Pavel Chernov

Machine Learning Engineer

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Technologies

PyTorch, Pandas, OpenCV, Sklearn, CatBoost, Docker, Matplotlib, Keras, TensorFlow, Python

Education

Computer Science in South Ural State University, Chelyabinsk, Russia, GPA: 4.85 out of 5 graduated June 2002

Online Coursera courses

Game Theory	accomplished Sep 2013
Machine Learning	accomplished Nov 2013
Neural Networks and Deep Learning	accomplished Sep 2017
Improving Deep NN: Hyperparameter tuning, Regularization and Optimization	accomplished Sep 2017
Structuring Machine Learning Projects	accomplished Oct 2017
Convolutional Neural Networks	accomplished Nov 2017
Sequence Models	accomplished Feb 2018
Practical Reinforcement Learning	accomplished Dec 2019
Interest Rate Models	accomplished Oct 2020
Trading Algorithms	in progress…

Experience

MapHub (services for aerial footage), ML engineer — Sep 2021 – Oct 2021

Python, PyTorch, OpenCV, ONNX, Docker, Win, Linux

I created an object detection model to detect buildings, coconut palms, etc. in GeoTIFF files. I've chosen YOLOv5 architecture as it is fast and accurate enough. First challenge was that GeoTIFF files are typically very huge. I found a lightweight library, which is capable of loading some patches from large GeoTIFF files. Second challenge was that inference code from YOLOv5 is not capable of processing large GeoTIFF files by parts. That is why I created my own code, which runs model on multiple patches of source image and implements non-maximum suppression algorithm to produce the final predictions list. Third challenge was to build a docker image of some reasonable size. By converting model from PyTorch to ONNX format, I managed to create a lightweight docker image of only 300 Mb.

RTS Munity s.a. (e-sport odds and trading provider), senior data scientist — June 2020 – Oct 2020

Python, PyTorch, Tensorflow, OpenCV, Win, Linux, AWS

I managed to create a real-time OCR reader of different values of teams and players on video streams of League of Legends games. The first challenge was that there are 57 different values, such as: gold, kills, turrets, minions, health, mana, etc., which can be located in different places for different video stream providers. My code automatically recognizes layout (coordinates) of these values. The second challenge was to read all these values in real-time. I carefully constructed CRNN -based model architecture, to reach an optimal balance between speed and accuracy.
Examples: video1, video2, video3, video4, video5

RTS Munity s.a. (e-sport odds and trading provider), senior data scientist — December 2019 – January 2020

R-language, Win

Implemented a bundle of small models for predictions of different match outcomes for bets on e-sports games. Predictions were made based on some preliminary data available. The challenge for me was the necessity to use the R-language, which I had no experience earlier, and creating a complete R-package with unit-tests and documentation.

Osnova Ltd. (real estate management), deputy director, co-founder — July 2010 – present time

In addition to daily work I developed and implemented software (**Excel + VBA**) for diverse investments analysis which takes into account cash flow and calculates annualized rate of return. This makes it easy to compare results of investments in completely different kinds of instruments, for instance: commercial real estate vs stocks or bonds.

Laserographic Studio Ltd. (personalized laser engraved souvenirs), founder — Nov 2008 – June 2010

Besides creating and running new business I adapted existing basic accounting software (1C) for souvenir production.

Pallada Ltd. (local dealer of banking equipment), executive director Sep 2006 – Nov 2008

Besides my daily work:

- Programmed additional module for working software (**1C**) to speed up manual operations of sales managers.
- Adapted existing basic accounting software (**1C**) to work with many branches in the distributed database mode.
- Developed and realized new scheme for Internet access for all branches to make internal network and cut costs.
- Developed and created system to control Internet access for workers as it was expensive at that time.

Astra-ST CJSC (system integrator), team leader, **Linux C/C++** Sep 2002 – Sep 2006

My team created and certified special Linux distributive with safe boot, additional access control by different security levels, with server and clients working in graphical terminal mode. This project required wide variety of skills including: creating boot images and kernel module, adapting network protocols, modifying print stream on-the-fly, creating new graphical interfaces (C/C++, Assembler, Bash, PostScript).

DataQSoft (full stack software company), backend and desktop developer, **Win C/C++** Feb 2001 – June 2002

Created module for speech compression for voice chat over Internet (**C/C++**).
Created client/server for TCP tunnel over UDP protocol to connect two branches through restricted network (C/C++).
Created backend server module for online textual web-chat (**C++**).

