Iaroslav Omelianenko

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Summary

- An active researcher, avid learner and coder able to quickly grasp and distill complex matters into clean, understandable solutions
- Self motivated problem solver, self starter and excellent communicator with passion for shipping quality products
- Have strong experience with teams building and budgeting for variety of projects ranging from mobile app development to research projects (applying deep learning for psycho-demographics and neuroscience).
- Have managed projects for government, industrial, financial, and advertising sectors.
- Have strong machine learning/data science skills with majority of modern tools and frameworks
- Have strong interest in Artificial Intelligence, deep and reinforcement learning, Information Retrieval, Natural Languages Processing, and Brain-Computer Interface technologies
- The early adopter of cloud solutions, knowledgeable about building distributed high performance solutions into the computational clouds. Experienced with common computational clouds (Amazon AWS, Google AppEngine, IBM Bluemix) and cluster-based solutions (Storm, Spark).
- Mobile technology expert with proven record of about fourteen years of experience in management and development of various mobile enabled software solutions.
- Full stack mobile applications architect with expertise ranging from graphical UI/UX design to cost effective backend infrastructure architecture design and implementation (backend as service, micro services, cloud platforms)

Main Programming languages

Java - excellent (16+ years)
Objective-C - excellent (6 years)
Swift - excellent (2 years)
C/C++ - proficient (3 years)
GoLang - moderate (3 years)
JavaScript - moderate (1 year)
Python - proficient (4 years)
R - proficient (1year)

Cloud Computing

Amazon WS, Google Cloud Platform, IBM Bluemix, parse.com, heroku, firebase

Data science/ML frameworks and tools

Google TensorFlow (https://www.tensorflow.org), **mxnet** (http://mxnet.io), **OpenAI** (https://openai.com/requests-for-research/), **Stanford NER** (http://nlp.stanford.edu/software/CRF-NER.shtml), **Dragon Toolkit** (http://dragon.ischool.drexel.edu), **Mallet** (http://mallet.cs.umass.edu), **OpenCV** (http://opencv.org), **SciPy** (https://scipy.org), **Pandas** (http://pandas.pydata.org), **Scikit-Learn** (http://scikit-learn.org), **Weka** (http://www.cs.waikato.ac.nz/ml/weka/), **Orange** (http://orange.biolab.si), **IBM Watson** (https://www.ibm.com/watson/)

DevOps

Docker

Experience

1. CTO, NewGround LLC > Kiev, Ukraine – 2003-present

- I've engaged and implemented more than three dozens projects for development of custom software, starting with an initial interview with the client and finishing with the final delivery of the product
- Technological guidance of the company in adopting new technologies to meet fast changing business requirements
- Research and development activity in order to find new business opportunities for the company
- Architecting software solutions to meet customers' requests and to follow modern software design approaches
- Implementation of ML solutions for internal projects based on simple and advanced ML methodologies (regression analysis, artificial neural networks, etc.)
- Software design and implementation with J2SE, J2EE, J2ME , Android (Java, C++), iOS (Objective-C, Swift), Qt, Erlang, GoLang, C++/C, Python, R, JS
- Cloud based solutions implementation: Google AppEngine, AmazonWS, Parse.com, Heroku, firebase.org
- Mobile platforms evangelist (Android, iOS, JS, BlackBerry, J2ME)
- Contemporary digital media assets design and implementation (Processing, openFrameworks, openCV)
- Projects management , team building, mentoring and management
- Pre/post - sales interaction with customers, requirements analysis

2. Freelancer, Data Science/Engineering > Kiev, Ukraine - 2014-present

- Participated in multiple online data science contest in order to gain hands on expertise in Machine Learning and Data Science
- Developed advanced machine learning algorithms using C++, Java, and Python
- Applied following statistical and ML methods: linear regression analysis/ classification, extremely randomized forests, SVD, PCA, SVM, Browning/Halton data sampling, variety of NLP methods, Recurrent NN, Deep NN, Convolution NN, variety of CV feature detection methods, etc
- Participated in OpenAI reinforcement learning research program (https://openai.com/requests-for-research/)
- Used following ML/DS tools/frameworks: ***Google TensorFlow*** (https://www.tensorflow.org), ***mxnet*** (http://mxnet.io), ***Berkley Caffe*** (http://caffe.berkeleyvision.org), ***Stanford NER*** (http://nlp.stanford.edu/software/CRF-NER.shtml), ***Dragon Toolkit*** (http://dragon.ischool.drexel.edu), ***Mallet*** (http://mallet.cs.umass.edu), ***OpenCV*** (http://opencv.org), ***SciPy*** (https://scipy.org), *Pandas* (http://pandas.pydata.org), ***Scikit-Learn*** (http://scikit-learn.org), *mxnet* (http://mxnet.io), ***OpenAI*** (https://openai.com/requests-for-research/), ***Weka***

