (RAG + LLM):** Developed an AI assistant that answers recruiter queries about resume and portfolio content using embedding-based retrieval and LLMs. Implemented content crawling, chunking, and vector search with source attribution for explainable responses.
- **AI Meeting Transcription, Summarization & Q&A System (RAG + LLM):** Built an end-to-end system for meeting transcription, summarization, and context-aware Q&A using Whisper, Qdrant, and LLMs, with FastAPI + React for real-time processing and interactive querying.
- **Multimodal Semantic Search Chat System (RAG + Multimodal AI):** Built a multimodal semantic search chat system enabling cross-modal retrieval across text and images using CLIP, BLIP, SentenceTransformers, Typhoon OCR, and Qdrant, with FastAPI + Next.js for real-time interaction and hybrid semantic search
- **Multimodal Semantic Retrieval Platform (Image & Video):** Designed a cross-modal search system using CLIP embeddings and vector search, enabling real-time retrieval across images and video frames from natural language queries.
- **Visual Question Answering System (VQA, Multimodal AI):** Engineered an end-to-end VQA system combining YOLO, CLIP, ViT, and BLIP with LLMs for context-aware image understanding and real-time interactive querying.
- **AI Video Analysis & Semantic Search System:** Built an end-to-end video intelligence platform integrating object detection, scene understanding, and embedding-based retrieval. Enabled timestamp-level semantic search and navigation across video content.
- **Real-Time Smart Surveillance System (Detection + Tracking):** Developed a real-time surveillance system using YOLOv9-seg and ByteTrack for instance segmentation and multi-object tracking. Implemented boundary-based intrusion detection with automated Telegram alerts for real-time monitoring.
- **Multimodal Search Chat System (Text + Image):** Designed a multimodal retrieval system combining CLIP, SentenceTransformers, and Qdrant. Integrated OCR and hybrid ranking to support real-time semantic search via FastAPI and Next.js.
- **CI/CD & Deployment Automation** Designed and implemented CI/CD pipelines using Jenkins and Docker, including automated deployment, DNS synchronization, and real-time alerting systems.

## Publications

### International Journals

- **Enhancing Automatic Electric Vehicle Charging: A Deep Learning Approach with YOLO and Feature Extraction Techniques** (Scopus Journal Q1, Frontiers), DOI :[10.3389/fcomp.2025.1505446](https://doi.org/10.3389/fcomp.2025.1505446).

### International Conferences

- **Efficient Video Object Detection for EV Charging Plug Type Identification in Real-World Scenarios**, 2024 19th International Joint Symposium on Artificial Intelligence and Natural Language Processing (ISAI-NLP), DOI: [10.1109/ISAI-NLP64410.2024.10799466](https://doi.org/10.1109/ISAI-NLP64410.2024.10799466).
- **Efficient Video Object Detection of Indoor Furniture and Home Appliances**, 2024 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom), DOI: [10.1109/BlackSeaCom61746.2024.10646241](https://doi.org/10.1109/BlackSeaCom61746.2024.10646241).

# PHASUWUT CHUNNAPIYA

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## PROFESSIONAL SUMMARY

Full Stack Developer with 6 years of experience building scalable web applications and production systems, with a strong focus on frontend development using Next.js, React.js, and TypeScript to deliver responsive, user-friendly, and high-performance interfaces. Skilled in developing end-to-end solutions across frontend and backend using Nest.js, Node.js, and FastAPI. Experienced in building AI-driven applications, including LLM-based systems, RAG pipelines, and computer vision.

## EDUCATION

### Master of Science in Computer Science

King Mongkut's University of Technology North Bangkok

2021 – 2024

GPA: 3.85

### Bachelor of Science in Computer Science

King Mongkut's University of Technology North Bangkok

2016 – 2019

GPA: 2.71

## PROFESSIONAL EXPERIENCE

### TechFlowSolutionCo., Ltd.

April 2025 – Present

#### Full Stack Developer

Designed and developed multi-service business platforms, including a multi-vendor marketplace, centralized media management system, and shared authentication services across internal systems.

