TOM CROUX

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EDUCATION - Toronto Metropolitan University

COMPUTER ENGINEERING UNDERGRADUATE (2021 - 2027) DEAN'S LIST
COMPUTER SCIENCE MINOR (2023 - 2027) CGPA - 3.520

PROFESSIONAL EXPERIENCE

RESEARCH ASSISTANT - Ryerson Multimedia Research Laboratory (RML) February 2024 - August 2024

- Developed an **automated system** to scan barcodes, with a resolution of 0.33mm on 2x1.5m pallets wrapped in plastic film, while moving on forklifts at 15 km/h.
- Selected and installed a high quality, fast global shutter camera, server with 10 GbE capabilities, and PoE network equipment.
- Developed a box & label & barcode detector using **Yolov8** with a custom dataset, and a Python-based enhancement algorithm using **OpenCV** and scikit-image to improve readability for accurate reading by third-party services (Dynamsoft, Scandit).

CONTROL SYSTEMS LEAD - Toronto Metropolitan Aerial Vehicles (TMAV) September 2022 - Present

- Leading and recruiting 20 members for my sub-team while helping manage the entire design team.
- Developed autonomous libraries in **ROS** for a package delivery UAV running on a Jetson Nano and a Pixhawk, with custom **Python algorithms** for surveying, path optimization, and battery management.
- Developed computer vision target tracking and plane avoidance using OAKD's and a gimbal.
- Helped develop an autonomous system coded in Python with website interface in React for a taxi UAV, running on a Jetson with Sixfab LTE modules and landing zone computer vision detection.

RESEARCH ASSITANT - Robotics, Mechatronics, and Automation Laboratory (RMAL) October 2023 - March 2024

- Developed a custom 6D pose estimation program using **PyTorch** composed of two **CNNs**, adapted from the UNet and VGG16 architectures.
- Automated dataset generation using **Blender** and 3D models of object of interested, applying various augmentation techniques with auto annotations.

WEBSITE DEVELOPER & VIDEO PRODUCER - DMS Ameublement June 2022 - August 2022

- Collaborated with the client to assess needs, define messaging, and outline website requirements in meetings.
- Designed, developed, and hosted a fully customized website using **HTML**, **CSS**, **JavaScript**, and **PHP**, including an admin login portal with basic encryption and content management.
- Filmed, edited, and produced a commercial video, integrated it into the website.
- Delivered a complete solution from concept to launch, including **SEO** and website hosting, ensuring alignment with the client's vision and business. Website link

TECHNICAL SKILLS AND AWARDS

- Programming Languages: **Python**, Java, HTML, CSS, PHP, **C**, Matlab, Assembly, JavaScript
- OS: macOS, **Linux** (Ubuntu (18, 20, 22), Debian, Raspberry Pi OS, DSM (Synology), CasaOS, **Windows**
- Server: **Docker** and Portainer, **Proxmox**, ROS, HomeAssistant, Termius, Plex, ESPHome
- Applications: Termius, Postman, KiCad, OnShape, Fusion360, Cura, QGroundControl, Betaflight, INAV
- Cloud Services: Cloudflare, RunPod.io, Planet Hoster, Zerotier, Twingate, **Google Cloud Platform**
- Manual Skills: Electronics repair (**Soldering**, microscope, DC PSU, Oscilloscope, Function Generator), Powered tools
- Hardware: Raspberry Pi (3/4, Zero W, Pico), Arduino (Uno, Leonardo), ESP32, **CPU/Memory Overclocking**
- Others: Media (Final Cut Pro, gimbals, camera), RC vehicles (custom Drones, Planes, Cars and Model Rockets)
- Awards: - **Metropolitan Engineering Competition** - Programming: 3rd, 1st, and 2nd place in 2021, 2022 and 2023 respectively
  - **Ontario Engineering Competition** - Programming: 4th place in 2022

PERSONAL PROJECTS

HomeLab:

- **Proxmox** server running HomeAssistant, Ubuntu 22.04 in an **LXC** for Web Development and Docker.
- Synology DS220+ for NAS, custom Discord bots, Docker, Portainer and Reverse Proxy.
- Mini PC running **Ubuntu 20.04** for ROS Noetic, Gaming Servers (Minecraft, Terraria, Factorio, Valheim).
- **Windows Server 2019** and OS X Mountain Lion for everyday access.
- Raspberry Pis for Octoprint and Shairport Sync.

Autonomous UAV: Assembled an RC plane with GPS, LiDAR, OAK-D camera, and a **Raspberry Pi** connected to an F4 flight controller, enabling autonomous missions and collision avoidance.

Github to website: Developed a webpage using **JavaScript**, **HTML**, and **CSS** to display public **GitHub** repository projects, using custom labels to gather and showcase live demo links, images, and project details. Github Link

Amplifier Design: Designed and simulated a single-supply, **multistage amplifier** with a +15V supply, 50 (±10%) voltage gain, and input resistance over 50 kΩ, meeting a 20 Hz to 50 kHz frequency response.