Aidar **Khatiullin**

Senior Software Engineer (C++/Python) · Computer Vision Systems

Novi Sad, Serbia & Remote

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Summary

Senior Software Engineer (C++/Python) with 10+ years of experience building production computer vision systems. Worked across the full pipeline, from camera setup and data collection to model training, deployment, and long-term support. Strong background in systems programming and performance optimization, with a focus on solving practical problems in messy real-world environments. Experience includes senior engineering roles with technical leadership responsibilities in startups, work in large research-driven organizations, and hands-on involvement in running a small business.

Skills

Core Engineering	C++, Python, performance tuning (profiling, multithreading/multiprocessing, assembly, SIMD/SSE/AVX), cross-platform development, systems design
Computer Vision & ML	Image processing, object detection, segmentation, keypoints, boosting trees and feature extraction, motion analysis, OCR, automatic labeling, PyTorch, OpenCV, NumPy, scikit-learn, scikit-image, YOLO, UNet, R-CNN, SAM, CVAT, Roboflow
Delivery & Operations	FastAPI/Flask, Docker, CMake, Poetry, Git, GitHub Actions, Pytest, Gtest, Sphinx, QA
Business & Product Context	Ownership, engineering trade-offs, budgeting, mentorship, stakeholder communication, planning
Languages	English (intermediate), Serbian (B2), Russian (native)

Work Experience

Rescope

Jun. 2025 – Jan. 2026

Lead Computer Vision Engineer & Consultant — *San Francisco, US, Remote*

- Acted as a senior computer vision engineer, independently leading and owning multiple computer vision projects end-to-end, and consulting on product definition, feasibility, required system components, and resource and effort estimation to meet potential customer requirements.
- Designed and implemented a building segmentation pipeline from satellite imagery using PyTorch, combining SAM-based masks, edge refinement, and geometry-aware fitting with primitive shapes.
- Built a PDF layout processing pipeline for extracting structured building data, combining YOLO-based detection, raw PDF vector data extraction, image-based post-processing, and LLM APIs for semantic interpretation.
- Implemented floorplan segmentation solutions for both vector and raster data, including vector preprocessing, alignment of multiple floorplan representations, graph-based heuristics, and U-Net-based segmentation for raster images.
- Collected and prepared three datasets (each ∼1,000 images), including data extraction from PDFs, integration with Mapbox, OpenStreetMap, and Azure Maps, annotation guidelines design, supervision of manual labeling, and training of auto-labeling models.
- Wrapped computer vision pipelines into backend services using FastAPI, exposing inference and data processing via production-ready REST APIs.

ABBYY (CoreOCR Team)

Nov. 2021 - Oct. 2024

Research Engineer & Principal C++ Developer — *Novi Sad, Serbia, Hybrid*

- Worked as a researcher and C++ developer on core components of ABBYY's OCR engine, focusing on robustness and performance under real-world noisy inputs.
- Developed feature extractors and a boosting-based classifier, together with a lightweight BiLSTM model, to improve text layout analysis, including garbage/non-text filtering, word boundary detection, and line spacing recognition. This resulted in a 3–5% overall recognition quality improvement and more than 10% improvement on low-quality documents and complex layouts.
- Contributed to memory footprint reduction and runtime performance optimization of the OCR engine through profiling, refactoring inference components, and careful memory management in production inference pipelines.
- Improved robustness and precision of language-related components by tuning classical (non-LLM) language models and refining heuristic post-processing for noisy and ambiguous recognition results.
- Investigated and fixed a critical AVX-related bug by analyzing crash dumps from ARM-based macOS builds and debugging C++ code with gdb, identifying SIMD-specific issues in cross-platform execution.

DataNerdsAI *Nov. 2018 - Nov. 2021*

Head of Computer Vision & Senior CV Engineer *Moscow, Russia, On-site*

- Led the computer vision direction, combining hands-on development with technical leadership, system design, and direct customer communication.
- Designed and delivered multiple production-ready computer vision systems for agriculture and logistics, working end-to-end from requirements definition and data collection to deployment and long-term support in customer environments.
- Built camera-based systems for agriculture and logistics, including harvester action recognition, license plate recognition (LPR), truck detection, and cargo fullness estimation, operating under harsh outdoor conditions and limited computational resources.
- Developed computer vision pipelines using RGB, depth (Intel RealSense), drone, and satellite imagery, applying detection and segmentation models such as YOLO and R-CNN, as well as classical tracking and classification approaches.
- Integrated computer vision solutions with on-prem infrastructure, edge devices (NVIDIA Jetson), and backend services, including system installation guidelines, hardware requirements, and production monitoring.
- Fully owned data preparation and annotation workflows, including dataset collection, annotation guidelines design, supervision of labeling, and quality control using LabelMe and CVAT.
- Worked closely with customers to translate business processes and constraints into technical requirements, delivery timelines, and system architectures.

Intelligent Security Systems *Oct. 2016 - Nov. 2018*

Computer Vision Researcher & C++ Developer *Moscow, Russia, On-site*

- Worked on large-scale license plate recognition (LPR) systems in C++, focusing on robustness, performance, and adaptability to real-world deployment conditions.
- Extended and adapted LPR systems for multiple countries (Thailand, UAE, Mexico, USA), handling variations in plate formats, fonts, colors, camera setups, and environmental conditions.
- Improved character and number recognition using classical computer vision techniques, using curve- and shape-based analysis, template matching, feature extraction, and feature-based classification without neural networks.
- Performed low-level performance optimization of image processing pipelines in C++, including multithreaded implementations and SIMD vectorization (SSE) of core operations such as affine transforms, geometric corrections, and binarization.
- Adapted recognition pipelines for cargo and railway carriage number recognition, handling broken symbols, unaligned text, perspective distortions, and multi-camera result matching.
- Developed internal tools for analysis and evaluation of recognition results, including ground-truth comparison, string similarity metrics (Levenshtein distance), batch result analysis, and C++ UI components using Qt.

Small Local Business in Serbia *Nov. 2024 - Jun. 2025*

Owner / Operator *Novi Sad, Serbia, On-site*

- Direct responsibility for running and operating a small business, including hiring, payroll, taxes, cost control, and day-to-day operations.
- Hands-on experience making decisions under financial, legal, and operational constraints, with full accountability for outcomes.

Education

Lomonosov Moscow State University

Bachelor's and Master's Degrees in Computer Science *2012 – 2018*

- Faculty of Computational Mathematics and Cybernetics, Graphics and Media Lab.

Publications

Fast Occlusion Filling Method for Multiview Video Generation

A. Khatiullin, M. Erofeev, D. Vatolin. *3DTV Conference, 2018.*

Software tool for automatic multiview video generation

A. Khatiullin *Registered software, RF, 2019.*