#### ◆ E-Commerce Marketplace Platform (Next.js · NestJS · TypeORM · PostgreSQL)

- Developed a scalable multi-vendor e-commerce platform supporting buyer-seller workflows and merchant storefronts.
- Built full-stack features using Next.js and NestJS, including authentication, user profiles, seller onboarding, and product discovery.
- Designed multi-tenant architecture with subdomain-based storefronts for merchant isolation.
- Implemented KYC workflows with document handling, verification, and admin review processes.
- Integrated Google Maps for location-based features and improved user interaction.
- Built reusable UI components using Ant Design and Tailwind CSS for consistent user experience.

#### ◆ Cooperative — Shared Authentication & RBAC Module (Next.js · NestJS · TypeORM · Oracle DB · Ant Design · Tailwind CSS)

- Developed a shared end-to-end authentication module using Next.js and NestJS across frontend and backend services.
- Implemented OAuth sign-in flows, including login redirect, authorization code callback handling, and secure token exchange.
- Built authenticated profile retrieval flows and implemented secure session management with access and refresh tokens, token expiry validation, and automatic redirection for invalid sessions.
- Designed RESTful authentication APIs with structured error handling and environment-based configuration for reliable integration with external identity providers.
- Designed and implemented a role management module to support user role assignment and permission control across the system.
- Built backend services using TypeORM and Oracle Database to manage roles, permissions, and access control data.
- Implemented role lifecycle workflows, including creation, update, assignment, and retrieval, to support authorization logic and administrative operations.

#### ◆ Media Service — Centralized File Management API (Node.js · TypeScript · Hono · AWS S3)

- Built centralized media service using Node.js (TypeScript) and AWS S3 with secure pre-signed URL access
- Designed RESTful APIs for file upload, retrieval, and access control across multiple services
- Implemented image processing pipeline with thumbnail and multi-size generation
- Managed metadata using PostgreSQL and Prisma for efficient querying
- Ensured reliability with validation (Zod), API documentation (Swagger), and unit testing (Jest)

Delivered web platforms and APIs across real estate, automotive, banking, insurance, and consumer industries — spanning property management, campaign sites, chatbot systems, and lead-generation platforms.

#### ◆ Real Estate Platform (Next.js · LoopBack 4)

- Developed a responsive real estate platform and RESTful APIs using Next.js, Node.js, and LoopBack to manage property listings and content.
- Delivered the project over a one-year development cycle, continuously enhancing features based on client feedback.
- Built key pages, including About Us, Career, Case Reports, Search, Procurement, Inspiring Stories, and Land Listings, with dynamic data integration via APIs.
- Integrated Google Maps with a custom polygon drawing feature, enabling users to define multi-sided property boundaries for land listings.
- Implemented multi-language support (Thai/English) to improve accessibility for a broader audience.
- Integrated Google Analytics (GA3/GA4) and UTM tracking to monitor user behavior and evaluate marketing performance.
- Developed background processing jobs (cron) to offload heavy tasks and improve overall system performance.
- Implemented user consent management to ensure compliance with privacy policies and data regulations.
- Built automated email notification systems for customer and internal workflows triggered by lead form submissions.
- Integrated Google reCAPTCHA to prevent spam and bot submissions across lead and promotion forms.

#### ◆ Automotive Platform — China Client (Next.js · Laravel · Bootstrap · Tailwind CSS)

- Developed responsive automotive websites using Next.js, Laravel, Bootstrap, and Tailwind CSS to support product promotion and customer engagement.
- Delivered websites for five car models (two in 2023 and three in 2024), ensuring consistent design and performance across multiple product lines.
- Integrated backend APIs to enable test drive registration and appointment management for customers.
- Connected to existing showroom databases to synchronize and manage test drive appointment data.
- Built dynamic vehicle model and specification pages, retrieving and displaying detailed data via APIs.
- Developed a chatbot system using Dialogflow, LINE Messaging API, and Facebook Messenger API to assist users with inquiries about car models, promotions, and test drive bookings.
- Implemented LINE Rich Menu to provide quick access to FAQs and key actions, improving user interaction and engagement.

#### ◆ Automotive Platform — Japan Client (Next.js · NestJS · Prisma · Tailwind CSS · Mantine · Microservices)

- Developed a responsive automotive website using Next.js, NestJS, Prisma, Tailwind CSS, and Mantine.
- Designed and implemented a microservices architecture to improve system scalability and maintainability.
- Built promotion and promotion detail pages to showcase marketing campaigns and product offers.
- Developed and integrated custom APIs to dynamically fetch and display promotion data.
- Integrated LINE Tag Conversion via Google Tag Manager to support marketing tracking and campaign performance analysis.

