Myroslav Kravchuk

C++,3D, optimization/processing/automation

Senior Software Engineer

Telegram: +380687412210

email: mkravchuk@gmail.com

Summary of Qualifications	I have over a decade of experience in IT industry, and for the last 7 years I have been working solely in 3d field, automating and optimizing manufacture processes. During that time, I participated in more than 6 projects of various size, complexity and technologies. I have successfully performed design and development for the few projects and frameworks with great impact on overall production productivity. I feel convenient to work with different type of task descriptions from almost abstract to very detailed and with different type of methodologies as Waterfall, Agile and Scrum. Most of my works that I have done have been required deep researches before development. During my long work experience I gain a strong intuition of abstraction, modularity, automation, and optimization. Have strong experience in 3d optimization and visualization using C++ and 3D processing and batch testing using C# programming languages. Working with big input data I have built strong optimization skills for CPU and OpenGL, partially GPGPU (I managed to optimize libigl OpenGL by 20x times, optime Eigen lib by 7%, optimize nonlinear solvers by 70% and mathematical equations by 60x times, optimize GPGPU hashing algorithms by 5%). I love solving complex problems and learn new technologies to make solutions as best as possible. I am open-minded and result-oriented with accent on quality and efficiency. I love technical discussions and meetings, helping teammates with any questions, be proactive and propose solutions. I'm hardworking person and mindful to details.

Skills

Programming Languages

- C++ (calculation, optimization)
- Python (automation)
- C# (automation, visual unit tests)
- OpenGL, Vulkan

Optimization

- Logical (algo simplification, reusing calculations)
- Caching (hash tables, binary tries)
- Memory (access, size, allocation)
- CPU (SIMD, OMP, Cache coherency, bit operations)
- OpenGL (vertex indexing, data compression, layers, shaders, culling)
- Vulkan
- GPGPU (kernel optimization, linear memory access, increasing waves/warps)

Frameworks/Libraries

- Unreal5
- OpenCV, OpenXR, Monado
- VCL (CPU SIMD optimization)
- Eigen (mathematic)
- Libigl (geometry processing, visualization)
- Nanogui (OpenGL GUI)
- QT (2d GUI vs OpenGL integration)
- VTK (OpenGL visualization)
- RhinoCommon (CAD c# algo and visual)
- OpenCascade (CAD c++ algo and visual)

Programming Technologies

- Research & Development
- Estimation

Development Tools

- Visual Studio + ReSharper (coding, CPU profiling)
- Very Sleepy (CPU profiling)
- Nsight (OpenGL and Vulkan profiling)
- 3ds Max (basic operations and validation)
- Rhinoceros (batch processing, visual testing)
- Draw.io (draw diagrams)
- Git Tortoise, Github

Testing Tools

- NUnit
- Ms Test

Methodologies/Technologies

- Agile, Scrum, Waterfall
- Pair Programming

Operating Systems

- Microsoft Windows
- Unix

Experience

Application for implant injection

Project Description: Application makes possible to inject implant into bone foramen that located in human mouth. It is designed as wizard with few steps. By first, doctor selects what patient he is going to surgery. Then calibrates camera to make connection between real world and CT scan. Then doctor is planning operation by navigating in CT in 3d space and put markers that will guide him in final step. Finally doctor inject implant exactly into planned position thank to visual navigation that connects implant and real human at one picture. All these steps required because the target place is hidden from human eyes and is visible only on 3d picture of CT scan.

I was responsible for integrating VTK library into QT framework, and establishing framework for drawing and controlling viewports where all doctor manipulations will be shown, drawing elements on viewport at proper location and orientation.

Customer: Israel/USA company

Involvement Duration: 10 months

Project Role: Senior Software Developer

Responsibilities:

- Research and design of VTK integration into QT OpenGL framework;
- Developing convenient API for 3d module based on MVC pattern;
- Requirements analysis and clarification;
- Communicating with customer;
- Estimation and prioritization;
- Knowledge sharing of approaches to work in 3d space with teammates;
- Code review; Helping teammates to find solutions;

Project Team Size: 8-10 team members
Tools & Technologies: 2017, Resharper, CMake; C++ 17; QT; VTK, ITK, OpenGL; DrawIO; Agile, Scrum; GitLab, Jira; MVC; VS profiler, Very Sleepy;

Remeshing application for photorealistic renders

Project Description: Application allows remeshing huge triangle meshes into quad meshes. This automates hard work of 3d professionals and helps to achieve better quality. Triangle meshes are obtained by meshing CAD models. This application was developed to solve well know problem that is actively researched by top universities in Switzerland and Germany, and is a bottleneck for making digital transformation for big companies that want to sell products by showing them in photorealistic form.

