

Personal Projects

3D Rendering Engine

github.com/proch92/proch3d

I developed a rendering engine for studying purposes. I used C++ and OpenGL from scratch. The engine uses a custom 3d file format and custom shading pipelines.

Tech: C++, OpenGL, OpenGL ES

Steganography tools

github.com/proch92/psteg

I developed a tool for image steganography analysis. It can extract useful informations to assist in steganography detection.

Tech: C

Time series prediction

github.com/proch92/ai-projects

I modeled a RNN for time series prediction with python and tensorflow. The project focuses on data preparation and augmentation to boost regression performances.

Tech: python, tensorflow

Big Data pipeline

github.com/proch92/bigdata-project

I designed a big data transform and query pipeline in pyspark and gitlab CI technologies to automatically test and run examples in google GCP using Google Cloud APIs.

Tech: python, Apache Spark, Google GCP, Gitlab CI

DDQN Reinforcement Learning

github.com/proch92/SIR-exam

I implemented a Dueling DQN in tensorflow to solve the cartpole reinforcement learning benchmark. I engineered a modified reward function to significantly boost convergence.

Tech: python, tensorflow, openAI gym

RSA

github.com/proch92/RSA

RSA public key cryptography algorithm implementation with custom big-number class and operations for OOP university exam.

Tech: C++

Py meta-model FSM language

github.com/proch92/iss

I implemented a meta-model language for platform-independent distributed systems in robotics. The meta-model offers a high level finite state machine framework for control logics. I used decorators to mimic a Domain Specific Language and asyncio subroutines to manage multiple fsm actors per-process.

Tech: python, asyncio

Master's Degree Thesis

I studied and reimplemented a recent continual learning technique, Growing Dual Memory. The technique uses a hybrid approach with two hierarchically organized auto organizing neuron maps and memory replay phases for long term memory consolidation. I also applied Transfer Learning techniques to fine tune a VGG CNN for feature extraction. The experiments showed very good results exceeding expectations compared to state of the art baseline results.

Tech: python, tensorflow, pandas, seaborn

Certifications

Machine Learning - Stanford - Coursera

Stanford machine learning course with strong mathematical basis and a look on business processes.

The course covers Gradient Descent for parameters optimization, unsupervised and supervised learning, SVM and PCA algorithms, and various techniques to analyze and optimize learning performances.