#### ◆ Insurance Industry Client (Next.js · REST APIs · Tailwind CSS)

- Developed a responsive website for an insurance industry client using Next.js with API integration for dynamic content management.
- Implemented key features, including search functionality, bookmarks, article listing, and article detail pages, with dynamic content retrieval from backend APIs.
- Built essential pages such as About Us, custom 404, and a Cookie Consent system to improve compliance and user experience.
- Designed and implemented a global layout with reusable components, including a Navbar, to ensure consistent navigation across the platform.

#### ◆ Banking Client A — 4 Websites (HTML · CSS · JavaScript · jQuery · GSAP · Bootstrap · Tailwind CSS)

- Developed and delivered four responsive websites for a banking client using HTML, CSS, JavaScript, jQuery, Tailwind CSS, GSAP, and Bootstrap, improving user experience and digital service accessibility.
- Credit Card Platform: Built responsive pages to present credit card details, benefits, and related financial services.
- Second-Hand Property Platform: Implemented user authentication (login/register) to enable users to manage property listings and account information.
- Funeral Service Platform: Developed features for activity search, obituary listings, and event registration, including multi-step forms, QR code donation verification, condolence messaging, and online wreath submissions.
- Funeral TV Platform: Designed responsive pages to display condolence messages and event schedules, enabling easy access to funeral timelines and information.

#### ◆ Banking Client B — Corporate Website (HTML · CSS · JavaScript · jQuery · GSAP · Tailwind CSS)

- Developed responsive static websites for a banking client using HTML, CSS, JavaScript, jQuery, Tailwind CSS, and GSAP.
- Built core pages such as Who We Are, Team Member Details, Strategic Partnerships, Partner Profiles, News & Blog, and Splash pages to support corporate branding and content delivery.
- Implemented Contact Us pages with lead capture forms and a Recognition section to highlight company awards and achievements.

#### ◆ Eyewear Industry Client (Next.js · Sequelize · Tailwind CSS · Lottie · GSAP)

- Developed a responsive website for an eyewear industry client using Next.js, Sequelize, Tailwind CSS, Lottie, and GSAP, with API integration for dynamic content management.
- Built key pages, including Search, Awards, Career & Career Detail, Promotions, and Promotion Detail, with dynamic data retrieval from backend APIs.
- Implemented drop-lead forms to collect user information and store it in the database to support marketing and customer engagement.
- Developed essential pages such as Contact Us, Privacy Policy, and a custom 404 page.
- Enhanced user experience with interactive animations using Lottie and GSAP.
- Integrated Google Analytics 4 to monitor user behavior and analyze website performance.

### ◆ Coffee Shop Campaign (Next.js · Tailwind CSS · Node.js · Express.js · MySQL )

- Developed a responsive campaign website and APIs using Next.js and Tailwind CSS to drive user engagement and campaign conversions.
- Built an interactive homepage featuring product bag designs and reward-based participation mechanics.
- Designed and implemented a multi-step reward claim flow, including input validation, quiz interaction, and social sharing.
- Integrated Google Analytics 4 and Facebook Pixel to track user behavior and generate insights for campaign performance optimization.

### ◆ Gaming Campaign (React.js · Node.js · Express.js · Tailwind CSS · MySQL)

- Developed a responsive campaign website and APIs using React.js, Node.js, Express.js, and Tailwind CSS to drive user engagement and campaign participation.
- Built a homepage featuring campaign details, reward information, and FAQ content.
- Designed and implemented a multi-step lead capture flow with structured data collection and validation.
- Integrated backend storage and third-party services for data validation and automated redeemable game code generation.

### ◆ Glass Packaging Industry Client (HTML · CSS · JavaScript)

- Developed a responsive corporate website using HTML, CSS, and JavaScript to support company communication and industry content delivery.
- Built core pages, including About, Contact Us, and News, improving content accessibility and user engagement.
- Designed a global layout and reusable components to ensure consistent UI/UX across the platform.

