

COMPANY

In-Q-Tel (IQT)

PROJECT TITLE

Secure Deep Learning

PROJECT DESCRIPTION

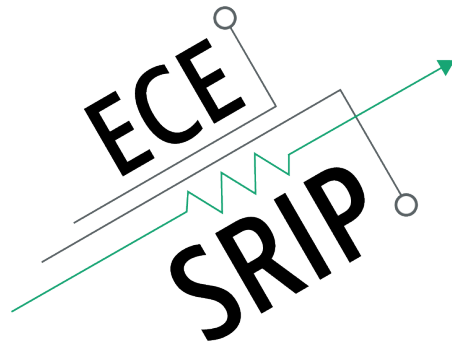
Lab41, In-Q-Tel is planning a project exploring data security in machine learning models for image recognition. Studies show that some algorithms effectively memorize portions of the data used to train them, and it is possible to reconstruct portions of the training set if access were given to the trained model. This presents a problem for models trained on proprietary or otherwise sensitive data, since access to the model must be limited in the same way that access to the training data is limited. Some recently proposed methods to explore this problem use a variety of techniques ranging from teacher ensembles to homomorphic encryption. The goal of this project would be to investigate existing techniques and develop new methods for training deep neural networks on image data securely and practically. New results will be published as academic publications and all code will be open source.

INTERNS NEEDED

2 MS Students

PREREQUISITES

Machine Learning, Introduction to Cryptography



COMPANY

In-Q-Tel (IQT)

PROJECT TITLE

Classifying Synthetic Biology

PROJECT DESCRIPTION

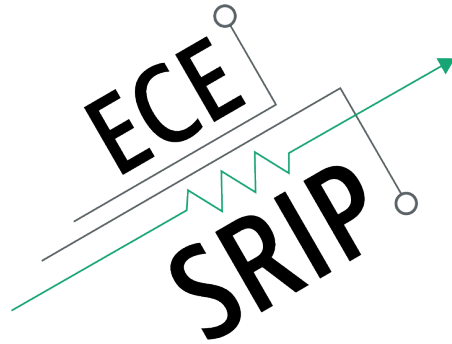
With the advent of genetic engineering, synthetic biology has become important to industrial processes and medical research. As techniques for engineering genetic sequences become increasingly accessible, there is a growing interest in automatically classifying sequences that have been genetically altered or occur naturally. Researchers at In-Q-Tel Laboratories are working to identify the purpose of genetic modifications, determining the intent of a modified sequence's designer. For example, the designer may have wished to bestow antibiotic resistance, alter an enzymatic pathway, or evade immune detection. The student selected for this project will work alongside IQT data scientists to expand prior work on sequence classification to modification analysis, "topic modeling for synthetic biology." This work is currently ongoing, and the student should expect to publish with IQT scientists at the end of the summer.

INTERNS NEEDED

1 MS student

PREREQUISITES

Statistical learning, Python, (Preferred Coursework with Neural Networks a Plus) Expertise in synthetic biology is NOT required.



COMPANY

In-Q-Tel (IQT)

PROJECT TITLE

Audio Recognition at the Edge

PROJECT DESCRIPTION

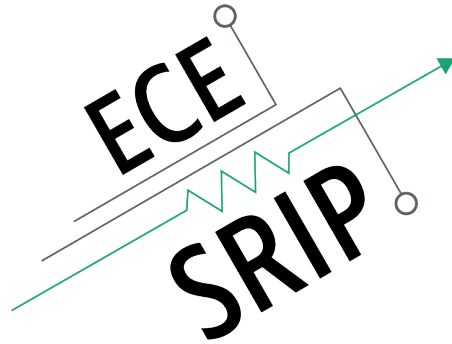
Lab41 would like to build an audio processing system which identifies speakers and understands audio content with a single microphone using a Raspberry Pi3. This is a challenging problem involving both signal enhancement and machine learning models running with limited computing resources and time constraints. The core objective is to create a machine learning model to recognize speakers and key speech phrases that can run in real-time in a constrained environment.

INTERNS NEEDED

1 MS/1 BS

PREREQUISITES

Some familiarity with machine learning/deep learning



COMPANY

In-Q-Tel (IQT)

PROJECT TITLE

Text in Video

PROJECT DESCRIPTION

Lab41 would like to identify and isolate textual content found in videos. A large amount of video content contains text that remains hidden to textual search engines. This project aims to identify, track, annotate, and transcribe this textual content in a way that exposes it to a traditional textual search. The progression of this project is to identify the presence of text within each frame, isolate each block of text in the frame, track each block between frames, and then transcribe the isolated text with temporal annotations.

INTERNS NEEDED

1 MS

PREREQUISITES

Familiarity with Machine Learning / Deep Learning