TX 5063

STATEMENT

I am interested in the notion of **Intelligence Augmentation** (as described by Doug Engelbart in his paper (Augmenting Human Intellect (1962))). Mathematica, Google Web Search, Stack Exchange, Wikipedia, Stenotype, the computer - and the internet - are recent examples of intelligence augmentation artefacts.

Why? Because breakthroughs in **Intelligence Augmentation** can be re-invested to bring about further breakthroughs - resulting in a recursive feedback loop analogous to a nuclear chain reaction or compound interest - ultimately leading to an **Intelligence Explosion**.

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TECHNICAL SKILLS

- Programming
- Mathematical Modelling
- Vector Calculus
- Linear Algebra
- Statistics
- Probability Theory
- Formal Logic

COMPUTER SKILLS

- Python
- Pytorch, TensorFlow, Pandas, Numpy
- Linux - Bash scripting
- SQL - schema design, triggers, stored procedures and backups
- Git
- Wolfram Mathematica
- R, MATLAB
- AWS - EC2, S3, RDS

HOBBIES

- Systematic enquiry into intelligence augmentation technology
- Learning Stenotype
- Learning Russian
- Dan Carlin Hardcore History Podcast
- Lex Fridman Podcast

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Conor Cosnett

conorcosnett@gmail.com

WORK EXPERIENCE

Artificial Intelligence Engineer

LIQQUID | MAY 2021 - FEB 2022

- engineering a model which estimates prices of properties in the UK
- developed a pipeline which extracts valuable data from floorplan images and images of energy performance certificates
- gained experience with Python, SQL, Git, BitBucket, Jira, Confluence, Slack

Data Science Intern

LIQQUID | APRIL 2021 - MAY 2021

- Wrote Wolfram Language program that parsed images of UK Energy Performance Certificates. These images are highly variable.

Deep Learning Intern

APPLIED OPTICS GROUP, NUIG | SUMMER 2018

- **Computer Vision** project using Python
- Extended an exoplanet "detection system" developed in (undergraduate) final year project to a "detection and localisation system".
- Documented the project in the style of a journal article
- Carried out further experimental work:
  - Replaced the Google Inception V3 (2D) CNN based classifier with a 3D convolutional neural net.
  - Compared the two classifiers using Reciever Operating Characteristic curves.
  - Demonstrated speckle (optical noise) removal from direct imaging sequences using an Autoencoder.

Deep Learning Intern

APPLIED OPTICS GROUP, NUIG | SUMMER 2017

- Took steps toward learning about the subject of detecting exoplanets within direct coronagraph image sequences.
- Applied an "off the shelf" neural net to the task of detecting exoplanets in simulated data. Used an AWS GPU instance to do this.
- Built a triple GPU Computer to experiment with Deep Learning.

EDUCATION HISTORY

NATIONAL UNIVERSITY OF IRELAND, GALWAY

HIGHER DIPLOMA IN APPLIED MATHEMATICS | 2019-2020

- **First Class Honours** with final overall grade of 82%
- Received a grade of 92% in my Formal Logic module.
- **Project**: Wrote the first chapter of a "cookbook" of SAT Solver recipes. Provided recipes to encode John Conway's Game of Life in Boolean logic and investigated the "Boolean Satisfiability Problem" in this context.

NATIONAL UNIVERSITY OF IRELAND, GALWAY

BSC (HONOURS) IN PHYSICS AND APPLIED PHYSICS | 2016-2018

- **First Class Honours** with final overall grade of 75%
- School of Physics Third Year Laboratory Gold Medal
- **Final Year Project:** Developed an exoplanet detection system using a Convolutional Neural Network: Used transfer learning to repurpose a pretrained instance of the Google Inception V3 to classify direct imaging sequences.

WOLFRAM LANGUAGE

- 14000+ hours experience coding in the Wolfram Language
- 6771 points on Mathematica Stack Exchange
- https://mathematica.stackexchange.com/users/36681/conor-cosnett
- https://www.youtube.com/channel/UCBinIDmOHSjm55pG0FDyXNw/videos
- https://github.com/ccosnett

This is a table of some relevant courses which I have completed in the fields of Computer Science, Mathematics and Physics:

Course	Institution	Teacher	Grade	Concepts Acquired/Skills Gained
Statistical Inference, ST2004	National University of Ireland, Galway	John Newell	76%	Frequentist statistics, Hypothesis testing, Likelihood...
Solid State Physics, PH422	National University of Ireland, Galway	Ger O'Connor	71%	Harmonic oscillator lattice model of crystalline matter
Quantum Physics, PH333	National University of Ireland, Galway	Harald Beresheim	72%	solving Schrödinger's equation to get the wave function
Quantum Mechanics, PH421	National University of Ireland, Galway	Ger O'Connor	76%	1-D quantum harmonic oscillator
Programming and Operating Systems, CS211	National University of Ireland, Galway	Emil Skoldberg	71%	Operating systems, Python programming
Probability - The Science of Uncertainty and Data, 6.431x:	edX	John Tsitsiklis	Pass	Probability Theory
Probabilistic Graphical Models 1: Representation	Coursera	Daphne Koller	Pass	Bayesian Network, Markov Chain Monte Carlo
Partial Differential Equations, MP494	National University of Ireland, Galway	Martin Meere	92%	Finding exact solutions to Partial Differential Equations
Object-Oriented Programming in Python	datacamp	Alex Yarosh	Pass	Python, Objects, Methods, Inheritence
Numerical Analysis II, MA378	National University of Ireland, Galway	Kevin Jennings	98%	Numerical: {Integration, Differentiation, Interpolation}
Numerical Analysis I, MA385	National University of Ireland, Galway	Niall Madden	76%	Using iterative algorithms to solve Differential Equations
Non Linear Systems, MP491	National University of Ireland, Galway	Petri Piiroinen	85%	Chaos, Lorenz Attractor, 2D-ODE's
Modelling 2, MP307	National University of Ireland, Galway	Petri Piiroinen	88%	control theory
Modelling 1, MP305	National University of Ireland, Galway	Petri Piiroinen	93%	https://youtu.be/K4PYLalZab4
Mathematics (Honours), MA180	National University of Ireland, Galway	Götz Pfeiffer, Graham Ellis	90%	Modular Arithmetic, Cryptography, Logic, Number Theory
Mathematical Thinking in Computer Science	Coursera	Alexander S. Kulikov	Pass	Graphs
Mathematical Methods II, MP346	National University of Ireland, Galway	Michel Destrade	81%	Numerical Techniques for solving differential equations
Mathematical Methods I, MP345	National University of Ireland, Galway	Michel Destrade	75%	Symbolic Techniques for solving differential equations
Machine Learning	Coursera	Andrew Ng	96.76%	Logistic Regression, Neural Net, Gradient Descent
Logic, CS3304	National University of Ireland, Galway	Dane Flannery	92%	First Order Logic, Logical Consequence Checking
Linear Algebra - Foundations to Frontiers, UT.5.05x:	edX	Robert van de Geijn	Pass	Linear Algebra
Introduction to SQL	datacamp	Nick Carchedi	Pass	SQL
Introduction to Programming with MATLAB	Coursera	J. Michael Fitzpatrick	Pass	MATLAB
Introduction to Logic	Coursera	Michael Genesereth	Pass	Mathematical Logic, Propositional Calculus, Proofs
Introduction to Graph Theory	Coursera	Alexander S. Kulikov	Pass	Graphs
Introduction to Discrete Mathematics for Computer Science Specialization	Coursera	Alexander S. Kulikov	Pass	Graphs, Combinatorics, Number Theory
Introduction to Deep Learning with PyTorch	datacamp	Ismail Elezi	Pass	PyTorch, Deep Learning
Introduction to Computer Science and Programming Using Python	edX	Eric Grimson	Pass	Python
Introduction to Bayesian Modelling, ST417	National University of Ireland, Galway	Andrew Simpkin	76%	The religion that is Bayesian Updating
General Relativity, MP403	National University of Ireland, Galway	Michael Tuite	85%	metrics and curvature
Fluid Mechanics, MP365	National University of Ireland, Galway	Harold Berjamin	70%	Modelling fluids using Vector Fields, Navier-Stokes
Electromagnetism, MP366	National University of Ireland, Galway	Martin Meere	81%	Modelling electric fields using Vector Fields + calculus
Electromagnetism and Special Relativity, PH424	National University of Ireland, Galway	Alexander Goncharov	86%	Maxwell's equations
Computer Science, CS103	National University of Ireland, Galway	Emil Skoldberg	66%	Python, data structures, procedural programming
Computer Architecture	Coursera	David Wentzlaff	Pass	pipelining, caching
Computational Physics	National University of Ireland, Galway	Matthew Redman	70%	https://youtu.be/U_nBZ79Nleo
Combinatorics and Probability	Coursera	Alexander S. Kulikov	Pass	Random Variable, Probability, Combinatorics
Applied Physics Bachelors Thesis on: Using Deep Learning to detect exoplanets.	National University of Ireland, Galway	Nicholas Devaney	79%	TensorFlow, Academic Writing, Python
Applied Optics and Imaging, PH423	National University of Ireland, Galway	Alexander Goncharov	74%	ability to model the transmission of light through matter
Applied Mathematics, MP180	National University of Ireland, Galway	Kevin Jennings	73%	Vector Calculus
Applied Mathematics Thesis on SAT Solvers (for Higher Diploma)	National University of Ireland, Galway	Götz Pfeiffer	77%	SAT Solvers, Encoding problems in Boolean Algebra
Algorithms And Scientific Computing, CS209	National University of Ireland, Galway	Michael Mc Gettrick	51%	Big O Notation, Analysis of Sorting Algorithms