### ◆ Special Projects & Internal Tools

- Developed a LINE OA chatbot to introduce the organization and its products, enhancing customer communication and supporting sales operations.
- Built web-based object detection applications using React.js and TensorFlow.js for real-time visual recognition, demonstrating applied computer vision capabilities in web environments.

## Adesso Technology Co., Ltd

July 2020 – July 2021

*Full Stack Developer*

### ◆ Video Streaming Platform (React.js · Node.js · Express.js · GraphQL · Sequelize · Bootstrap)

- Built a responsive video streaming platform with content browsing, search, and on-demand playback using React.js.
- Implemented authentication (register, login, session management) with protected routes restricting premium content to active subscribers.
- Built subscription management UI for plan selection, upgrades, downgrades, and billing overview.
- Integrated a GraphQL API layer with Apollo, enabling flexible data querying and eliminating the over-fetching common with REST.

### ◆ E-Commerce Book Platform (Next.js · Node.js · Express.js · Sequelize · MySQL · Material-UI)

- Built a responsive online bookstore supporting browsing, product detail pages, and a checkout-ready cart.
- Implemented listing pages with category filters, search, and sorting; product pages display metadata, pricing, and availability via REST API.
- Built full authentication with JWT session handling and profile management for personalized shopping.
- Delivered a fully responsive UI using Material-UI, maintaining visual consistency across desktop and mobile.

## The Siam Cement (Ta Luang) Co., Ltd.

May 2019 – August 2019

*Internship Full Stack Developer*

### ◆ Warehouse Management System (HTML · CSS · JavaScript · jQuery · Bootstrap)

- Built a WMS for The Siam Cement (Ta Luang) to digitize inventory tracking, goods receiving, and warehouse operations replacing manual workflows.
- Implemented stock-in/out recording, inventory monitoring, and data search to help staff manage items efficiently.
- Designed a responsive Bootstrap UI accessible on both desktop workstations and warehouse floor tablets.

## TECHNICAL SKILLS

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<b>Programming Languages</b>	· TypeScript · JavaScript · Python · HTML · CSS · SCSS · PHP · Solidity · Java · XML · C · C++
<b>Frontend</b>	· React.js · Next.js · Vite · React Native · Expo · Redux · Axios · Web3 · jQuery · Laravel
<b>UI Libraries &amp; Animation</b>	· Tailwind CSS · Ant Design · Mantine · Material-UI (MUI) · Bootstrap · GSAP · Lottie
<b>Backend</b>	· NestJS · Node.js · Express.js · FastAPI · Laravel · LoopBack 4 · Hono
<b>Backend Architecture</b>	· REST API · Microservices · Modular Architecture
<b>Backend Processing</b>	· Cron Jobs · Background Jobs · File Upload · AWS S3 Pre-signed URLs
<b>API &amp; Integration</b>	· GraphQL · Webhooks · Swagger / OpenAPI
<b>Auth &amp; Security</b>	· JWT · OAuth
<b>Relational Database</b>	· PostgreSQL · MySQL · Oracle
<b>ORM</b>	· Prisma · TypeORM · Sequelize
<b>DevOps &amp; Cloud</b>	· Docker · Jenkins · AWS EC2 · AWS S3 · DigitalOcean droplet · Cloudflare · Nginx · PM2 · Heroku · RunPod · Vercel
<b>Messaging</b>	· Kafka · Dialogflow · LINE Messaging API · Telegram Bot API · Facebook Messenger API · MQTT
<b>Maps &amp; Location APIs</b>	· Google Maps API · Places API · Places Autocomplete · Geocoding API · Polygon Drawing · Marker Placement · Pin-based Location Selection
<b>Analytics</b>	· Google Analytics (GA3/GA4) · Google Tag Manager · Facebook Pixel
<b>Testing &amp; Monitoring</b>	· JMeter · Jest · React Testing Library · Grafana
<b>Version Control</b>	· Git · GitHub · GitLab · Bitbucket
<b>Automation</b>	· n8n · Discord Alerts · Telegram Alerts
<b>Third-party Integrations</b>	· Google reCAPTCHA · DBD Company Data API
<b>AI / ML</b>	· <u>LLMs</u> : · GPT-4o-mini · GPT-4.1 · GPT-5 · LLaMA 3.2 · Ollama · DeepSeek · <u>RAG &amp; Q&amp;A</u> : · LangChain · FAISS · Qdrant · Document Q&A · <u>Embeddings &amp; Semantic Search</u> : · OpenAI text-embedding-3-small · SentenceTransformers (BAAI/bge-m3) · Hugging Face Embeddings (BAAI/bge-m3) · <u>Speech &amp; Summarization</u> : · Whisper · FLAN-T5 · <u>Multilingual AI</u> : · NLLB-200 · <u>Image Generation</u> : · SDXL Turbo · FLUX · Diffusers
<b>AI Libraries &amp; Frameworks</b>	· LangChain · Hugging Face · PyTorch · TensorFlow · ONNX · Scikit-learn · OpenAI API · DeepSeek API
<b>Computer Vision</b>	· <u>OCR</u> : · Typhoon OCR · <u>Vision-Language Models</u> : · CLIP · BLIP · Vision Transformer (ViT) · <u>Object Detection</u> : · YOLOv3–YOLOv12 · YOLOv26 · RF-DETR · GroundingDINO · <u>Object Tracking</u> : · ByteTrack · BoT-SORT · <u>Video Object Segmentation</u> : · XMem · Cutie · <u>Instance Segmentation</u> : · YOLOv8-Seg · YOLOv9-Seg · YOLOv11-Seg · YOLOv12-Seg · YOLOv26-Seg · RF-DETR-Seg · Mask R-CNN · SAM · <u>Image Processing &amp; Augmentation</u> : · OpenCV · Albumentations · NumPy
<b>Document / Data Processing</b>	· PyPDFLoader · PyMuPDF · Pandas · NumPy
<b>Vector Database</b>	· FAISS · Qdrant
<b>Search &amp; Retrieval</b>	· SentenceTransformers (BAAI/bge-m3) · OpenAI Embeddings
<b>AI Coding Tools</b>	· GitHub Copilot · Claude Code · Codex
<b>Design &amp; Dev Tools</b>	· Figma · Adobe XD · Canva · Trello · Jira · Postman · MATLAB · Android Studio · Termius

