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Objective: Leverage disruptive innovation to solve hard problems and improve lives.

Summary: I have made commercially viable solutions for previously unsolvable problems in a variety of research areas, particularly AI. My jobs have ranged from Principal Scientist thru CTO and CEO roles, including fundraising with VCs.

Software skills: LLMs, Prompt Engineering, C/C++, Python, Java, Perl, JavaScript, Swift, SQL, Octave, Matlab, real-time multi-threaded systems, distributed systems, high performance systems, AI: ML, and Rules-based, testing and validation techniques, image processing, 3D simulations, encryption.

Hardware skills: Systems analysis, digital and analog hardware design, VME bus, optical sensor technologies, fault-tolerant and high reliability system design.

JustAnswer, Principal Engineer, 2019-2023

- Conceived, designed, and managed the development of an AI-based Reinforcement Learning system that increased company revenue by \$12MM annually. The system uses Natural Language Processing, Bayesian statistics, Multi-Armed Bandits and Potential Value Remaining techniques.
- Conceived, designed, and managed the development of an AI-based intent recognition system that improved system results on customer messages by 156%, while being super fast. The system used OpenAI's davinci LLM model with a highly engineered prompt to label training data and then used Fine Tuning on a babbage model with Human-In-The-Loop training to create the production system. The system in production has an average latency of only 160 ms, which was a 25x speedup over alternative approaches.
- Doubled the effective throughput of the ChatScript rules-based NLP AI engine, with no cap, by adding the ability to horizontally scale. Added Japanese and Spanish language support to the ChatScript engine.
- Increased profit for the company's largest category by 3%. To achieve this I created a Neural Net based ML model doing the following steps: reorganized the ontology, coordinated the company's largest human labelling operation to date, Pre-trained a Neural Net model with a large corpus, and then Fine Tuned the model using human-labeled data.

SapientX, CTO, 2019

- Developed prototypes demoed at conferences including Comdex.
- Managed and developed the back-end language processing systems. Wrote the AI Natural Language Understanding (NLU) system in ChatScript
- Integrated Automated Speech Recognition (ASR) and Text to Speech (TTS) systems.

Photonic Sentry LLC, Co-Founder and Technical Lead, 2016-2018

- Achieved 96% efficacy finding and killing mosquitoes with lasers over a 30 m range in field trials with the USDA.
- Designed the system architecture for mosquito killing laser system. Developed the tracking system for targeting mosquitoes using Machine Learning, and Image Processing AI techniques. Led the team of developers using C++, Python, and Matlab.

Intellectual Ventures Lab, Technical Lead, 2012-2016

- Researched non-chemical approaches to killing mosquitoes for Bill Gates and Nathan Myhrvold.
- Developed technology to determine the minimum required laser doses to kill mosquitoes using an AI-based tracking system. Used Kalman filters to do sensor and data fusion.
- Author on an article in Nature on our work: <https://www.nature.com/articles/srep20936>.

Work for A9 (Amazon search), 2012

- Wrote a Search MVP that significantly outperformed existing Amazon Search. This design used the existing AWS API Marketing interface, and the AI-based ChatScript NLU engine.

Blue Origin LLC, Member of Technical Staff, 2002-2012

- Designed an AI spacecraft Vehicle Health Monitoring (VHM) and Response system that successfully detected a hardware failure in-flight and provided commands to land the vehicle for Jeff Bezos' Blue Origin.
- The VHM software detects off-nominal behavior in real time and alters the mission accordingly.
- The VHM system uses simulations running on-board in real-time compared to actual flight hardware to detect problems and provides commands to respond in case of anomalies.
- Designed and developed multiple sets of avionics software systems, which all flew successfully.

Disappearing Inc., Co-Founder and CEO, 1996-2001

- Developed the technology and started a company to make email that disappears after a set period of time. Raised \$22MM. Grew to a staff of 72 people. Solved an "unsolvable problem." (Author on US patents US7246378, US7096355, US6625734).

Worlds Inc., VP of Engineering, 1994-1996

- Built the first 3D VR multiuser spaces that run over the Internet on PCs.
- Clients included Steven Spielberg's Starbright Foundation, IBM, Visa, and the US Army.

Knowledge Adventure, Multimedia Producer, 1993-1995

- Co-produced award-winning (CES) educational CD ROM's.

NASA's Jet Propulsion Labs, Sr. Software Engineer, 1991-1994

- Won the JPL Achievement Award for the AbNet work and the patent.
- Led a team of 4 engineers to develop an ultra-fault tolerant network topology for use in power system distribution automation (Author on patent US5457689). This approach was later used by Napster and other P2P networks.

Standards Efforts:

- Author on the W3C P3P specification, an early privacy specification for the Internet endorsed by Microsoft, AOL/Netscape, Al Gore, the World Wide Web Consortium and many others.
- Principal author of the Universal Avatars specification, a standard for exchanging identity information, location, and other real-time data in 3D online user environments.
- Member of the Technical Advisory committee for the Living Worlds specification.

Education:

- California Institute of Technology, BSc in physics and BSc in engineering.
- Continuing education to keep skills up-to-date in an evolving field:
 - Yale University, graduate studies in physics and computer science
 - University of California at Irvine, graduate studies in computer science and electrical engineering
 - California Institute of Technology, continuing graduate studies in computer science

Hobbies:

- Fencing, Jiu-jitsu, Robotics