Email: dmitry.grigorovich7@gmail.com

Dmitry Grigorovich

Portfolio

C, C++11/14/17, Qt, QML, STL, HTML/CSS/JavaScript, D3.js, DevOps, XML, OpenCV, Shell script, Windows, Linux, Embedded, SQL, C#, Figma, Camtasia

April 2024

Contents

1. Generating SVG Images

Period: March 2024 – April 2024

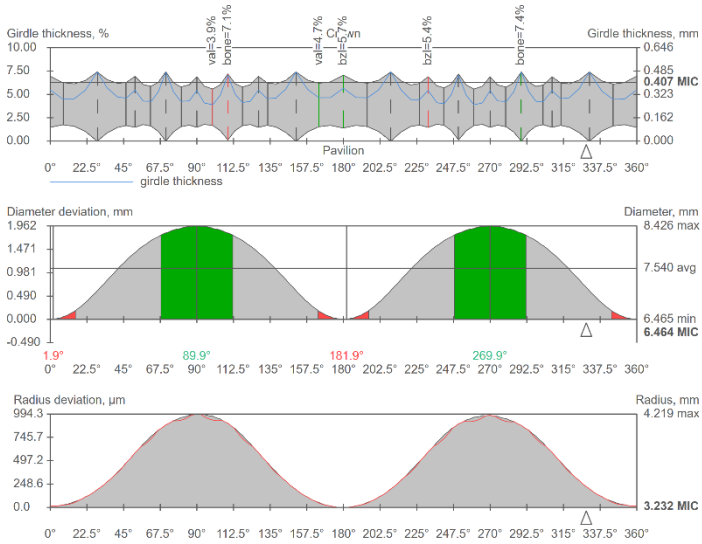
Category: Desktop application development

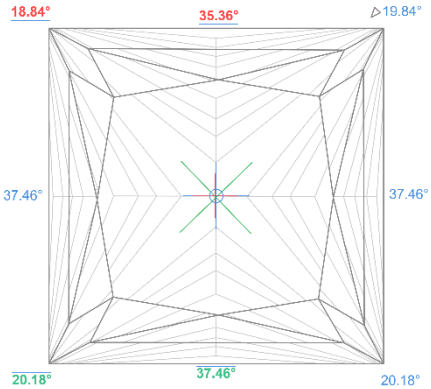
Company: OctoNus Finland Oy Ltd, Tampere, Finland

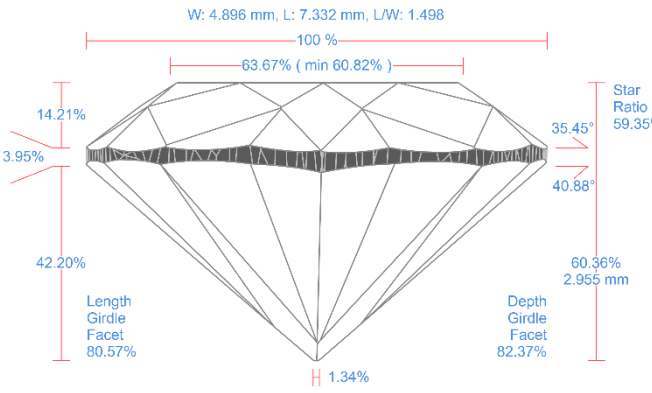
Technology: C++, STL, SVG, Visual Studio

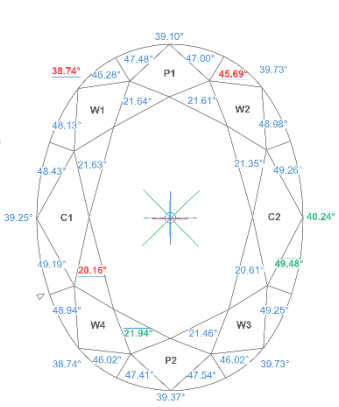
Description:

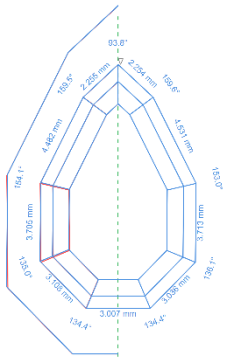
Developed a feature to generate SVG images containing various types of 3D diamond model projections, complete with text labels including minimums, maximums, and main facet labels, as well as charts. This feature supports a total of approximately 70 verified SVG images.











area loss = 0.16%
mass loss = 0.05% (0.0004ct)

2. Remaining Depth Chart Interactivity

Period: January 2024 – February 2024

Category: Web development

Company: OctoNus Finland Oy Ltd, Tampere, Finland

Technology: JavaScript, D3.js, HTML, CSS

Description:

Enhanced interactivity has been implemented, and the Remaining Depth chart, created using D3.js and JavaScript, has been adapted across various resolutions. This chart visually illustrates the distance between girdle facets observed in a scan and those outlined in a plan.
The girdle, a thin perimeter of a diamond, separates the crown above from the pavilion below. This tool is invaluable for analyzing the precision of the bruting process used to shape the girdle on the scan in alignment with the provided plan.