Link-Service Ltd. (accounting software company), developer, **Win 1C and C** June 2000 – Sep 2000

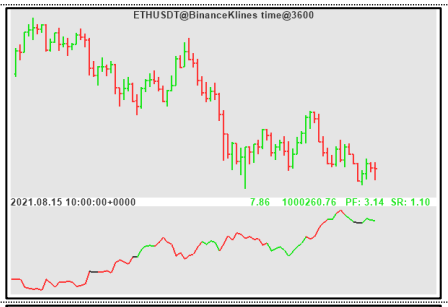
Created module for sales software to connect electronic balance to speed up sales and reduce operator errors.

Personal Research Projects

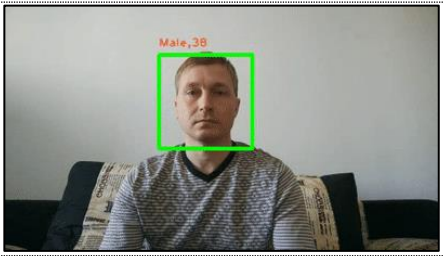
Reinforce – deep study of reinforcement learning (Pytorch, Python, RL)
I studied several reinforcement learning algorithms and implemented them in code from scratch. The algorithms are:

- CMA-ES
- DQN (+Double, +Duelling)
- A3C
- A2C
- PPO

Intraday – Gym environment for intraday trading bot (Python, Numpy)
I created a package, which provides gym compatible environment to simulate intraday trading based on stream of trades, either historical or real-time.
https://github.com/diovisgood/intraday

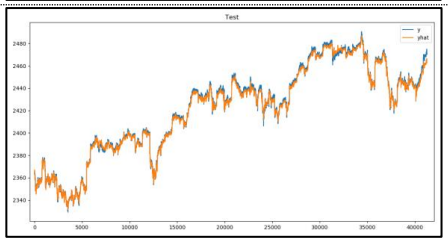


Agender - age and gender real-time estimation (Python, TensorFlow, OpenCV)
https://github.com/diovisgood/agender
This is a demo project I made to learn OpenCV. It uses pre-trained lightweight models and can estimate age and gender in real time.
Article on Medium.



Index - stock index price prediction (Python, Pytorch)
https://github.com/diovisgood/index

This is a demo project in which I show that you may train a good model for linear regression, but it won't help you to beat the market.



QGEN – Competing Genetic Algorithm to find profitable trading strategies in financial market (Lua, Torch)
https://github.com/diovisgood/qgen_lua
This is a project I made trying new approach to find profitable trading strategies. I could not beat the market, but developed Competing Genetic Algorithm that can be useful for many other problems. Article on Medium.

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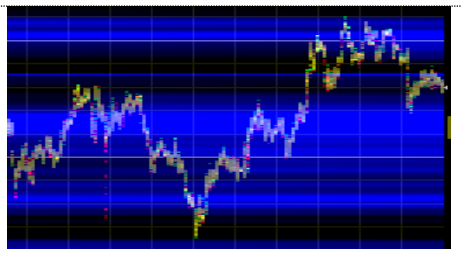
Example of evolved trading strategy code in synthetic language, with profit factor: 1.99, max drawdown: 1.4%

VISOR – bitcoin price prediction (Lua, Torch)
In this project I applied deep convolutional networks to predict price movement. I trained different models on a specially constructed bitcoin price chart (images). I managed to train model that gained profit on new data it has never seen before. Though its profit factor is too low to use it for real trading.



Trained on: 01.09.2017 – 01.10.2018.
Tested on: 16.01.2019 – 18.06.2019
Profit factor: 1.28, max drawdown: 8%

Summary

Master in computer science. Started in different software and system integrator companies as a backend developer, system architect and a team leader. Went to develop management skills as executive director in a banking equipment service company. Started a company for personalized laser engraved souvenirs. After that, more than 10 years have been running own business in development and real estate management. Then went back to the start and since 2013 make my way in machine learning and data science.

Through my carrier, I have been a programmer, a team leader, a deputy director, an entrepreneur and co-founder of small business. I never stop learning.

My ultimate goal is to relocate to Europe. But it is better to start with a contract work (as I am individual entrepreneur), within which I can complete a complex and interesting project for you.