# Ivan Alles

Machine Learning Software Engineer

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github.com/ivan-alles     linkedin.com/in/ivanalles     youtube portfolio

I'm a software engineer focusing on machine learning, computer vision, and robotics with 25+ years of software development experience. As an early AI adopter, I've accomplished 10+ deep learning projects for industrial tasks.

## Skills

**Expert:** Python, C++, C, numpy, OpenCV, CNTK, SVN.
**Advanced:** TensorFlow, C#, .NET, algorithms, robotics, SQL, Point Cloud Library, Git.
**Familiar:** TensorFlow.js, music information retrieval, Javascript, Vue, pandas, Java, Qt, Perl, Pascal, UML, OpenGL.

## Work History

### User-friendly AI framework for Industry
*Founder at Urobots, 2019-2021*
- Leading a team of experts, created a user-friendly AI framework to solve computer vision and robotics problems without coding.
- Developed AI algorithms for classification, object detection, semantic segmentation, robot-camera calibration.
- Designed REST APIs.
- Implemented software modules for camera, robot, and advanced Blockly programming.
- Applied the framework in 10+ customer projects.

Python, TensorFlow, CNTK, OpenCV.

### Demonstration of human-AI collaboration in computational creativity (hobby project)
*Software engineer, 2018-2021*
- Developed a model to learn user preferences.
- Optimized GAN generator for usage in javascript.
- Developed a web application demonstrating human-AI collaboration in computational creativity.

Python, TensorFlow, TensorFlow.js, javascript, Vue.

### Neural Network for Object Detection for industrial projects
*Founder at Urobots, 2019-2021*

- Developed computer vision algorithms for real-time object localization, achieving accuracy < 2 pix in position and < 2° in rotation.
- Created a transfer learning model, reducing the required number of training data by 90%.
- Applied the algorithm in 10+ projects in robotics, object counting, quality assurance.

Python, TensorFlow, TensorFlow.js, OpenCV, javascript, Vue.

## Embedded AI for IDS Imaging
*Founder at Urobots, 2019-2021*
- Pioneered the introduction of deep learning models in low-energy consumption environments (CPU, FPGA).
- Applied deep learning in an interactive exhibit in Germany's most prominent science center.

Python, TensorFlow, CNTK, OpenCV, ARM, FPGA, Linux.

## Robot vision to grasp unknown objects for Cronimet
*Founder at Urobots, 2016-2019*
- Implemented algorithms for segmentation and grasping of previously unseen objects in 2D and 3D.
- Designed and developed software processing 3D camera input and controlling the robot.

Python, TensorFlow, CNTK, OpenCV, Qt.

## Optical quality control of industrial components
*Founder at Urobots, 2016-2020*
- Developed methods for defect detection using the minimal "defect / no defect" input on the whole image rather than labeling each defect separately.
- Implemented software for optical quality control of industrial components: object presence, segmentation, tracking, counting.

Python, TensorFlow, CNTK, OpenCV, Qt.

## Optical assembly inspection of plate heat exchangers for Mahle
*Founder at Urobots, 2012-2021*
- Developed algorithms and applications to check the assembly correctness of products consisting of hundreds of near-identical specular parts, achieving 99.95% accuracy.
- Managed a team adapting the core algorithms for 100+ product types.
- Designed the relevant hardware (lightIng, cameras) for 15+ installations.

C++, python, JSON, XML, boost, OpenCV, Qt, MFC, Visual Studio.

## Head Pose Tracking (hobby project)
*Software engineer, 2012*
- Developed and evaluated algorithms for real-time head pose tracking in video.

C++, opencv, OpenGL.

### Computer Poker (hobby project)

*Software engineer, 2010-2012*
- Developed efficient algorithms and software for the Annual Computer Poker Competition.
- The program reached 4th place in the limit hold 'em 2-player event, challenging teams with tenfold human, computer, and time resources.

C#, C++, Java, Maven, Linux.

### Automated Baggage Loading System for Grenzebach

*Freelance software engineer, 2009-2013*
- Developed methods and software for 3D object recognition and registration.
- Developed methods and software for LIDARs-robot calibration, reducing manual effort by 90%.
- Implemented physics and LIDAR simulation.
- Developed algorithms for optimization of container loading (3D knapsack).
- Designed and implemented production software and tools.

C++, XML, MFC, boost, Point Cloud Library.