3. Sawing and Recognition automated test system

Period: November 2023 – December 2023

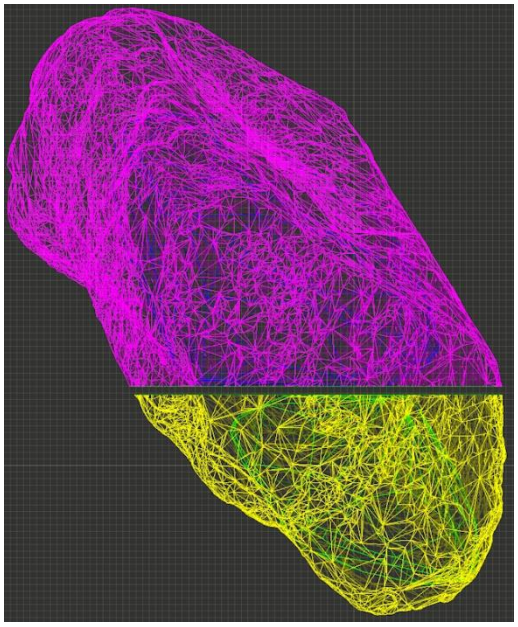
Category: Desktop application development, Automated test development

Company: OctoNus Finland Oy Ltd, Tampere, Finland

Technology: C++, STL, Visual Studio

Description:

The Sawing + Recognition test system is engineered to streamline the automated testing process for the new Recognition algorithm, which selectively ignores specific facets to enhance 3D model matching. Additionally, the testing system evaluates the creation of sawing preplans (predictive 3D models), utilizing batch mode to efficiently handle a set of files.
Comprising two core components – creation of sawing preplans and synthetic scans, and the Recognition process. The test system is designed to generate input data for Recognition testing. This involves leveraging a solution database built on rough examples, featuring 2 diamonds and a sawing plane.
Recognition tests are conducted in batch mode, utilizing the generated database of Sawing Preplans and Pseudoscans as input. The results from Recognition tests are recorded in a CSV file, capturing various metrics for subsequent analysis.