(http://www.cs.waikato.ac.nz/ml/weka/), ***Orange*** (http://orange.biolab.si), ***IBM Watson*** (https://www.ibm.com/watson/)

3. Senior Java Developer, NewGround LLC > Kiev, Ukraine – 2002-2003

- Team guidance and mentoring
- Architecting software solutions and database schemes
- Software implementation with Java platform
- Quality assurance
- Customer requests analysis
- Intensive research activity

4. Java Developer, Jworx > Kiev, Ukraine – 2000-2002

- Software implementation with Java platform
- Architecting software solutions and database schemes
- Development of online financial tools (Java Applets)
- Mathematical analysis
- Quality assurance
- Intensive research activity

Education

Ukrainian State University of Food Technologies, Kiev, Ukraine – Production management, Technological process control. Master of Engineering. 1999

Patents

Ukraine #31149 / March 25, 2008 / http://base.uipv.org/searchINV/search.php?action=viewdetails&IdClaim=102950

Method for data exchange is characterised with preparation of files with information, advertisement or entertainment content suitable for loading to mobile device, with preparation of server for ordering of files distribution, loading files from server to computer connected with module of wire-less data exchange, with placement of computer equipped with module for wireless data exchange in place of periodic access from users of mobile devices, with control of computer and reporting of statistical data based on sessions of communication with mobile devices. The ones performs search of mobile device nearby by means of module of wireless data exchange. The ones performs preliminary informing of mobile devices' users upon availability of particular file for downloading. The ones performs file transfer to mobile devices after having obtained permit from user. Preliminarily ones additionally forms schedule of files distribution, and it is installed to the managing computer together with ordering of files distribution. Between the managing computer and the server ones provides data exchange during which it is possible to perform content files updating as well as updating of distribution ordering and schedule of files distribution.

Publications, Conference Papers

1. Iaroslav Omelianenko. Applying Deep Machine Learning for psycho-demographic profiling of Internet users using O.C.E.A.N. model of personality.
Talk presented at the Future Technologies Conference 2017, Vancouver, BC, Canada. Available at the *arXiv preprint service:* arXiv:1703.06914

In the modern era, each Internet user leaves enormous amounts of auxiliary digital residuals (footprints) by using a variety of on-line services. All this data is already collected and stored for many years. In recent works, it was demonstrated that it's possible to apply simple machine learning methods to analyze collected digital footprints and to create psychological profiles of individuals. However, while these works clearly demonstrated the applicability of machine learning methods for such an analysis, created simple prediction models still lacks accuracy necessary to be successfully applied to practical needs. We have assumed that using advanced deep machine learning methods may considerably increase the accuracy of predictions. We started with simple machine learning methods to estimate basic prediction performance and moved further by applying advanced methods based on shallow and deep neural networks. Then we compared prediction power of studied models and made conclusions about its performance. Finally, we made hypotheses how prediction accuracy can be further improved.

2. Iaroslav Omelianenko. Applying advanced machine learning models to classify electro-physiological activity of human brain for use in biometric identification.
Available at the arXiv preprint service: arXiv:1708.01167

In this article we present the results of our research related to the study of correlations between specific visual stimulation and the elicited brain's electro-physiological response collected by EEG sensors from a group of participants. We will look at how the various

characteristics of visual stimulation affect the measured electro-physiological response of the brain and describe the optimal parameters found that elicit a steady-state visually evoked potential (SSVEP) in certain parts of the cerebral cortex where it can be reliably perceived by the electrode of the EEG device. After that, we continue with a description of the advanced machine learning pipeline model that can perform confident classification of the collected EEG data in order to (a) reliably distinguish signal from noise (about 85% validation score) and (b) reliably distinguish between EEG records collected from different human participants (about 80% validation score).

Languages

English - full professional proficiency
Russian / Ukrainian - native or bilingual proficiency

Software Projects

Research of applicability of Advanced Machine Learning to build classification models able to classify electro-physiological activity of human brain for use in biometric identification

Objective: In this research it was tested whether advanced machine learning models can be applied for analysis of EEG records collected from different human participants in order to build robust classification model able to reliably distinguish between them. As result was proposed method allowing biometric user identification based on EEG data collected from simple sensors which can be easily integrated into virtual reality helmets or augmented reality glasses.