## PUBLICATIONS

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### ◆ International Journal (Scopus Q1)

- Enhancing Automatic Electric Vehicle Charging: A Deep Learning Approach with YOLO and Feature Extraction Techniques
  - *Frontiers in Computer Science — Scopus Q1 — DOI: 10.3389/fcomp.2025.1505446*

### ◆ International Conferences (IEEE)

- Efficient Video Object Detection of Indoor Furniture and Home Appliances
  - *2024 IEEE International Black Sea Conference on Communications and Networking(BlackSeaCom)—DOI: 10.1109/BlackSeaCom61746.2024.10646241*
- Efficient Video Object Detection for EV Charging Plug Type Identification in Real-World Scenarios
  - *2024 19th International Joint Symposium on AI and NLP(iSAI-NLP) — DOI:10.1109/iSAI-NLP64410.2024.10799466*

## KEY PROJECTS

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### • Master's Degree Projects

#### ◆ Electric Vehicle Charger Socket Detection

- Developed computer vision models to detect and classify multiple types of EV charger sockets from images
- Built detection pipeline using Python, PyTorch, and YOLOv5–YOLOv8 for multi-class object detection
- Designed data preprocessing and augmentation workflow using OpenCV and Albumentations to improve model robustness
- Trained and evaluated models for accurate classification of different charging connector types under varied conditions
- Enabled automated identification of EV charger sockets, forming the foundation for downstream segmentation, tracking, and deployment systems

#### ◆ EV Charger Socket Detection Web Application:

- Developed a web-based system for real-time detection and classification of EV charger socket types from images
- Extended from: Electric Vehicle Charger Socket Detection
- Designed full-stack architecture integrating frontend and AI inference pipeline for interactive detection
- Built frontend using Next.js and Tailwind CSS to support image upload and real-time visualization of detection results
- Integrated YOLOv6/YOLOv8 and TensorFlow models for image-based inference and classification
- Implemented end-to-end workflow from user input to model prediction and result rendering in the browser
- Enabled accessible, real-time EV charger socket detection through an interactive web interface

