Konstantin **Burlachenko**

Ph.D. student in CS program, CEMSE division at KAUST

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During my career I created Systems for Machine Learning, AI, Computer Graphics, Computer Vision, Computational Physics via full exploiting hardware via DSL languages and contemporary areas of Applied Math and Computer Science.

Education

2020-Now	Ph.D. program in CS Program at King Abdullah University of Science and Technology under supervision of prof. P.Richtárik. *Awards :* Dean's Award 2019, KAUST. Transcript : Link
2015-2019	Graduate Non-Degree Program. Leland Stanford Jr. University, Stanford, USA. Transcript : Link
2015-2018	Leland Stanford Jr. University, Stanford, USA. Data, Models and Optimization Graduate Certificate : Link. Program Description
2016 - 2019	Leland Stanford Jr. University, Stanford, USA. Artificial Intelligence Graduate Certificate : Link. Program Description
2003-2009	Master Degree in Computer Science. Bauman Moscow State Technical University, Russia. Transcript evaluated by World Education Service : Link
	Summer Shools and Conferences : Regularization Methods for ML 2021 (Certificate) ; The PRAIRIE/MIAI AI summer school 2021 (Certificate) ; ICML-2021 (Certificate) ; Oxford ML Summer School-2021(Certificate)

Selected paper and notes

FL_PyTorch : Optimization Research Simulator for Federated Learning — 2021

https://distributedml.org/program/

Accepted for presentation and publication to 2nd Workshop on Distributed Machine Learning, co-located with CoNEXT 2021.

MARINA : Faster Non-Convex Distributed Learning with Compression — 2021

https://arxiv.org/abs/2102.07845

Accepted for presentation and publication to Thirty-eighth International Conference on Machine Learning (ICML 2021)

Personalized federated learning with communication compression — 2021

E. Bergou, A. Dutta, K. Burlachenko, P. Kalnis and P. Richtárik

Note about Main math models in area of interest of Machine Learning — 2018

https://sites.google.com/site/burlachenkok/articles/main-math-models-in-area-of-interest-of-machine-learning

Notes about book A.N.Kolomogorov, S.V.Fomin Introductory Real Analysis — 2020

https://sites.google.com/site/burlachenkok/articles/notes-about-the-book-of-ankolomogorovsvfomin

Notes about various aspects in ML, AI, CS, Optimization, Programming Languages, Physics, Applied Math — 2010-2021

https://sites.google.com/site/burlachenkok/articles

Presentations

JULY-2021	Poster and spotlight for in ICML-2021 : MARINA Faster Non-Convex Distributed Learning with Compression
APR-2021	Poster presentation at Communication Efficient Distributed Optimization at NSF-TRIPODS Workshop.
FEB-2020	OpenTalks.AI, https://www.huawei.com/ru/news/ru/2020/huawei_ai_development_in_russia
JULY-2019	Teach one month Deep Learning Course with Dmitriy Kamzolov. Russia, Sochi, Srius
DEC-2018	Guest Lectures in Moscow Institure of Physics and Technologies. Subtle things around decision trees. ▶ **https://github.com/burlachenkok/presentations_bruziuz/tree/master** ▶ **https://www.youtube.com/watch?v=r4ZTy90233w** ▶ **https://www.youtube.com/watch?v=evkzN6AZTnc**
APR-2016	GTC 2016, San Hose. **http://www.gputechconf.com/**. Presenter in Driveworks NVIDIA Booth
AUG-2012	SIGGRAPH 2012, LosAngeles. ACM Siggraph **http://s2012.siggraph.org**. Presenter in CentiLeo Booth.

Competences

General Programming Languages	C89/C99, C++14/11/03, C#, Python, Cython, Bash, Perl, x86/x386/ARM, Java
DSL Programming Languages	Gl Shader Language, TVM, Google Protobuf, CUDA, OpenCL, Matlab, R
Frameworks	Qt, CUDA, PyTorch, TensorFlow, WinApi, Posix, OpenGL, OpenCL, PyTorch
Libraries	Numpy, CUDA, TensorFlow, CvxPy, CUDA Toolkit
Operating Systems	Windows, Linux based, Orbis, XBox, Windows CE, Android, NDA OS-es
Development Environments	QtCreator, Visual Studio, Eclipse, WinDbg, Android Studio, TexStudio, Nsight
Development Tools	SysInternals, AqTime, Cmake, GNU Toolchain, CppCheck,Valgrind,Git
Markup and Type Languages	Latex, HTML, XML, Protocol buffers
Areas of interest	Federated Learning, Stochastic Distributed Math Optimization, Computer Science, Machine Learning, AI, Computer Vision, System Programming, GPU Programming, Distributed Systems, Convex Optimization, Non Convex Optimization
Examples of own Projects	Provided under request. I have personal projects from 100 lines to 80K lines.
Recomendations from co-workers on recent projects	Can be Provided under request

Professional Experience

August 2020 – March 2019 | **Principal Lead Engineer | Foundation AI Lab, HUAWEI, Moscow**

- R&D in internal ML/DL middleware for HUAWEI HiSilicon
- R&D in internal projects in ML/DL middleware for HUAWEI Consumer Business Group
- Preseting HiSilicon solutions in Russian AI Conferences

Math Optimization | AI | Machine Learning | C++ | Python | TVM | Java | Google Protobuf | CMake | Qt | TensorFlow