Responsibilities:

- Research plan creation
- Machine learning models architecture creation
- Source code (Python programming language, Scikit-learn ML framework)
- Conducting experiments
- Preparing research report with achieved experimental results

Research of applicability of Deep Machine Learning for internet users profiling

Objective: Applying deep machine learning to analyze digital footprints of internet has important practical value by building recommendation systems based on person psycho-demographic profile. In this research it was decided to create state-of-the-art deep learning predictive models able to accurately estimate psycho-demographic profile of Internet users based on the content they generate by using Facebook.

Responsibilities:

- Research plan creation
- Machine learning models architecture creation
- Source code (R programming language, TensorFlow)
- Conducting experiments
- Preparing research report with achieved experimental results

Secure Internet Browser for Ministry Of Defence

Objective: It was requested to create secure internet browser to run intranet applications within premises of Ministry Of Defence

Responsibilities:

- R-n-D in order to define technological platform to be applied in order to meet customer requirements
- Library API design in order to provide secured access to browser internals from JavaScript front end
- Software design and implementation (Qt, C++)
- Customer negotiations and consulting
- Overall guidance of project implementation

Client-server mobile CRM for digital agency

Objective: It was requested to create mobile client (iOS, iPad) for existing CRM solution by multi brand digital agency in order to automate information gathering from over hundreds of thousands retail points.

Responsibilities:

- Project scope estimation
- Overall guidance of project implementation
- Participation in specification design with client
- Participation in UI/UX design with client
- Team management

Client-server mobile CRM for VAT refund agency

Objective: It was requested to create mobile client (iOS, Android) for existing CRM solution allowing bus drivers to submit trip reports automatically tracked by GPS unit in order to receive VAT compensation in foreign countries across Europe.

Responsibilities:

- Project scope estimation
- Communication with customer
- Participation in specification design with client
- UI/UX design
- Software design and implementation (Android/Java, iOS/Swift)

Interactive media surface for advertisement agency

Objective: It was requested to create software for multitouch surface panel with rich visual media content in order to engage customers with brand awareness trough series on interactive games.

Responsibilities:

- Project scope estimation
- Communication with customer
- Participation in UI/UX design with client
- Software design and implementation (Qt, C++)

Client-server mobile applications for Danfoss Group (8 applications)

Objective: It was requested to create series of mobile standalone and client-server applications (Android, iOS) with rich functionality in order to promote brand awareness and expand mobile presence of Danfoss branded applications.

Responsibilities:

- Deep communications with customer in order to help refine requirements and create mobile applications specifications
- Under my guidance was developed 8 applications
- Project scopes estimation

- Participation in UI/UX design with client
- Software design and implementation (Android/Java, iOS/Objective-C, Java SE)
- PaaS platform selection (parse.com, Google AppEngine)

Data Science Crowdsourcing (9 projects)

Objective: In order to have real world experience and gain practical skills in area on Machine Learning, Natural Languages Processing, and Deep Learning I've participated in variety of Data Science related crowdsourcing projects at my spare time.

Skills gained:

- Ability to write highly customized software solutions (C++, Java, Python) in order to solve optimization and pattern recognition tasks
- Familiarity with modern Data Science algorithms, methodologies, and underlying statistical/mathematical principles
- Strong understanding of Deep Learning NN architectures and solutions
- Hands on experience with popular Data Science/ML libraries and frameworks: ***Google TensorFlow*** (https://www.tensorflow.org), ***mxnet*** (http://mxnet.io), ***Stanford NER*** (http://nlp.stanford.edu/software/CRF-NER.shtml), ***Dragon Toolkit*** (http://dragon.ischool.drexel.edu), ***Mallet*** (http://mallet.cs.umass.edu), ***OpenCV*** (http://opencv.org), ***SciPy*** (https://scipy.org), ***Pandas*** (http://pandas.pydata.org), ***Scikit-Learn*** (http://scikit-learn.org), ***mxnet*** (http://mxnet.io), ***OpenAI*** (https://openai.com/requests-for-research/), ***Weka*** (http://www.cs.waikato.ac.nz/ml/weka/), ***Orange*** (http://orange.biolab.si), ***IBM Watson*** (https://www.ibm.com/watson/)

R&D to define computer vision system for recognition of specific objects

Objective: It was requested to study possibility of applying computer vision algorithms in order to create system for automatic tracking of specified objects in video stream data and finding anomalies in their behaviours as well as precise recording of current system state based on detected objects.