#### ◆ Indoor Furniture Detection

- Developed object detection models to classify various indoor furniture types such as chairs, sofas, and tables from images
- Extended from: -
- Built detection pipeline using Python, YOLO, and OpenCV for multi-class object detection
- Designed data preprocessing and training workflow to improve model performance across different indoor environments
- Trained and evaluated models for accurate recognition of furniture objects under varying conditions
- Enabled automated visual recognition of indoor objects, demonstrating general-purpose object detection capability

#### ◆ Movie Review Sentiment Analysis

- Developed a natural language processing model to classify sentiment of movie reviews from textual data
- Built text processing pipeline using Python, Pandas, and NumPy for data cleaning and feature preparation
- Applied Scikit-learn to extract features and train classification models for sentiment prediction
- Designed evaluation workflow to assess model performance on positive and negative sentiment classification
- Enabled automated sentiment analysis, demonstrating fundamental NLP modeling and text classification capability

#### ◆ Blockchain-based Lottery Trading Platform

- Developed a decentralized web application for lottery trading using blockchain and smart contracts
- Designed and implemented smart contracts using Solidity to handle lottery transactions and ensure trustless execution
- Built frontend using React.js and Redux for state management and user interaction
- Integrated Web3 to connect the frontend with blockchain network and enable transaction processing
- Developed backend APIs and deployed the system on Heroku for application hosting and service integration
- Enabled secure and transparent lottery trading through decentralized architecture and smart contract automation

#### ◆ Heart Disease Prediction

- Developed a machine learning model to predict heart disease risk from structured medical data
- Built data processing pipeline using Python, Pandas, and NumPy for data cleaning, preprocessing, and feature engineering
- Applied feature selection techniques to identify important health indicators influencing prediction outcomes
- Trained classification models using Scikit-learn to predict disease risk based on patient attributes
- Evaluated model performance to ensure reliability and effectiveness for medical prediction tasks
- Enabled automated risk prediction, demonstrating applied machine learning in healthcare analytics

#### ◆ People Detection System

- Developed a real-time people detection system using embedded hardware and sensor-based input
- Designed system using Arduino and sensor modules to detect human presence based on environmental signals
- Implemented event-driven logic to trigger automated responses when human activity is detected
- Integrated hardware components with control logic to enable real-time detection and response workflow
- Enabled practical human presence detection for automation scenarios, demonstrating embedded system and IoT capability

### • Bachelor's Degree Projects

#### ◆ Warehouse Management System (WMS)

- Developed a warehouse management system to manage inventory and warehouse operations for SCG Saraburi
- Extended from: -
- Designed and implemented web-based system using HTML, CSS, JavaScript, jQuery, and Bootstrap
- Built core functionalities for inventory tracking, stock management, and warehouse operation workflows
- Developed user interface to support data entry, monitoring, and operational management
- Enabled efficient warehouse operations by digitizing inventory processes and improving data accessibility

#### ◆ Numerical Methods Web Applications

- Developed web-based applications to solve numerical methods problems through interactive interfaces
- Extended from: -
- Implemented numerical algorithms using JavaScript for solving mathematical problems such as root finding and iterative methods
- Built frontend using HTML, CSS, and JavaScript with Ajax to handle dynamic input and real-time computation
- Designed user interaction flow to allow users to input parameters and visualize computed results
- Enabled practical learning and application of numerical methods through web-based tools

### ◆ Barcode Scanner Application

- Developed an Android application for scanning and decoding barcodes in real time
- Extended from: -
- Built mobile application using Java and Android Studio for camera-based barcode detection
- Implemented image capture and decoding workflow to process barcode data from camera input
- Designed user interface for scanning, displaying results, and handling user interaction
- Enabled efficient barcode recognition for practical use cases such as inventory or product identification

### ◆ Face Mask Detection:

- Developed a computer vision model to detect and classify face mask usage from images for real-time safety monitoring
- Built object detection pipeline using Python, YOLOv3, and OpenCV for binary classification (masked vs unmasked)
- Designed data preprocessing and training workflow to improve detection accuracy under real-world conditions
- Trained and evaluated model for reliable detection performance across different environments and face orientations
- Enabled automated monitoring of mask compliance, demonstrating practical application of computer vision in public safety

