Vasilev Valentin, age 32, Russia, Saint Petersburg,
+7 952-242-16-68, zergqi@ya.ru

ELIXIR DEVELOPER / SCIENTIFIC PROGRAMMER

Programmer and mathematician with strong, proven capabilities in both disciplines. Real-life, practical experience ranging from programming Unmanned Aerial Vehicles (UAVs) to real-time trading systems. Capability to bridge programming and maths skillfully and create state-of-the art software solutions, using a wide range of programming languages. I have knowledge and experience in linear algebra, calculus, topology, combinatorics and groups. I believe these skills to be timely and useful as AI and Neural Networks mature, and as ever more data is collected and analyzed. I am curious, outgoing, continuously learning and always looking out for new problems to wrap my brain and fingers around.

LOOKING FOR

- remote work/contractor assignments (flexible schedule / piecework / work in a project);

- for example: a job as an *Elixir* back-end web developer; applied mathematics; developer of decentralized systems and applications, blockchain developer; developer of distributed fault-tolerant solutions (*Elixir*);

- work in an area such as bioinformatics; mathematics; fundamental research.

SUMMARY

- In 2009 I graduated in applied mathematics and informatics. Did research on multi-agents, consensus in distributed networks, constructing my own variant of denotational semantics for dataflow programming. I also used my interest in bioinformatics, and adopted its techniques to analysis of polyphonic music.

- Strong programming skills in back-end web development, and development of fault-tolerant distributed applications with *Elixir/OTP*. I have also worked with *Ruby [RoR], PHP [Symfony], Haskell, C/C++ [Qt/STL], JS, Java [SE/EE], Tcl/Tk, Python and others*.

- Highly interested in decentralized systems and apps, blockchain technologies, algorithms and mathematics "behind the scene". I am currently working on fault-tolerant automated trading system (my own pet project).

EDUCATION AND RESEARCH

- **Graduated from the St. Petersburg State University, the faculty of Mathematics and Mechanics.** I have a specialist degree in applied mathematics and informatics (pre-Bologna 5-year program; academic department: Applied Cybernetics). Passed externship in Motorola.

- **Post-graduated at the same faculty in 2009-2010, 2011-2012.**

+ Research in "hybrid models of computations" (had a few publications) and also in multi-agent systems. My idea was to create multi-agent system consisted of UAV (Unmanned Aerial Vehicles). The project won 2010 grant for the project titled "Multi-agent system that controls a group of light UAV". I Implemented a base station software *[Erlang/OTP]*, curated three diploma theses projects within the same problem area. I also conducted researched on consensus in distributed networks.

+ Simultaneously, and following my interest in classical music education I conducted research in "automatic analysis of polyphonic music", which is a mining of a melodic and harmonic patterns. These patterns could be used to determine an authorship, or to study music evolution or real-time harmonization.

PROFESSIONAL EXPERIENCE

- **From 2007 until 2012** I was working as a freelancer for various employers, solving a variety of tasks using *PHP*, *JS*, *Ruby*, *Python 3*. I also worked as a web developer and wrote documentation using federal standards *[Java SE 6/EE 5, Hibernate, JPA, JSF/JSP, Glassfish, EJB 3.0, Servlets 2.5, SWING, JFreeChart, MySQL]*.

- **From 2012 until 2018 I worked in *PJSC "Inteltech"*.** My department specialized in a state border-control topics. During the work process I researched solutions for the following tasks:

    1. Developing a system that finds patterns in a sequence of events ("Sequential Pattern Mining"). This was used for estimating a degree of deviation from the usual behaviour and warn about possible failures. I adopted the *Apriori* algorithm to use the MapReduce implementation provided by MongoDB *[Ruby, RoR, MongoDB, PostgreSQL]*;

    2. Developing a system that uses *decision tree learning* to classify an alarm signals from sensors located on a border area to filter

a false-alarms *[C++]*;

3. Developing a prototype of a fault-tolerant distributed soft real-time stream processing engine capable of aggregating and analyzing data from potentially infinite streams (portion by portion). The UI is provided for composing computational blocks (like filters, aggregators, generators, models builders and flow controllers) in a computational chain. The system is agnostic to database and data sources (through connectors), uses flow-based programming, supports horizontal scaling, it is transparent, and supports changing data-processing chains in a runtime. It is mainly meant to look like a highly simplified analog of Azure Stream Analytics.