Responsibilities:

- Project scope estimation
- Communication with customer
- Research of available tools and appropriate algorithms (SURF, ORB features detectors, HMM, neural networks)
- Software prototypes design and implementation (C++, Open Frameworks, OpenCV)

R&D to define software/hardware solution for Ukrainian parliament's electronic voting system

Objective: It was requested to study possibility to modernise existing electronic voting system installed in Ukrainian parliament (Verkhovna Rada) in order to provide richer visual experience by introducing touch-based interfaces with

wider access to the legislative/information data sources directly from deputy work space.

Responsibilities:

- Project scope estimation
- System architecture design and specification writing
- Appropriate technological platform selection in order to meet rigid requirements to energy consumption and interface responsiveness
- Software prototype implementation (Qt, C++)
- Custom linux distributive assembling
- Participation in appropriate hardware components selection

Client-server mobile ride sharing application with additional routing through public transportation

Objective: It was requested to develop ride sharing client-server application with rich mobile clients for both Android and iOS platforms with ability to connect routes via public transportation as well.

Responsibilities:

- Project scope estimation
- Communication with customer
- System architecture design and specification writing
- Technological platform selection (Storm, Scala, Casandra)
- Overall guidance of project implementation

Interactive media assets for advertisement

Objective: It was requested to implement multiple interactive digital media assets allowing engaging interaction with customers during advertisement campaigns and events.

Assets created:

- Multitouch surface based on fiducial markers tracking (2009 year!)
- Computer vision based installation for interactive shopwindow (***https://youtu.be/DnVAFM0xDzk***)
- Interactive visual environment with augmented reality for dance performance (***https://youtu.be/9Eln2iLEM1o***)
- Augmented reality virtual test drive (***https://youtu.be/f2En5F8Tut8***)
- Augmented reality show (***https://youtu.be/NHUDAOQ1aWo***)
- 3D projection mapping (***https://youtu.be/YwiBDmAftGE***)
- Interactive music game for mass events (***https://youtu.be/hRiOKeyGnSw***)

Responsibilities:

- R&D and main concept ideas generation
- Software design and implementation (Java, C++, Processing, Bluetooth, MIDI, OpenCV)
- Guidance and technical support during events

Online collaboration platform deployment at Amazon AWS

Objective: It was requested by customer to deploy his online collaboration platform to the Amazon AWS in order to meet anticipated users peak during public launch of the solution and reduce costs involved. System was stable and operable over more than one year before customer decided to shutdown it. It was among one of the first commercial products deployments on AWS platform.

Responsibilities:

- Backend system architecture design and implementation
- Development of automatic load balancing (it was long before AWS Elastic Load Balancer)
- Development of automatic self configuration scripts allowing easy configuration of fresh started instances (there was no AWS Auto Scaling those days yet)
- Custom linux distributive creation

Development of embedded hardware system for Bluetooth/proximity marketing

Objective: It was decided to develop company's own IoT hardware system able to deliver custom content to the Bluetooth enabled handsets in order to create proximity marketing campaigns for customers (year 2008 - a way ahead of iBeacon). System was meant to be installed at remote locations (street boards, retail chains, etc) allowing remote management and content updates.

Responsibilities:

- R&D in order to define system specification and finding appropriate hardware components
- Custom linux distributive creation
- Software design and implementation (Java, C, OSGi)

Development of match-making and scoring backend server for mobile games

Objective: It was requested to develop multi player online game with mobile J2ME-based client for soccer game.

Responsibilities:

- Project scope estimation
- Communication with customer
- Team guidance
- Technological platform selection
- Software and database architecture design
- Design of custom binary protocol for robust client-server communications with minimal footprint and easy processing at endpoints
- Software development (J2EE, Tomcat 5.1, MySQL)

Development of about five dozen mobile games/applications for J2ME platform

Objective: It was requested by variety of customers to develop about five dozen mobile game and application for J2ME enabled handsets over period mostly from 2003 to 2008

Responsibilities:

- Project scope estimation
- Communication with customer
- Team guidance and mentoring
- System and UI design
- Software development (J2ME, J2SE, J2EE)

Development of online securities trading system

Objective: It was requested to develop online securities trading system able to operate as client with PFTS (First Securities Trading System - http://www.pfts.ua) which was under development in Ukraine in order to provide online trading environment.

Responsibilities:

- Project scope estimation
- Communication with customer
- Consulting of core PFTS developers regarding new at that time concepts and protocols (XML-based endpoints)
- Software and database architecture design
- Software development (J2EE, JDBC 2.0, Jakarta Struts 1.0, Jakarta Avalon, SAX2, Jintegra JAVA – COM bridge, Oracle 9i, JBOSS 2.4.3)