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Original copy (in case broken): `https://mullikine.github.io/cv/`

1 Shane Mulligan; BSc (Computer Science)

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Platform Engineering · Prompt Engineering · Test Automation · Natural Language Processing

1.1 Shane Mulligan [Cover Letter]

Dear Hiring Manager,

Please consider me for this role.

I'm passionate about developing tooling and automating software development processes and applying programming language design to models of natural language. I am currently developing a new kind of programming language for running software on GPT-3.

In 2020 I contracted for FMG in Australia developing CI/CD infrastructure their vehicle autonomy team on AWS. I enjoyed creating productivity tools for the developers, working with GitLab CI and AWS EC2. I have returned to New Zealand since and been involved with my friend's project in realistic avatars (URL: `https://takaheai.github.io/`). I've also been through the Facebook interview process for a platform engineering job, so have completed this primer `https://github.com/donnemartin/system-design-primer`.

In 2019 I automated a pipeline to scale a platform for automating pull requests to GitHub. The pipeline scripts I made touched on everything from GCP, kubernetes, GitHub and AWS and utilised shell, golang, python and common lisp.

In 2018 I studied Information Retrieval and Deep Learning at the University of Otago. I developed a GitHub search engine as my project.

From 2016 to 2017 I maintained CI infrastructure for Crown Equipment Corporation for their autonomous forklifts.

I really enjoy emacs, chatbots, NLP and lisp. I work entirely within a terminal environment I have been automating since 2011. I have 10+ years experience in the workforce as a linux-based software developer and tester. I can research, create quality documentation, design and automate experiments. Please take a look at my blog (`http://mullikine.github.io`) I am very capable and hard working.

Thank you for your consideration,

Shane Mulligan

1.2 Links

- Personal Blog: Bodacious Blog (GitHub: mullikine)
- AI Blog: TakaheAI (GitHub: Takahe)
  Ultra-realistic avatars and chatbots for the enablement of humanity.
- NLP Blog: semiosis (GitHub: semiosis)
  Semiosis is building programming languages to keep computing textual.
- ML Blog: infogetics (GitHub: infogetics)
  Infogetics maps software for transforming one type of information into another
- GitHub, gists, Most active GitHub users in New Zealand

1.3 Past CVs

This is here to communicate my background but not my direction.

- CV and written reference - 2015 - Application for C++ Development

1.3.1 Presentations

1. *<2021-02-19 Fri>* `prompt-engineering` Part 1: Building the environment `https://mullikine.github.io/posts/creating-a-playground-for-gpt-3-in-emacs/`

   nlp **gpt-3** **emacs**

   This presentation is about building a programming environment for the new programming-paradigm of **prompt engineering**.

2. *<2020-10-06 Tue>* Creating standalone UI applications for CLI tools using emacs and docker `https://mullikine.github.io/posts/codecraft-creating-uis-for-cli-programs-with-docker-and-emacs/`

3. *<2018-04-30 Mon>* COSC431: The Case for Learned Index Structures `http://github.com/mullikine/cosc431-assignment-2-presentation/blob/master/presentation.org`

1.3.2 Relevant blog articles for Platform Engineering / DevOps

- `GCP`
  - Tremendous Task: Searching for code on GitHub with BigQuery and GHTorrent // Bodacious Blog
  - CodeCraft: Stacklet - Save Money on the Cloud // Bodacious Blog
- `NLP`
  - Generating poetry with GPT-2/
- Deployment and `IaC`
  - `https://mullikine.github.io/tags/iac/`
  - CodeCraft: Stacklet - Save Money on the Cloud // Bodacious Blog
  - Deployment with IaC and Octopus // Bodacious Blog/
  - Automatic, interactive handling of build files and IaC // Bodacious Blog
  - Review of 'Terraform code quality - CloudSkiff' // Bodacious Blog
  - Terraform // Bodacious Blog/
  - OS-agnostic program installation with Ansible // Bodacious Blog
  - Review of 'Ansible and Terraform: Better Together' // Bodacious Blog

  - HashiCorp: Terraform, Vault, Vagrant, Packer // Bodacious Blog/
  - Provisioning with IaC // Bodacious Blog/
  - Ansible // Bodacious Blog/

- AWS
  - Review of 'AWS RoboMaker - Amazon Web Services' // Bodacious Blog
  - Autoscaling GitLab Runner on AWS // Bodacious Blog

1.4 Work experience

1.4.1 Fortescue Metals Group (contract)

Job title Senior Software Tester and Tooling

Description Software testing, CI/CD and deployment for autonomous mining vehicles.