I was responsible for research and development, make GUI using OpenGL for rendering huge meshes, performance optimization both for CPU and GPU, apply mathematical approaches to solve the problem, combine algorithms into pipeline to achieve the best quad mesh quality. I optimized OpenGL render engine taken from libigl by 30x time, so now my old GPU can render 10millions polygons with transparency, optimized mathematical algorithms by 60 times by solving equations, optimized nonlinear solvers by 2x times by merging two solvers into one using SIMD command, and many other algorithms optimizations for processing mesh.

Customer: EU company

Involvement Duration: 60 months

Project Role: Senior Software Developer

Responsibilities:

- Research and development of new approaches and algorithms
- Architecture and Design;
- Optimization of OpenGL pipeline, mesh processing, mathematic calculations;
- Communication with 3d professionals to obtain requirements and test;

Project Team Size: 1-3 team members

Tools & Technologies: VS 2017, Resharper, CMake; OpenGL; Nanogui, libigl, Eigen lib; VS profiler, Very Sleepy, NVIDIA Nsight; 3Ds Max, Meshmixer, Cotangent, Instant Meshes

Plugin for auto-fixing issues in CAD models

Project Description: Plugin fixes issues in CAD models in semi-automated way. This helps professionals obtain better meshes and done their work in shorter time. Some CAD models have internal issue, especially when they are converted to other formats. The problem grows exponentially to models complexity and size. Plugin solve the issue by automate whatever is possible and provide extensive information for the user allowing full control over the process.

I was responsible for research and development, architecture and design, developing logic for automate fixes and user interaction, testing software with real CAD models, improving performance, creating batch processing and visual testing. During multithreading optimization I helped to detect two multithreading issues in source code of Rhinoceros 3d what helped/pushed them to add multithreading support in next product release.

Customer: Indie product

Involvement Duration: 24 months

Project Role: Senior Software Developer

Responsibilities:
- Research and development of new approaches and algorithms;
- Communication with support team;
- Modules architecture;
- GUI Design and its speed optimization;
- Adding multithreading and async events;
- Testing product;

Project Team Size: 1-3 team members

Tools & Technologies: VS 2013, Resharper; C#; ObjectListView component; Rhinoceros; Ansys ScaceClaim, Ansys ICEMCFD, MoI 3.0;

Automation tests

Project Description: Automated testing of existing websites for the company from top 500 fortunes. The company owns many sites, and new business was acquired, and they wanted to cover sites by automated test to find out and fix all issues.

I have created framework to automate and simplify writing automated tests that improves readability and overall productivity of writing tests by 30%. Also, I extended NUnit engine to handle exceptions in automated way, what simplifies test structure and improves readability and overall productivity of automation of writing tests by additional 20%. I was responsible for job of one junior developer and one middle developer, helping one senior developer.

Customer: USA company

Involvement Duration: 4 months

Project Role: Senior Automation Tester

Responsibilities:
- Research and development of optimized way of automation tests;
- Communicating with customer;
- Review work of development team;
- Training teammates;
- Implementing automation unit tests;

Project Team Size: 5-10

Tools & Technologies: VS 2013, Resharper; C#; Nunit; Selenium, Chrome, XPath, Regular expressions;

Web application for showing products descriptions

Project Description: Application allows showing products and their branches in the web. The ipad version should allow using application in offline mode.

I was responsible for developing UI part and DB, migrating application to IOS using.

Customer: USA company

Involvement Duration: 8 months

Project Role: Senior full stack developer

Responsibilities:
- Design web application, web UI and DB;
- Develop new functionalities;
- Migrate part of .NET MVC web site to IOS as standalone application;

Project Team Size: 5-10

Tools & Technologies:	VS 2013, Resharper; C#, Html, Javascript, Angular, Cordova; MVC, Entity framework; C# to JS conversion tool;
	Mobile billing system
Project Description:	Product allows making millions of users bills in very short time, what should be delivered at user homes no late then specific time. This is very important for mobile operators, since they have millions of user and want to be sure that product is capable of doing job without an issue and with high ability for billings changes. Product should run in Unix and is a part of long business chain. All connections over secured and requires careful remote control. I was responsible for creating command line tools for different needs, process customer mails and discuss issues with different teams, business trip to customer side.
Customer:	USA company
Involvement Duration:	30 months
Project Role:	Software developer
Responsibilities:	▪ Developing high performance and multithreading mini tools; ▪ Processing mails from customer; ▪ Focal point for local and remote teams;
Project Team Size:	10-30
Tools & Technologies:	VS 2013, Resharper; C++, C#, Java; Unix, Putty; MS Excel; Multithreading, optimization, memory control;

Education	**M. Sc. Degree in Mathematical Sciences** Ivan Franko National University Faculty Of Mathematics And Mechanics