

David BLACK

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MOTIVATION

This position, as a Data Scientist using Computer Vision & Natural Language Processing at Ancestry, is a confluence of my passions & interests. I have always envisioned being a scientist at the frontier of research. Also from an early age, I've accompanied my father in his effort to source and verify our family history. In this role, I can combine these two interests & talents with three more – data extraction from older documents, linguistics, & coding. At a previous job, I supported work on automated information extraction from manuscript & machine-created text. In my most-recent job, I was able to expand my skills in NLP as I worked on the Speech Science & Machine Learning team. I would love to use my initiative & creativity in CV/NLP tasks for family history, and especially to continue with the use of Neural Networks for data extraction.

HIGHLIGHTS

- » Over 5 years' experience in cutting-edge machine-learning research for automated handwriting & speech recognition
- » 11+ years' experience in computation research & software design
- » At least 6 months' experience in each of the following roles
 - » Simulation of physical processes to compare with particle-collision data (27 publications)
 - » Programming the underlying shape-detection algorithms for Asian handwriting recognition & participating in Neural Network model creation & coding; work mostly done in Keras / TensorFlow but also learned from PyTorch implementations
 - » Volunteer work with Dr. Ryan Farrell (BYU) in computer vision

SKILLS

- » Finding, reading, & understanding scientific papers as well as applying their principles to set up experiments & to create practical implementations
- » Helping patrons to successfully locate, analyze, & apply learning from historical records so as to lead to the discovery of additional records & information sources
- » Initiative & excitement in finding new problems & solutions
- » Data compilation, creation, curation, annotation, assimilation, appreciation, utilization, interpretation, & dissemination
- » Handling the flow of large data-collection efforts in academic & industry-related research
- » Kindness, likeability, social aptitude, & the sincere desire to listen to & help others
- » Implementing shell-script solutions – usually `bash` shell, but other major shells – into `Python` to increase portability &, for some projects, expand into an object-oriented framework
- » Communication with business executives & legal counsel to show the financial implications and ethical concerns, respectively, accompanying research projects
- » Paleography - i.e. the knowledge, understanding, & transcription of handwriting in multiple languages from varied language families and various time periods
- » Coding in many programming languages & using various software packages, APIs, etc.; ability to quickly learn & use new tools

RELEVANT WORK EXPERIENCE

AI Labs) Team Member (May 2018 – Mar 2023)

CaptionCall / Sorenson Communications (Salt Lake City, UT)

- » As part of the original Speech Science & Machine Learning team, helped set priorities, determine direction & tools, & collaborated closely with the other original team members.
- » Initially conducted substantial literature review & decided implementation of findings || `Python`, `scikit-learn`, `NumPy`, `SciPy`, `matplotlib`, `PIL`, `Pandas`, `NIST's sclite`, `kaldi`

- » Taught other team members to use `Linux®` & `Linux`-type implementations; debugged & adapting package builds & software for our needs || `bash`, `C`, `C++`, `make`, `CMake`, `Perl`
- » Automated scoring || wrote `Python` wrapper for NIST's `sclite` executable
- » Normalization of different human & machine transcribers' output so as to have only words as pronounced || extensive use of `regexes` & customized algorithms
- » Designed, developed, distributed, & maintained normalization tool as a `Python` package
- » Used a Microsoft-based version control system at the start but used `git` the last 3 years
- » Participated in a transition to an Agile-based system accompanied by a move to Jira
- » Broad project to use the best of annotation from humans & machines to increase accuracy
- » Created customized datasets leveraging call-recording software on which I worked through managing a freelancer || `Python`, `Twilio`, `Amazon Elastic Beanstalk`, `AWS NoSQL`
- » Silence detection & removal to allow more words per unit time in data collection, implemented Hidden Markov & Support Vector Machine models || `pyAudioAnalysis`
- » Iterative break testing for changes in software; used my knowledge of the intricacies of language & its representation along with coding experience to create robust testing material
- » U.S. Patent No. 11017778, Issued May 25, 2021; One of five inventors
- » Participated in a recent broadening of ML tools based on speech; attended informational and demo meetings, particularly concerning end-to-end, real-time ASR & concerning conversation summarization along with question answering using transformers

Document Specialist (*Aug 2017 – April 2018*) *Church History Dept. – Granite Mountain Vault (Salt Lake City, UT)*

- » Digitized microfilm of family-history-related documents using proprietary software
- » Viewed a wide variety of documents & kept notes of interesting documents; Having just finished my work with automated image classification, zoning, and textual continuity - all for automated extraction for individual and relationship information with the research team - I focused on possibly-useful document types that I hope to use in furthering such extraction

Data Analyst, Contractor (*July 2016 – July 2017*) *FamilySearch (Salt Lake City, UT)*

- » Provided material for the Advanced Technology Research team as part of a group that provided a bridge between it & the Records Division
- » Found, prepared, analyzed & helped facilitate annotation of records. Discussed algorithms & analyzed data patterns with the research team
- » Data curation, especially for the 2-to-20 effort. Family Search catalog use, efficient data storage & retrieval || `bash` tools, `Python`, `Perl`, `Unicode`, & `utf-8`
- » Software design for data annotation. Worked closely with volunteers using the software; Wrote object-oriented, Java software which software included resources for image classification, image segmentation, segment classification, & transcription. Facilitated major acceleration of the zoning & classification || `Java`, `Windows CMD Scripting`
- » Software design for evaluating Asian language OCR software || `Java`, `JNI` (Java Native Interface), `C++`, NIST's `sclite`

Undergraduate and Graduate Research Assistant (*2008 – 2013*)

Brigham Young University (Provo, UT) (2008 – 2010)

University of California at Riverside (Riverside, CA) (2010 – 2013)

- » Data flow management & real-time data quality assurance at the Relativistic Heavy Ion Collider || `Postgre SQL`, `csh/tcsh`, `ksh`, `zsh`, `bash`, `Perl`, `PHP`, `HTML` || UCR
- » Simulation of physical processes for comparison between theory & experiment || `C++`, large & custom `C++` libraries & wrappers, Monte Carlo methods || UCR
- » Computation of electromagnetic fields & intensities || `MATLAB®` || BYU

EDUCATION

- » **Master of Science, Physics**, University of California at Riverside, 2012
- » **Bachelor of Science, Physics**, Brigham Young University, 2010 || Minors: **French**, **Mathematics**