Job Application Application to Fortescue Metals Group // Bodacious Blog

Started Jan 2020

Ended May 2020

Area	Task
Point of failure analysis	FMEA
CI/CD	GitLab Runner, Docker
Tooling	ROS2, C++
Deployment	Shell, Octopus
Platform Engineering	EC2, Terraform
Research	AWS RoboMaker

1.4.2 CodeLingo Ltd

Job title Software Engineer (contractor)

Description CI/CD for autonomous GitHub pull requests.

Started Sep 2018

Ended May 2019

CI/CD, Platform Engineering with kubernetes, GCP and AWS. Development in many (10+) languages. CodeLingo is a SAAS for linting and automating pull requests on GitHub using a domain-specific language.

1. Examples of pull requests generated and made automatically

   These pull requests were generated by the automated CodeLingo platform.

   `https://gist.github.com/1860bfea2a9e1e3b3bbb96b95a11bdd0`

2. Languages used

language	context
Golang	Platform Development. Tooling. Specifically, lexicons.
Shell	Deployment Pipeline
Ruby, Python, Go	GitHub API
ElasticSearch Lucene	Debugging
BigQuery standard SQL	GHTorrent / Bigquery for Github
JavaScript	Unit testing
emacs lisp	Building an environment for a new language (CLQL)
YAML, Go, Python, Ruby	Researching best practices and generating code

3. Highlights

    - 0 to 1000 automated github pull requests over 8 months.
    - Pipeline outreach scaled the platform from 10 to 300 app installs.

1.4.3 Crown Equipment Corporation

Job title Software Engineer

Description CI and testing for autonomous forklifts.

Started Jan 2015

Ended Sep 2017 (2 years 8 months)

HIL (hardware-in-the-loop) testing

CI/CD

C++ application development

Python unit testing

1. primary languages used

    - C++ 13
    - python

2. Responsibilities

    - HIL (hardware-in-the-loop) rigs / integration tests
    - Implement driver for 3D Basler Camera

3. Highlights

    - Built a platform for correlating error messages with logs and code using the the Sphinx open source search engine.

1.4.4 TracMap

Job title Software Engineer

Description Embedded software development for GPS navigation.

Started Jan 2011

Ended Mar 2013 (2 Years 2 months)

Embedded C++ application development. Porting Firmware.

1. primary languages used

    - C++
    - Python
    - JavaScript
    - PostgreSQL

2. Highlights

    - Ported the firmware from the older TM4 head units to the then prototype TM5 headunit.

3. Images
    - 2012: TM4 needs love
    - 2019: First TM5 returns home

1.5 Open-source Projects

1.5.1 Age of Kings Trigger Studio

`http://aok.heavengames.com/blacksmith/showfile.php?fileid=12103`

The most popular Age of Empires II scenario editor. Downloaded 11,000 times since 2014. Used in making campaigns for Age of Empires II HD edition and expansions.

Software	Purpose
IDA Pro	Reverse engineering
Visual Studio 2005	Compiling
emacs/vim	Programming

1.6 Skill set

- Natural Language Processing
- Prompt Engineering
- emacs
- Language agnostic / polyglot
- Self-management
- Continuous learning
- Automation
    - Build tools, pipelines, cloud.
- Functional Programming

1.7 Current projects

1.7.1 `pen.el` - Prompt engineering in emacs

Facilitates the creation, development, discovery and usage of prompts.

Prompt engineering is a new programming paradigm based on querying large Language Models such as Google's BERT and GPT-3.

