# Louai Eleslamboly

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## Education

**Faculty of Engineering, Cairo University**

*Senior-1 Systems and Biomedical Engineering* 2021 - 2026 (Expected)

## Relevant Coursework

- Object Oriented Programming
- Data Structures and Algorithms
- Database Management
- Computer Vision
- Signal Processing
- Computer Architecture

## Projects

**Real-time Multi-Channel Signal Monitor** | *Python, Qt*

- Developed a PyQt desktop application with custom GUI for signal visualization, featuring modular OOP design and integrated signal processing
- Built custom plotting widgets with synchronized multi-signal playback and interactive controls, automating real-time processing tasks including merging, extraction, and ROI analysis

**Image Filtration & Edge Detection Toolkit** | *Python, Qt, Numpy, Matplotlib*

- Built a comprehensive image processing pipeline in Python with core algorithms implemented from scratch, including custom low-pass filters and edge detectors without relying on OpenCV
- Created tools for histogram analysis, equalization, and thresholding with interactive visual output, integrated into a custom GUI with hybrid image generation and real-time testing capabilities.

**Shape Detection and Active Contour Analysis** | *Python, OpenCV, Qt, Numpy, Matplotlib*

- Implemented computer vision algorithms including Canny edge detection and Hough transform to identify lines, circles, and ellipses in images.
- Developed active contour model (SNAKE) using greedy algorithm for boundary detection, representing results as chain code and calculating perimeter and area measurements

**Sampling-Theory Studio: Signal Sampling & Reconstruction Tool** | *Python, Qt, Numpy, Matplotlib*

- Developed Sampling-Theory Studio, a desktop application to demonstrate signal sampling, reconstruction, and aliasing effects, based on the Nyquist-Shannon sampling theorem.
- Implemented real-time signal processing with features like sampling at various frequencies, Whittaker-Shannon interpolation, additive noise control, and frequency domain analysis for educational purposes.

**Imaging Department Workflow System** | *HTML, Bootstrap, Flask, PostgreSQL*

- Implemented an inquiry system in Flask with PostgreSQL database to manage patient and doctor data, enabling efficient communication between users and administrators
- Developed a responsive web platform using HTML and Bootstrap that streamlined coordination between patients, radiologists, and admins, including integrated radiology report uploads for faster diagnoses

## Extracurricular Activities

- **IEEE EMBS:** Biomedical Engineering Mentor
- **CUFE In English:** President and English language Instructor

## Awards

- 3rd Place at the 10th Undergraduate Mathematics Research Forum at Cairo University Faculty of Engineering: for my work on optimizing radiotherapy treatment using a mathematical approach along with Matlab.