## ● Personal Projects

### ◆ AI Document Search & Question Answering System (RAG)

- Built a production-ready multimodal AI platform enabling unified search and question answering across documents, audio, and images.
- Designed a scalable RAG-based architecture supporting ingestion, indexing, and query workflows for multiple data modalities.
- Developed FastAPI services for file upload, background processing, semantic indexing, and real-time Q&A.
- Implemented multimodal ingestion pipeline using PyMuPDF (documents), OCR (images), Whisper (audio), and BLIP (image captioning).
- Built hybrid retrieval system combining vector search (Qdrant) and keyword search (Elasticsearch), improving recall and precision.
- Generated embeddings using SentenceTransformers (bge-m3) and orchestrated retrieval + generation with LangChain and multiple LLMs.
- Reduced hallucination by grounding responses with retrieved context and source attribution.
- Developed Next.js frontend for interactive search, file upload, and cross-modal knowledge exploration.

### ◆ Real-Time Smart Home Surveillance System for Parcel Delivery and Fence-Climbing Intrusion Detection

- Developed a real-time smart home surveillance system to monitor parcel deliveries and detect fence-climbing intrusions
- Extended from: Parcel and Person Multi-Object Tracking
- Designed video processing pipeline using YOLOv9-seg for instance segmentation and ByteTrack for multi-object tracking across frames
- Implemented object tracking logic to maintain consistent identities and analyze movement trajectories over time
- Built boundary-based event detection by defining virtual zones (e.g., fence areas) and detecting when tracked objects cross predefined lines
- Integrated Telegram API to automatically send real-time alert notifications when intrusion or delivery events are detected
- Enabled continuous monitoring with immediate alerts, allowing users to respond quickly to potential security incidents

### ◆ AI Resume Chat with LLM and RAG (Portfolio Assistant)

- Developed an AI-powered assistant that answers recruiter questions about resume and portfolio content using natural language queries
- Extended from: AI Document Question Answering System with RAG and LLM
- Designed data ingestion pipeline by crawling portfolio pages via sitemap, extracting and cleaning text, and splitting content into semantic chunks
- Generated embeddings using OpenAI text-embedding-3-small and stored them in a vector database to enable fast semantic retrieval
- Implemented top-k retrieval to match user queries with the most relevant portfolio content and provide context for answer generation
- Integrated selectable LLMs (GPT-4o-mini, GPT-4.1, GPT-5) to generate summarized, context-grounded responses with source references and relevance scoring
- Built full-stack system using Next.js and TypeScript for frontend interaction and API integration
- Enabled transparent and reliable responses by grounding answers in portfolio data with traceable sources, improving recruiter accessibility and understanding

### ◆ Visual Question Answering System with YOLO, CLIP, ViT, BLIP, BLIP Caption and LLM

- Developed an end-to-end Visual Question Answering (VQA) system that allows users to upload images and ask natural language questions about the scene
- Extended from: Multimodal Semantic Search, Image Captioning Pipeline
- Designed multimodal pipeline combining YOLO for object detection, CLIP for image–text similarity reasoning, Vision Transformer (ViT) for classification, and BLIP for automatic image captioning
- Integrated extracted visual features and semantic context into selectable LLMs (GPT-4o-mini, GPT-4.1, GPT-5) for context-aware answer generation
- Implemented multi-model comparison workflow allowing users to evaluate responses from different LLMs on the same visual input
- Built backend services using FastAPI for model inference and API orchestration across multiple vision and language models
- Developed interactive React-based frontend for image upload, model selection, visualization of bounding boxes, and AI-generated explanations
- Enabled explainable and context-aware visual reasoning by combining detection, captioning, and LLM-based inference into a unified system

### ◆ AI Video Search and Scene Analysis System:

- Developed a video analysis application that enables semantic search and scene-level understanding from uploaded videos
- Extended from: Text-to-Video Semantic Search, Multilingual Semantic Video Event and Action Search Engine
- Designed video processing pipeline by extracting frames using OpenCV and detecting objects with YOLOv8 to identify key visual elements in each scene
- Generated visual embeddings using CLIP to represent frames semantically and stored them in a FAISS vector index for high-speed similarity search
- Implemented scene retrieval logic to match user queries with relevant frames based on object presence and visual similarity
- Built backend services using FastAPI for video upload, frame processing, timeline generation, preview, and navigation APIs
- Integrated LLMs (GPT-5, GPT-4o-mini, GPT-4.1) to automatically summarize video timelines and generate high-level insights
- Developed a Next.js frontend enabling users to search scenes, preview frames, and navigate directly to relevant timestamps
- Enabled efficient video exploration by allowing users to locate important scenes without watching entire videos

