Antony Van der Mude

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Firmware Engineer

Software engineer experienced in all aspects of development ranging from firmware to advanced AI applications. Experienced in environments ranging from large research labs to small startups. Employed both full-time and as a consultant in a wide range of industries. Worked in hardware labs debugging on oscilloscopes or logic analyzers, and in the Amazon and Microsoft Azure clouds. Deep understanding of computer science theory and physics, enabling the development of original solutions to real-world problems. Accomplishments include peer-reviewed papers in genomics, cancer and philosophy of science.

Processors: TI TMS320 DSP, ARM Cortex-M RISC/DSP, Microchip PIC, Motorola 68000

Languages: Python, C, Java, C++, C#, Perl, LISP

Firmware Platforms: LabView • Windows CE • Debian GNU/Linux

Firmware Technologies: i2c, canbus, spi, uart, usb, rs422

Firmware Development: DOORS requirements documentation, DOD-STD-2167A, MISRA C, LDRA testing

Technologies: Agile Methodology • Computer Algorithms • Bayesian Statistics • Deep Learning • Ensemble Methods • Explanatory AI • SQL and Oracle databases • Firmware and UNIX internals • PID feedback

Cloud Platforms: Databricks • Amazon AWS • Microsoft Azure

Libraries: PySpark, pandas, scikit-learn, Tensorflow

# PROFESSIONAL EXPERIENCE

**Humana, Boston MA 12/2020 to 3/2024**

**Healthcare and Insurance company**

## **Senior Natural Language Processing Data Scientist**

Member of Digital Health and Analytics Department. Applied Natural Language Processing to analyze customer sales calls and identify improvements. Wrote Azure functions that process analytics, including BERT vector analysis of human resources data and Optical Character Recognition of medical faxes.

## Signify (Philips Lighting), Burlington MA 11/2016 to 10/2020

## Consumer Products & Internet of Things

**Data Engineer**

Performed data analysis of luminaire sensor data acquisition and processing. Performed statistical analysis of failure points for Architectural Lighting division (lighting systems for bridges, stadiums, and buildings, such as the Empire State Building). Developed data structure mapping software that converted layouts of building floors, rooms, sensors, and devices into company’s standard normalized building data structure.

## Security Scorecard, New York NY 9/2015 to 8/2016

## Cybersecurity

**Data Analyst**

Developed NLP applications for cybersecurity targets and social engineering risks. Implemented Named Entity Recognizer to identify company targets in Hacker Chatter, map WhoIs IP addresses and parse data breaches. Achieved less than 2.5% False Positive rate on identification. Defined metrics for risk of social engineering of companies due to unusual use of company emails. Used DBSCAN clustering analysis to classify hacker chatter and cluster companies by security risk.

## Knewton, New York, NY 3/2013 to 7/2015

# Adaptive Educational Software

# Senior Software Engineer

Member of Data Analytics/Dashboards team. Wrote Hadoop ETL programs and machine learning tools. Developed machine learning text classifier in Python and C to categorize pages with educational content. Wrote jobs for Amazon's Elastic Map Reduce to load student interactions from Cassandra to Redshift. This data was used to train the Machine Learning systems for adaptive learning.

## Antony Van der Mude LLC, Hackettstown, NJ 1/2005 to 3/2013

## Computer Consulting

## President

Developed applications for Military, Medical and Consumer products. Defined project requirements, Statements of Work, schedules, and budgets. Developed algorithms and software for device firmware and supporting tools, authored and ran acceptance tests, and assisted transition to manufacturing.