March 2019 – July 2014 | **Senior Developer Technology Engineer, NVIDIA, Moscow**

- Contribute into Driveworks SDK - computer vision, machine learning
- Contribute into PhysX/Apex SDK - physics simulation, graphical special effects development
- Contribute into cuDNN/cuBLAS libraries - GPU computation, machine learning.
- Contribute into RAPIDS project - GPU based Machine Learning Framework

CUDA | GLSL | C++ | SSE2/ARM NEON | Linux | Windows | PS4 | XBox | OpenGL | Google Tests | GitLab | Perl | Python | CMake | Make | Qt | Git | TensorFlow | Computer Vision | Graphics | Deep Learning | CppCheck

July 2014 – May 2013 | **Senior Developer Engineer | Yandex Video Team, YANDEX, Moscow**

- Text and statistical machine learning features for video search `http://video.yandex.ru`
- Infrastructure to store static aspects web document with embedded video
- Statistical analysis in several billions web documents with embedded video in MapReduce
- Infrastructure to show plots for internal team's processes

C++ | Google Protobuf | JavaScript | Bash | Python | Computer Science | HTML | SVN | MapReduce | Decision Trees

April 2013 – March 2012 | **Lead Physics Engine Developer, FITTING REALITY, Moscow**

CEO Inga Nakhmanson can prove that I brought big value for the project and company. I have left due to that stopped financial support of a startup company.

- Develop library for clothing simulation started with CUDA
- Migrate cloth simulation library to OpenCL
- Adapt to use this library for Ogre.
- Custom render engine for clothing visualizatio `https://yadi.sk/d/ytygxSIYP62Tr`
- Carry internal math/cs trainings

C++ | OpenGL | GLSL | Qt | Linux | Windows | QMake | CUDA | OpenCL | Physics | Computer Graphics | gDebugger

March 2012 – September 2010 | **Software Developer Engineer, ACRONIS, Moscow**

Acronis invited B.Stroustroup author of C++ to give an advanced series of lectures about C++ which gave me additional great knowledge on the subject.

- Low-level debugging in a big codebase
- Key member of GUI team for Acronis Backup and Recovery 2011 Enterprise

C++ | C | Windows | WinDbg | VmWare | Specialized GUI library | SVN | SysInternals Suite | AppVerifer | CppCheck

September 2010 – March 2009 | **Senior Software Developer Engineer, CAPITAL RESEARCH, Moscow**

Left company due to that financial support of startup have starts be problematical. CEO Kirill Garanzha can prove that I was up to last moments.

- Developed Firefox plugin to create the three-dimensional HTML view for basics HTML elements

Firefox | C++ | Windows | HTML | CSS | Windows | OpenGL | GLSL

June 2009 – December 2006 | **C++ Programming Engineer, FLINT AND CO, Moscow**

- Created several computer games, write drivers to custom equipment, implement computer vision and computer graphics part
- Trips to customers

C++ | SDL | Linux | Windows | Development Image Library | Low level programming | Computer Vision | OpenGL | SVN

November 2006 – March 2006 | **C++ Programming Engineer, ASTRASOFT TECHNOLOGY, Moscow**

Left company due no interconnection with my courses in 2006

- Developed visual elements of management system based on Qt and OpenGL

C++ | Qt | Windows | OpenGL | SVN

Some own projects

Math Optimization Research Studio — 2020

https://bitbucket.org/konstantin_burlachenko/opt_studio Project report Math Optimizaiton Research Studio
CS380 : Math Optimization Research Studio.

C++ | Linux | Windows | CUDA | CMake

Experimental Neural Net Framework — 2019

https://sites.google.com/site/burlachenkok/stanford-cs230-experimental-neural-net-framework
Poster Presentation Session, CS230 - 2019 4 minute presentation bitbucket repo
CS230 : Experimental Neural Net Framework done under mentoring of Steven Ziqiu Chen (stevenzc@stanford.edu)

C++ | Linux | Windows | CUDA | Python | CMake

Convex optimization solvers with leveraging into GPU/CPU power for AI/ML — 2018

https://sites.google.com/site/burlachenkok/convex-optimization-solvers-with-leveraging-into-gpucpu-power-for-aiml
Poster Presentation Session, CS221 - 2018 bitbucket repo
CS221 : Convex optimization solvers with leveraging into GPU/CPU power for AI/ML under mentoring of Steven Diamond `http://web.stanford.edu/~stevend2/`

C++ | Linux | Windows | CUDA | Python | CMake | Convex Optimization

Convex Optimization for Machine Learning — 2017

https://sites.google.com/site/burlachenkok/articles/cvx4ml Poster Presentation Session, CS229 - 2017
4 minute presentation
Stanford, CS229 : Convex Optimization for Machine Learning

C++ | Visual Studio | Numerical Linear Algebra | Convex Optimization | Python | CMake

Advacned tool to plot data — 2017

40 minute presentation github.com/burlachenkok/plotter_plusplus
This is an advanced plotter tool which receives commands over the network TCP connection. Goal of this program is to assist debugging and development process. It have been written in C++ and it use Qt Framework 5.7.* as only one external library.

C++ | Linux | Windows | Embeded Systems | Qt | Python

Lane detection using Fourier based line detector — 2016

http://web.stanford.edu/class/cs231a/prev_projects_2016/final_konstantin_burlachenko.pdf
10 minute presentation
Lane detection from several image input videostream.

Matlab

References

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