



Arthrex – Embedded Surgical Image Recognition

This project is in cooperation and partnership with Arthrex California Technology Inc located in Goleta (within biking distance of campus!).

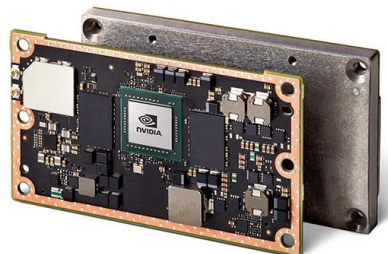
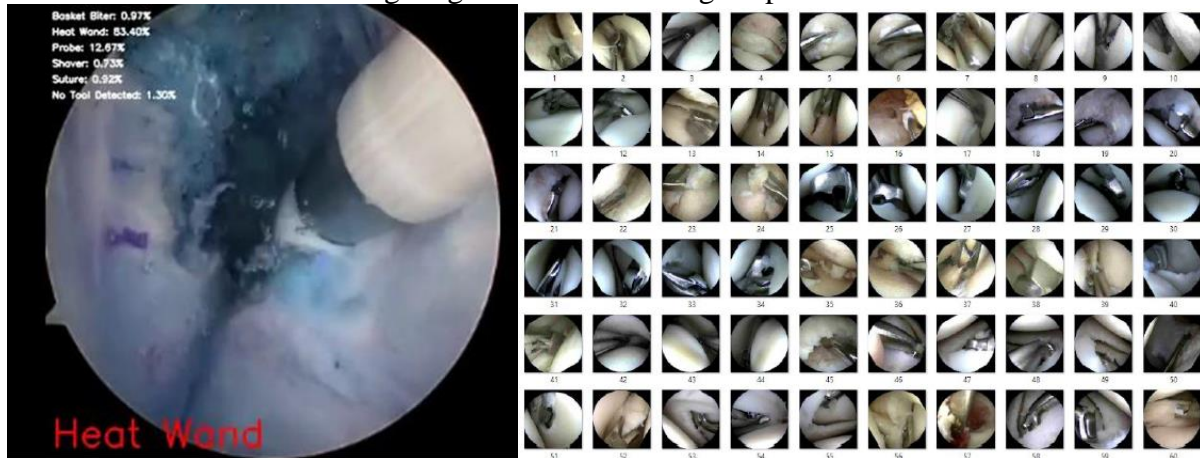
Arthrex Project Support: John Batikian

Arthrex is a global medical device company and leader in new product development and medical education in orthopedics. With a corporate mission of helping surgeons treat their patients better, Arthrex has pioneered the field of arthroscopy and developed more than 11,000 innovative products and surgical procedures to advance minimally invasive orthopedics worldwide.

Project Description

Problem Statement

The Arthrex Synergy UHD4 Imaging Platform is the first endoscopic 4K resolution camera system on the market. The console revolutionizes endoscopic visualization and image management, by combining 4K camera heads, LED lighting, image management and integration with an intuitive tablet controller. The console allows for capturing images and videos that are reviewed by the surgeon and shared with the patient at the conclusion of a procedure. The goal of this project is to demonstrate a deep learning algorithm for the automatic annotation and/or classification of live streaming surgical video and image captures.





Objective

The goal of this project is to develop a deep learning algorithm for the automatic annotation and/or classification of surgical video and image captures.

An optional goal is to port a new or existing deep learning algorithm, which is running on a desktop with an Nvidia Titan V GPU, onto an embedded platform (Nvidia TX2).

The project consists of developing and porting the following algorithms:

- Convolutional neural network
- Preprocessing image processing and computer vision routine
- Post processing filtering of the network output

The team will be provided our existing algorithms for the identification of surgical tools/instrumentation in the live video. Along with the algorithm, we will provide 100K tagged images for the development and training of new artificial neural networks that are suited for running on an embedded platform in real-time.

The objective would include a live demo with video piped from our camera system, optionally running on a Jetson TX2 board.

Student Requirements

Team participant will be required to;

- Sign non-disclosure forms with Arthrex to limit outside disclosure of proprietary information related to supplied camera system.
- Sign agreements that provide Arthrex with access to any intellectual property developed during the project.

Ideal Student Qualifications

- Signal and image processing
- Computer Vision
- Algorithm development
- Strong programming skills
- Embedded software

Students interested in the medical imaging industry will find this project interesting and challenging. This is an opportunity to work with industry engineers, marketing executives, and medical professionals.

Assets Provided by Arthrex

- Arthrex Synergy UHD4 Camera Controller Unit
- Nvidia Titan V
- Nvidia Jetson TX2

Website: www.Arthrex.com