Rizo Isrof

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Summary

I am a computer scientist and software engineer specialized in design and development of large-scale systems for data processing. My passion lies in applying theoretical research ideas to real world problems to generate value for people and businesses. I have extensive experience in software architecture, functional programming, databases and operating systems. I am also a polyglot programmer with practical knowledge of OCaml, D, C/C++, Haskell, Clojure, Scala, Python, R, SQL, among other languages. I am naturally curious, entrepreneurial and tenacious with a focused discipline in learning while also enjoying teaching and helping others.

Experience

Senior Data Science Engineer at Movvo *Jan 2016–Present*

Was part of the Research & Development department and worked as a technical lead in numerous analytics-related projects in which I:

- Designed, implemented and tested a distributed computation workflow for efficient computation of *Key Performance Indicators* which are the core component of the Movvo's business.
- Contributed to the modelling and implementation of a *PostgreSQL* database used as a backend for the analytics API and dashboard.
- Implemented a data storage system in *OCaml* that worked as cache service for a *Cassandra* cluster and then completely replaced it handling dozens of terabytes of raw data.
- Trained the members of my team on advanced functional programming concepts, algorithms design and analysis, system programming, distributed systems and *Unix* platforms.
- Produced technical documentation and specification for all the *KPIs* within the *Analytics Platform*.
- Worked closely with the executive and management teams to define the future releases of the Movvo's products having a key participation in the all the technical decisions.

Head of Data Analysis at Movvo *Dec 2014–Jan 2016*

Responding to the growing needs of the company I led the creation and managed the Data Analysis department. I managed 10 projects within the team composed of very talented computer scientist and developers with whom I built flexible data oriented products which were successfully delivered to the customers. During this period I:

- Designed and implemented a scalable system for data analysis. Used *Spark* as a computation engine with *Cassandra* connector and *Clojure* interface to process raw sensor data.
- Introduced functional programming in the company by showing practical benefits of immutability, composability and type safety.
- Improved the overall performance of the *Analytics Platform* by the average factor of 20x by reimplementing the metrics engine in *OCaml* drastically reducing the hardware resources and helping the delivery team to meet the tight deadlines imposed by some customers.
- Instituted *Extreme Programming* agile methodology within the Data Analysis team promoting test-driven development, code review and pair programming.
- Provided support and maintenance for the product batch pipelines working closely with the project managers and the customers.

Software Developer at AroundKnowledge *Oct 2013–Dec 2014*

I joined a hardware startup with three engineers where I made core contributions to the *Minimum Viable Product* which allowed the company to grow and attract investment. I participated in the development of all the technology layers:

- Studied the behaviour of RF signal and implemented an indoor positioning system that became a key component of the company's business for dozens of clients. Used R and Python for experiments and Python/Numpy for the final implementation.
- Worked on a firmware for real-time WiFi scanning and processing that was deployed on thousands of sensor nodes across hundreds of locations. Used OpenWRT to build the firmware, the services were implemented in C and the communication was done over the MQTT protocol.
- Started the creation of a distributed infrastructure based on CoreOS and Docker for service management and monitoring. The services were implemented in Python, Go and D.

Research Assistant at LIACC (Artificial Intelligence and Computer Science Laboratory) *May 2009–Nov 2013*

I implemented an interactive environment for manipulation and processing of models of computation, like *Finite Automata*, *Regular Expressions*, *Transducers* and *Turing Machines*. I used *Cocoa* and *Objective-C* to build the user interface that supported efficient rendering of graphs with more than 100k nodes, with automatic layout computation. I also created a protocol (with *Python*, *C* and *Nanomsg*) for incremental manipulation of automata by interfacing with the *FAdo* processing engine.

System Administrator at UPP Nonprofit Organization *Apr 2009–Jan 2014*

This position helped me to gain a deep understanding of Unix systems with regards to administration, configuration and security. I single-handedly managed all IT-related tasks:

- Provided administration and support for Debian GNU/Linux systems including server and workstation upgrades, backups and failure monitoring, user account setup and security administration.
- Integrated *Kerberos* authentication protocol across all the services inside the network.
- Configured and managed a distributed data storage system based on *OpenAFS* with several hundred video interviews for the *Memories of Work* project.

Independent Consultant at Ministry of Environmental Protection of Tajikistan *Jul 2010–Oct 2010*

I consulted for the Ministry of Environmental Protection of Tajikistan on a project presented on the opening day of the National Museum in which I developed an embedded dashboard to control an interactive 3D map. The hardware communication service was written in C (and some Assembly) and run on FreeBSD and the touch user interface was designed with the Qt4 graphics toolkit in C++.

Education

University of Porto, Candidate for Bachelor of Computer Science *2009–2013*

Publications

Rizo Isrof, Nelma Moreira, and Rogério Reis. *GUITAR: Graphical User Interface Tool for Automata Representation.* In Actas do IJUP, 2012.

Skills

I enjoy studying programming languages, their history and theory, actively promoting strongly-typed functional languages for not forcing me to choose between correctness, performance and simplicity. I have industrial experience with modern SQL & NoSQL databases, Unix-based operating systems and shell scripting for data analysis. Here is a list of the skills I used in at least one nontrivial project and the programming and natural languages I know:

Operating Systems	OS X	FreeBSD	Linux	Plan 9	NixOS
Databases	PostgreSQL	SQLite	Cassanda	Redis	Irmin
Tools	Vim	Git	Docker	LaTeX	Nix
Programming Languages	OCaml	C	Python	Julia	Javascript
	Haskell	D	Lua	Elixir	Bash
	Clojure	C++	Ruby	Objective-C	Awk
	Scala	Rust	R	Java	Go
Natural Languages	English (C1)	Portuguese (C2)	Russian (C2)	Ukrainian (C2)	Persian (A2)

Projects

Fold Programming Language

Fold is an ongoing effort to build a functional programming language built on top of the *OCaml* compiler toolkit inspired by *Elm*, *Clojure* and *APL*. It is a *Lisp* dialect with regular user-friendly syntax featuring powerful metaprogramming primitives (similar to templates in *D* and *C++*). It is particularly well suited for designing DSLs because of its dynamic and flexible parser.

Dataflow

My personal research of flow-based programming led me to discover the complexities and trade-offs involved in diverse streaming models, such as *iteratees*, *coroutine generators*, Haskell's *pipes*, Clojure's *transducers*, *etc*. My goal with *Dataflow* is to create a functional and secure streaming abstraction for efficient data processing in *OCaml* and *Fold*.

Swarmsence

I co-founded a working group whose mission is to build a platform for agriculture that enables metric analysis and provides actionable insights based on continuous crop monitoring via a dashboard. I developed an embedded service suite for a *Raspberry Pi* in *C* and *OCaml* that interfaced with *ZeroMQ*, stored data messages from a local *6LoWPAN* network with sensor nodes into a *SQLite* database and exposed the historical and real-time data for filtering over a *HTTP* and *WebSocket* interfaces.

Others

I created and maintained other software projects that can be found on my GitHub (http://github.com/rizo).

Interests

Category Theory, Types, Machine Learning, Formal Languages and Automata Theory, Mathematical Logic, Ontologies, Microservices, Distributed Systems, Space Exploration, Quantum Physics, Hiking, Graphic Design, Typography, Mechanical Keyboards, Music (guitar performance), Classic Literature, History and Philosophy.