* Wrote assembly firmware to measure battery life for patented hand-held LCD flashlight. Traveled to China to verify manufacture at factory and provided last minute changes of first run production.
* Wrote Android battery life application that uses time-smoothed statistical learning algorithm.
* Wrote C firmware for device to measure voltage current and phase of high-tension power lines.
* Wrote assembly firmware for DTMF detector for home security hardware.
* Wrote SQL and VXML phone interface prototype for financial transfer phone application. Presented demos for bankers.
* Wrote Posix standard firmware for I2C interface to precision timer chip for increased accuracy of Unix kernel time function. Used in PCI mezzanine card.
* Facilitated $18M in sales for the Navy by completing development and delivering on-schedule C firmware to control a sensorless motor to run an air compressor mounted on the F-16. Software also used to control landing gear on F-35 Joint Strike Fighter. Wrote and maintained requirements, software and test specifications. Ran verification tests and assisted in setup for manufacturing.
* Wrote C firmware for Cortex ARM/DSP chip to control custom valve for the Navy. DSP controls stepper motor to set valve to desired flow rate. ARM chip displays web page to control device.
* Wrote C firmware for user interface for Laryngoscope, used to diagnose diseases of the larynx.
* Wrote C firmware for switching power supply for helicopter hoist, including requirements, design and test specs.
* Wrote C# test software and statistical analysis reports for infrared camera black body calibration.
* Wrote C firmware home assistant and health monitoring device using firmware speech recognition.
* Wrote assembly firmware for device to measure resonant frequency of ceramic stirring rods.
* Wrote C# software for hardware test station telecommunications equipment power supply.
* Wrote assembly firmware for 8-pin 1-bit computer chip to control FM receiver chip.
* Wrote assembly firmware for a portable Polymerase Chain Reaction (PCR) detector.
* Wrote Labview CVI software for knee replacement physical therapy device.

## AT&T Labs, Florham Park, NJ 1/1999 to 12/2004

## Research and Development

## Member Technical Staff

Designed and rolled out machine learning Algorithms, analyzed speech recognition accuracy, and delivered speech recognition and text-to-speech solutions for AT&T infrastructure.

* Developed data tuning techniques to bring groundbreaking "How May I Help You" customer service speech recognition from 80% to 98% accuracy by tuning ML models and doing performance analysis.
* Enhanced AT&T network capabilities through key contributions to speech recognition and text-to-speech software, including long-haul switches and local data centers.
* Facilitated successful development of machine learning models supporting outside customers for natural language Understanding applications for AT&T Speech Recognition products.

**Additional Experience**

## Member of Technical Staff: Bell Telephone Labs, Holmdel NJ

Part of research and development team for maintaining the user experience of the Bell Telephone system. Built speech recognition and artificial intelligence prototypes for new AT&T services and conducted usability studies. Provided advanced computer expertise and capabilities bolstering on-time project completion and performed statistical analysis on studies and data collection tasks.

## Supervisor: Coopers and Lybrand, New York, NY

Developed and maintained Artificial Intelligence software to support of audit work. Wrote software for various auditing applications such as audit risk, hospital billing, and income tax. Project leader and lead developer on Machine Learning system for data conversion from financial auditing packages. Documented expert system for tax analysis written in Common LISP that was required for every income tax submission done in the firm.

# EDUCATION

**Master of Science in Computer Science** Rutgers University – New Brunswick, NJ

**Bachelor of Science in Physics**

Case Western Reserve University – Cleveland, OH

# PUBLICATIONS / PATENTS

**A Proposed Information-based Modality for the Treatment of Cancer** *Biosystems* Volume 211, January 2022 <https://doi.org/10.1016/j.biosystems.2021.104587>

## Poster presentation given at Cell Journal Symposium on the Hallmarks of Cancer, San Diego 2022.

**Structure Encoding in DNA**

*Journal of Theoretical Biology*, Vol. 492, 7 May 2020

https://doi.org/10.1016/j.jtbi.2020.110205

**Causally Active Metaphysical Realism**

*Quantum Speculations* (supplement to the International Journal of Quantum Foundations), Volume 1, Number 1, October 2019

https://ijqf.org/archives/5704

Patent #8,463,565B1 **LED flashlight with battery life indicator**

Ralph Osterhout, Michael J. Keating, Antony Van der Mude

https://patents.google.com/patent/US8463565B1

Patents #7,933,766, 7,620,550, 7,295,981

**Method for building a natural language understanding model for a spoken dialog system**

Narendra Gupta, Mazin Rahim, Gokhan Tur and Antony Van der Mude

https://patents.google.com/patent/US7933766B2

**On the Inference of Stochastic Regular Grammars**

Information and Control, Volume 38, Issue 3, September 1978

https://doi.org/10.1016/S0019-9958(78)90106-7

# PROFESSIONAL ORGANIZATIONS / AFFILIATIONS

ACM – Association for Computing Machinery IEEE – Institute for Electrical and Electronic Engineers AAAI – American Association for Artificial Intelligence