- `https://github.com/semiosis/pen.el`
- Autocompleting anything with GPT-3 in emacs // Bodacious Blog

Create elisp functions based on GPT-3 prompts. Chain GPT-3 queries together using keyboard macros and functions Interactively query, generate and transfrom both prose and code

Use GPT-3 as a search engine within emacs.

- Search the internet
- Search documents

1.7.2 `examplary` - An example-oriented DSL that can be used to construct and compose NLP tasks

This is an extension of `pen.el`. One uses this DSL to create more advanced prompts.

`https://github.com/mullikine/examplary`

1.7.3 LSP Server in Clojure

I have an ongoing project which is my expansive glossary. I'm currently building an LSP server in clojure which highlights any editor with things that I know or want to incorporate into my lexicon. I use this glossary system as the scaffolding to apply NLP algorithms and to help me to learn things. This is intrinsic and present within everything I do on my computer.

Updates and demonstrations of the glossary system // Bodacious Blog

1.8 Education

Degree	Field	Insitution	Status
BSc	Computer Science	University of Otago	Finished 2010
PGDip	Information Retrieval	University of Otago	Started 2018

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I have also been meticulously going through Ryan Ong's NLP 365 series, which he created as he went through his Masters and PhD.

A tour of Ryan Ong's - NLP 365 // Bodacious Blog

1.8.1 Highlights

- Won the COSC343 robot competition
- Completed a GitHub search engine using GHTorrent and BigQuery.

1.8.2 Interest papers

- Health science 1st year
- Chemistry (200 level)
- Anatomy (200 level)
- Information Retrieval (400 level)
- Neural Networks (400 level)

1.8.3 Books

- Read:
  - Neural Networks From Scratch (SentDex)
  - Introduction to Information Retrieval - Manning, Christopher D.
  - Language Modeling - Stanford University
  - Boolean Retrieval - Cambridge
  - Myst: The Book of Atrus - David Wingrove, Rand Miller, and Robyn Miller
  - The Elements of Eloquence - Forsyth, Mark
  - Coherence in natural language. Data structures and applications.
- Reading:
  - Search engines information retrieval in practice - Croft, W. Bruce Metzler, Donald Strohman, Trevor
  - HaskellBook - Christopher ALlen, Julie Moronuki
  - 1909.05858 CTRL: A CONDITIONAL TRANSFORMER LANGUAGE MODEL FOR CONTROLLABLE GENERATION - Salesforce
  - Using Search-Logs to Improve Query Tagging - research.google.com

– 2101.03961 - switch transformers - Google Brain

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I convert my books to text so I can do NLP on them and build up my glossaries.
`https://mullikine.github.io/posts/calibredb-inside-emacs-with-text-pdfs/`

1.9 Volunteer work

1.9.1 School of Computer Science

Ongoing. Tutoring junior school and high school students.

started 2018

ended Dec 2019

1. proud moments
   (a) portfolio gallery (circa. 2018) Guided 2 high school students in building an interactive portfolio gallery for the Otago Settler's Museum.
      - Taught CSS, javascript, php.
      - Used Google Cloud NLP for transcribing spoken queries

   (b) built a bot that can play the board game codenames (circa. 2018)
      - Taught the concept of 'word vectors'.

1.9.2 Experience

	Company	Context	
Containerization	FMG	Docker, docker compose, docker swarm	5 months (2020)
Orchestration	CodeLingo	Making tooling for K8s, EKS, minikube	8 months (2018, 2019)
Software deployment, **AWS**	FMG	AWS, GitLab CICD, Octopus.	5 months (2020)
GitLab CI/CD tools	FMG	Automating Build and Deployment	5 months (2020)
AWS	CodeLingo	Platform Automation CodeLingo	8 months (2018, 2019)
GCP	CodeLingo	Searching for github code	8 months (2018, 2019)
Golang	CodeLingo	Go application development	8 months (2018, 2019)
Test automation (**Hardware**)	Crown	Localisation, smoke, integration tests.	2 years (2016, 2017)
Test automation (**Hardware**)	TracMap	Prototype traceability matrix	2011
C++ testing	TracMap	C++ application testing	2011
Test automation (**JavaScript**)	TracMap	SAAS testing	2012
Python testing	TracMap	SAAS testing	2013
C++	Crown	C++ application development	2015, 2016
C++	TracMap	C++ application development	2011, 2012
Python testing	Crown	Selenium, HIL	2016, 2017
Test automation (**Golang**)	CodeLingo		2018
Point of failure analysis	Crown	Test logs	2016
Web Development			2005-2020