### Automotive drivers and middleware for SMSC

*Freelance software engineer, 2007-2012*
- Designed and developed various drivers: QNX Sound, Media Local Bus, EEPROM, Timer, GPIO.
- Implemented MOST middleware.
- Implemented PC simulation.

C, C++, C#, Visual Studio, Windows CE, ARM, INIC, Linux, QNX, OSEK.

### GUI Coverage Profiler (hobby project)

*Software engineer, 2007-2008*
- Developed instrumentation methods required working on .NET assemblies without access to the source code.
- Designed and implemented a program for measuring test coverage of GUI elements in .NET applications.

C#, C++, Visual Studio, Linux.

### C++ refactoring tool (hobby project)

*Software engineer, 2007*
- Developed scripts to convert the C++ grammar to the intermediate language of GNU tools Flex and Bison.
- Implemented a syntax error-tolerant parser and semantic analyzer.
- Programmed an add-in for Visual Studio to make code refactoring using a context menu.

C++, C#, perl, boost, Visual Studio.

### Automotive drivers for Harman Becker Automotive Systems

*Freelance software engineer, 2006-2007*

- Replaced a hardware parallel bus with a software-based serial bus, reducing hardware costs by 10% and CPU load by 90%.
- Designed and implemented peripheral device drivers (SPI, RS-232, MLB, I2C) with CPU load reduced by 90% due to the use of DMA.
- Managed a team developing a boot loader for a radio unit.

C, C++, Visual Studio, V850, OSEK, INIC.

## Control module for chemical analysis for Agilent Technologies
*Software engineer at K2L GmbH, 2002-2005*
- Implemented software components: GUI, generic data processing, inter-processor communication, device drivers.
- Designed and implemented a visual form editor for GUI development, simulation, and test tools.

C++, XML, Visual Studio, MFC, wxWidgets, Motorola MPC5200, OSE.

## Automotive software and tools for German car manufacturers
*Software engineer at K2L GmbH, 2000-2005*
- Designed and developed GUI for instrument panels for Audi, VW, and Iveco.
- Designed and implemented the MOST Network Master function block for BMW. The software was 100% compliant with the MOST specification and became a reference project for ISO 9001 certification.
- Managed a team implementing device drivers (USB, RS-232) and tools.

C++, C, XML, Visual Studio, ARM7, ST10, Windows CE, OSEK.

## Backend software for internet applications for E-Commerce
*Software developer at Actis Systems Internet, 1999-2000*
- Designed and implemented an application for monitoring changes in websites.
- Developed backend database management tools.

C++, COM, MS SQL Server, Oracle.

## Photoscan for Science Center of Komi Republic, Russia
*Freelance software engineer, 1999*
- Developed methods and software to measure the volume of round timber on camera images.
- Managed the development team.

C++, image processing.

## In-house software development for Energosbyt
*Software Engineer at Energosbyt, 1998-1999*
- Designed a contractors' database, incorporating contractors of all subsidiaries of the company.
- Designed and implemented a program for analyzing customers' data.
- Maintained and enhanced the company's software, consulted over 50 users.

Visual Basic, Fox Pro.

**In-house software development for Komi Bank of Sberbank of Russia**
*Software Engineer at Komi Bank of Sberbank of Russia, 1996-1998*
- Designed and implemented an analytical information system, incorporating financial indexes, information about all bank transactions, and a collection of converters for importing data from various sources.
- This work was awarded the First Prize in the "Young Banker 1997" republican competition.

Visual Basic, MS Access.

**Electronic Signature for Bank Evropeysky Sever**
*Software developer at Diploma project, 1994-1995*
- Developed an algorithm and implemented software to compress scanned signatures to 1% of the original size.

C++, Borland, image processing.

# Education

**Master of Science (M.S.) in Applied Mathematics**
Syktyvkar State University, Russia
1990 – 1995

# Courses

**Music Information Retrieval**
*University of Victoria, 2021*
Studied [Extracting Information From Music Signals](), Machine Learning for Music Information Retrieval, Music Retrieval Systems.

**Robotics**
*Columbia University, 2017*
Core techniques for representing robots that perform physical tasks in the real world.

**Machine Learning**
*Stanford University, 2016*
Certificate in [machine learning]().

**Machine Learning Foundations**
*University of Washington, 2016*
Studied [classification](), [regression](), and [practical applications]() of machine learning.

# Languages

Fluent in English, German, and Russian (native language). Elementary proficiency in Chinese.

# Hobbies

Hiking, cross-country skiing, yoga, computer games.