CALIN MOCANU

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WORK HISTORY

HEX ROBOTICS (FOUNDER) – **2019-PRESENT**

Designing and manufacturing dexterous robots, with human like upper body and dexterous hands.

Patent pending (US & UK) for innovative sensor circuit design with integrated joint positions and force sensors. Built and iterated 14 prototypes versions. Own design for 3D model, flexible sensor circuit, motor driver circuit board and control software for robot hand. Machine learning hand detection app to mimic user hand movement. Simulation model in MuJoCo to mimic physical robot. Customized motor sourcing.

https://www.youtube.com/@hexrobotics https://github.com/csiz/hextech-mecha-hand-mujoco

OXFORD ASSET MANAGEMENT, DEVELOPER/RESEARCHER – **2014-2018**

Researched and implemented value strategy trading one *billion dollar* worth of equity assets.
Built database combining multiple sources of earnings and analyst recommendation.
Designed API to access cleaned, hedging adjusted stock price data. Daily and intraday price series.
Automatic text analysis on SEC filings; filing sentiment analysis, key trigger words, accounting red flags.
Developed a principled portfolio optimization algorithm using dynamic programming. Trades were optimized based on alpha signal, trading costs, volatility estimates and bounded by total portfolio risk.
Developed a P&L visualization web app for rapid research and interaction with new datasets.

EDUCATION

UNIVERSITY OF OXFORD, BSC. PHYSICS, 1ST-CLASS HONOURS – **2011-2014**

Laboratory: building basic logic gates, electronic computer from components, using oscilloscopes, computer modeling of white dwarf stars, simulating fluid dynamics.

Project: Calibration device for lighting strike detection. Researched and implemented prototype of an electric field simulator written with Python, NumPy and matplotlib.

DEEP LEARNING NANODEGREE FOUNDATION – **2017**

ORACLE DATABASE SQL CERTIFIED EXPERT – 2011

INDEPENDENT PROJECTS

Self-balancing pendulum. Raspberry PI robot using IMU to balance itself upright. Actor-critic reinforcement learning algorithm implemented in TensorFlow and communicating via WebSocket. – 2018

Cell membrane simulation to analyze the jamming-unjamming transition. Built on Observable using ES6 JavaScript and d3: https://observablehq.com/@csiz/cell-settling. – 2018

PotholeCoin prototype; a crowdfunding app aimed at fixing potholes. – 2018

Personal website built on the Google App Engine platform. – 2011

Experiments with HTML5 Canvas: group fish movement, artistic tree, multi-body gravity – 2011

Games: Snake game using C++ and SFML. Solar system asteroids dodging game in Flash. – 2008

SKILLS

Languages: **English (C2),** Romanian (C2), Mandarin (A1)

Programming languages: **C++, Python, JavaScript**, HTML, CSS, SQL, Rust, Haskell

Libraries/tools: TensorFlow, d3, NumPy, git, pandas, SciPy, matplotlib, pybind11, react, WebSocket, boost, Lodash, IPython/Jupyter, nodejs, npm, pip, Beautiful Soup, requests, flask, PostgreSQL, Visual Studio Code, webpack, json, Pillow, Pylint, MuJoCo, ChatGPT, Stable diffusion

Embedded: **ESP32**, STM32, Arduino, Raspberry PI, I2C, MPU-6050 gyroscope, PCA9685 PWM (pulsed width modulation), SNx4HC595, smbus2, voltage regulator, buck converter, motor driver, MOSFET, ADC, FPC

CAD: **Fusion 360, KiCad**, Onshape, EasyEDA, PrusaSlicer, Anycubic Workshop

AWARDS

Exhibition, University of Oxford – 2012 Gold medals, National Olympiad Informatics, Physics – 2009, 2010