All was done according to employer requirements set out for work *C++, Qt and PostgreSQL*. I also adopted some of a Data Mining Models to work incrementally with an infinite input streams: bayesian and markov networks and association rule learning.

- **From 2018** I have been working on my own project, a fault-tolerant automated trading system that could connect to a different cryptocurrency exchanges [*Elixir/Phoenix*]. Part of this system is published as an open-source: *AgentMap* and *ConnPool* projects could be found on http://hex.pm.

- **Also, as a paid-hobby, tutoring in math and informatics from 2006 until now**. I spend hundreds of hours explaining and training for exams. At the end, the most efficient way to understand something is to explain it.

MAIN SKILLS & INTERESTS IN PROGRAMMING

- **Elixir/Erlang/OTP [Phoenix].** Two years ago I switched from *Erlang* to *Elixir* (the same VM). It's the language of my choice: functional, well documented, with a great community, based on a bulletproof VM. Elixir makes it easy as never to make fault-tolerant distributed horizontal scaling applications (out-of-box, practically).

- **Haskell.** Big fan since 2007. Used to know a lot about the theoretical foundations of FP (λ-calculus, HM type system, combinatorial logic, denotational semantics). I have had no chance to try it in production, but I have used it in an annual bioinformatics contests.

- **C/C++ [Qt/STL].** Used C++ for 6 years while working in "Inteltech".

- **Web development.** As an any back-end developer I am familiar with a front-end side: *JS / HTML / CSS / jQuery* and relative techs. As a

back-end developer, I started my journey with a bare *Java EE*, switched to *Symfony [PHP]*, then to *RoR [Ruby]*, and finally came to a *Phoenix [Elixir]* which serves my current demands perfect.

- **Blockchain.** Despite the global decline in interest, as a mathematician, I haven't lose a bit of enthusiasm in this technology. I attentively read white papers for all the main blockchain projects and make myself familiar with the algorithms behind decentralized systems and apps. I believe I have a strong understanding of an area, it's mechanics and limitations. I would love to spend more time playing with smart contracts, EVM and related tools, like Whisper protocol, Swarm or corresponding frameworks.

- **Linux.** Used to be my OS of choice from 2005. My path was *ALT Linux → Fedora → Slackware → GoboLinux → Ubuntu → OpenSUSE → Gentoo → Arch*. My skills in this area are quite advanced. My base tools are *Gnome 3*, *Guake + Spacemacs* [*org-mode*], *XeLaTex*, *ZSH*, *Git* and *Vivaldi*. Passionate console user.

SCIENTIFIC INTERESTS (MATHS MAINLY)

- The university program included a wide range of topics: discrete analysis and graph theory, geometry and topology, mathematical analysis and measure theory, algebra and number theory, mathematical logic, differential equations, financial mathematics, numerical methods, extremal problems, probability theory, functional analysis, theoretical mechanics, cybernetics theory, dynamical systems, statistics and mathematical physics problems.

- While post-graduated I was interested in: optimization theory (in concrete, in stochastic optimization and evolutionary computations), also in λ-calculus, π-calculus, combinatorial logic, denotational semantics and non-standard analysis. Later came interest in a type theory and a Martin-Löf type theory.

- Since I started researching it in 2014, I have tried to put a theoretical basis for the work that I was making in "Inteltech" (implementing dataflow processing system). From this point I learned from the theory of categories, probabilistic graphical models, semigroups, groups, and from so-called patch theory (*Darcs, Pijul*).

- I really enjoy mathematical research, developing proofs, performing computations and solving problems. My level of expertise is enough to see interconnections between different fields and adopt mathematical apparatus to solve domain-specific problems. Have general skills in *R*, *MATLAB* and *GNU Octave*.

EXPECTATIONS

- Remote working without permanent moving to another country, for now;

- flexible schedule, a piecework or work in a project;

- work alone or in a small team of passionate people, on crazy enough project;

- as a developer it would be nice to use (and learn more): Elixir / *Rust* / *Vue.js* / *Elm* **/** *Electron*; as applied mathematic, to learn in others fundamental areas, read articles, papers, make scientific writing.

OTHER

- **Physical activity:** hiking, rock-climbing, swimming, bicycle walks.

- **Also:** agnostic, pacifist, politically apathetic; quit smoking ages ago, drink very little; in my Alma Mater graduated from the military department and passed the military training; passionate SC2 player; love sci-fi and cyberpunk, movies and books; play piano, sing opera.