Evidence

Area	Evidence from my blog
Using OpenAI in my development	openai // Bodacious Blog
Language Server Protocol	Creating an LSP mode for racket // Bodacious Blog
Language Development	An example-oriented DSL that can be used for NLP tasks.
Templates and Diagrams	Templating mermaid diagrams // Bodacious Blog
Code Generation	Translating Haskell to Clojure with GPT-3 // Bodacious Blog
ChatBot / GPT-2, GPT-3	TakaheAI An operating system based on GPT-3 // Bodacious Blog
Natural language processing	Suggesting words with KeyBERT and pytextrank spaCy in emacs
Automating terminal applications	Automating rat, a powerful productivity tool // Bodacious Blog
Build tool automation	Automating build systems for many languages
Polyglot programming	Languages supported by my development environment
Scripting / pipelines / automation	Reading YouTube rather than watching it
Building terminal user interfaces	Complex Dwarf Fortress macros with tcl/expect, emacs and tmux
Building debugging tools	tooling TensorFlow Debugger (tfdb) and emacs DAP mode for emacs
Metaprogramming	Practical macros in Racket C++ template metaprogramming with Racket
Preprocessing	Filtering text streams
Algorithms	The Illustrated Transformer `https://mullikine.github.io/glossary.html`
Information retrieval	Tremendous Task: Searching for code on GitHub with BigQuery and GHTorre
Documentation	Graphviz and Hugo Entropy, Cross-Entropy and KL-Divergence
Web development	The Semantic Web and Ontology
Deep learning	The Illustrated Transformer
Continuous Integration	`http://codelingo.io` Overview of modern Continuous Integration tools
Functional programming	GHCi and Haskell code intermixed in babel
Telco / Microservices / Kubernetes	telco github GCP
Bayes	(WIP) Probabilistic programming with problog
Building editing environment	Browsing sqlite3 databases with edbi for emacs
Research / learning	Review of 'Language Engineering; Harnessing the Power of Language (2004)'
Code refactoring and linting	CodeQL by GitHub and Semmle CodeLingo vs Linters

I am always learning:

`https://mullikine.github.io/glossary.html`

1.9.3 Programming languages

I support many languages in my environment.

`https://mullikine.github.io/posts/emacs-languages-supported/`

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Language strengths

Language	Work Experience	Language	Work Experience
Python	yes	scheme / racket	
Clojure	yes	problog	yes
Shell (POSIX, bash, zsh)	yes	Perl	yes
c	yes	PerlRE and PCRE	yes
c++ (98)	yes	sed	yes
c++ (13)	yes	awk	yes
SQL (BigQuery)	yes	JavaScript	yes
Go	yes	Java	yes
Haskell		JQ	yes
Common Lisp		GraphViz	yes
TCL (expect)	yes	Latex	yes
emacs lisp	yes	VimScript	yes
Rosie RPL		Prolog	

Cloud-Native Language	Work Experience
CLQL	yes
CodeQL (GitHub / LGTM)	

1.10 Citizenship

- Australia
  Eligible for an E-3 visa in the USA.
- New Zealand

1.11 References

1.11.1 Dr Zhiyi Huang

email `zhuang@cs.otago.ac.nz`

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Department of Computer Science
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1.11.2 Jesse Meek

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1.12 Contact details

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1.12.1 Linkedin

www.linkedin.com/in/shane-mulligan-811b942b/

1.13 Personality

Mediator (`INFP`) Retrospective on my personality // Bodacious Blog

1.14 Colophon

If there are missing pages or the formatting is off, you can find an original here:

Online version: `https://mullikine.github.io/cv/`

PDF version: `https://mullikine.github.io/ox-hugo/cv-newest.pdf`

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