### ◆ Multimodal Semantic Search Chat System (FastAPI, Qdrant, CLIP, BLIP, Typhoon OCR)

- Developed a multimodal semantic search chat system enabling cross-modal retrieval across text and images through a unified chat interface
- Extended from: Text-to-Image Semantic Search Module, Image-to-Image and Video Similarity Search System
- Designed dual-database architecture using PostgreSQL for structured chat data and Qdrant for vector similarity search
- Generated multilingual text embeddings using SentenceTransformers and unified image-text representations using CLIP for cross-modal alignment
- Enhanced image understanding using BLIP for caption generation and Typhoon OCR for extracting and translating text from images
- Implemented hybrid retrieval pipeline combining semantic similarity across text and image modalities with ranking and filtering mechanisms
- Built scalable backend services using FastAPI for query processing, retrieval, and chat interaction workflows
- Developed Next.js frontend to support real-time chat interaction and interactive semantic search experience
- Improved retrieval relevance and accuracy by combining multimodal embeddings with hybrid search strategies

### ◆ AI Meeting Transcription, Summarization & Q&A System (RAG + LLM)

- Developed an end-to-end meeting intelligence system that transcribes, summarizes, and enables semantic Q&A over audio and video recordings
- Extended from: -
- Designed audio/video processing pipeline by splitting recordings and transcribing speech using Whisper
- Generated structured Thai summaries and action items using GPT-4o-mini based on transcript content
- Built semantic retrieval system by embedding transcripts using OpenAI text-embedding-3-small and storing vectors in Qdrant for efficient similarity search
- Implemented context-aware Q&A by retrieving relevant transcript segments and generating source-grounded answers with traceable references
- Developed FastAPI backend to manage processing workflows, status tracking, and API services, and built React frontend for reviewing transcripts, summaries, and audio segments
- Enabled efficient meeting understanding with searchable transcripts, automated summaries, and explainable Q&A for better productivity

### ◆ Object Detection and Segmentation Auto-Labeling (GroundingDINO, SAM, YOLOv8, YOLOv8-seg):

- Developed an automated dataset labeling system for object detection and instance segmentation using both automatic and manual annotation approaches
- Extended from: -
- Designed automatic labeling pipeline using GroundingDINO for text-guided object detection and Segment Anything (SAM) for generating segmentation masks
- Converted generated annotations into YOLO format to train YOLOv8 (object detection) and YOLOv8-seg (instance segmentation) models
- Implemented semi-automatic labeling workflow by training an initial YOLO model on manually labeled data and using it to generate annotations for additional images
- Performed iterative refinement by reviewing, correcting, and retraining models to improve dataset quality and labeling accuracy
- Enabled scalable dataset creation and significantly reduced manual labeling effort while maintaining high annotation quality

### ◆ Deployment Automation: Jenkins + Docker + Cloudflare DNS Sync + Alerts

- Designed and maintained a CI/CD deployment system to automate build, test, and deployment workflows for backend services
- Extended from: -
- Built automated pipelines using Jenkins and Docker to streamline continuous integration and deployment processes
- Managed domain and DNS configuration on Cloudflare and implemented automation to detect server IP changes and update DNS records dynamically
- Developed monitoring and notification system integrated with Discord and Telegram for deployment status (success/fail) and infrastructure events
- Ensured high availability by automatically synchronizing DNS records and maintaining uptime during server IP changes
- Enabled reliable, automated deployment workflows with real-time alerts and minimal manual intervention

### ◆ Document Q&A System using LangChain, LLMs, and Python:

- Developed a document question answering system that enables semantic search and context-aware responses from web and PDF content
- Built data ingestion pipeline using LangChain to load and process content from websites and PDF files
- Generated semantic embeddings and indexed them using FAISS to enable efficient similarity-based retrieval
- Implemented retrieval pipeline to select relevant document chunks and provide context for answer generation
- Integrated both local LLMs via Ollama (LLaMA 3.2) and cloud-based models (GPT-4o) for flexible inference options
- Enabled accurate, context-grounded responses by combining semantic retrieval with LLM-based generation