Batch mode

4. Predictive Model Concept and Pipeline

Period: March 2023 – October 2023

Category: Desktop application development, Web development

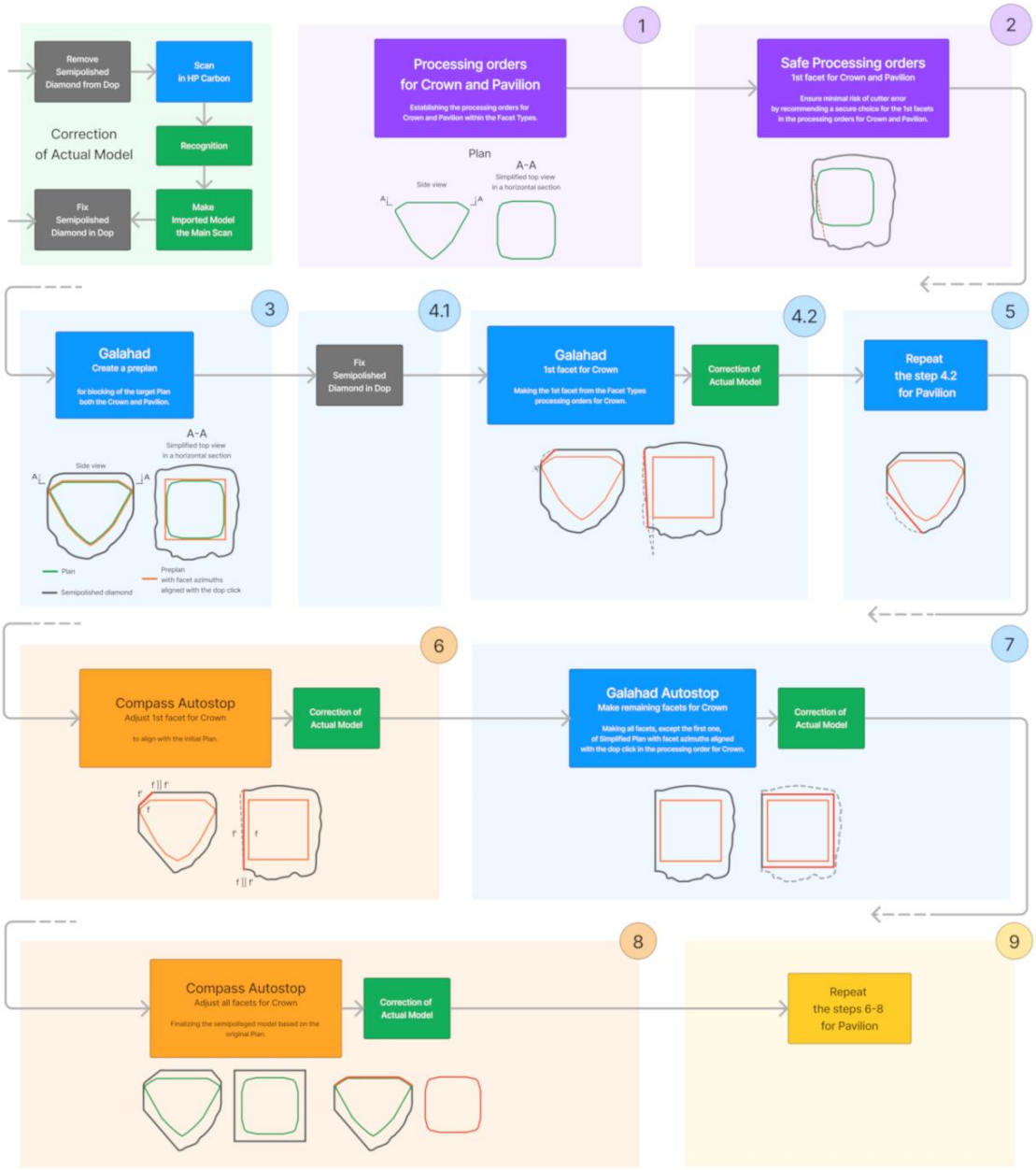
Company: OctoNus Finland Oy Ltd, Tampere, Finland

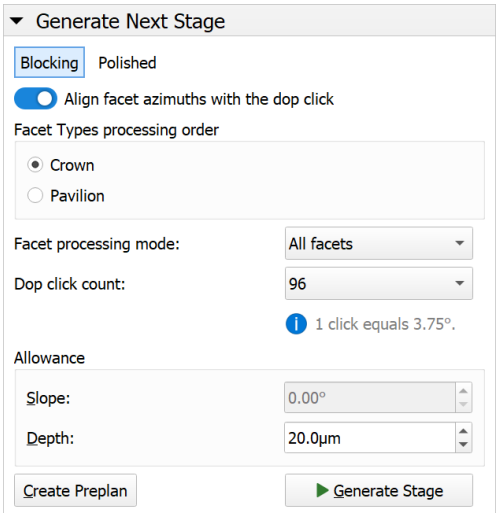
Technology: C++, STL, Qt, Visual Studio, Figma, Camtasia, JavaScript, HTML, CSS

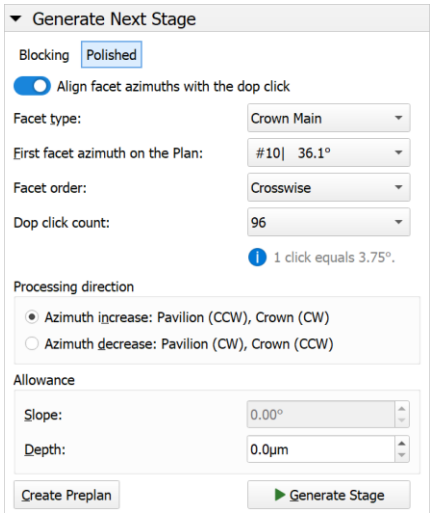
Description:

In the diamond production process, manufacturers utilize scan and virtual models at each technological stage. Following physical processing, an intermediate iteration is scanned for assessment. The 'preplan' concept serves as a predictive virtual model, anticipating outcomes at each stage. The seamless transfer of data from previous projects, including the original plan, solutions, inclusions, cavities, and scans, is crucial. The preplan is integrated into Recognition, a model-matching technology, facilitating efficient data transfer from prior projects to the current scan model.

The task formulation has been aligned with the requirements of clients and the company founder, leading to the development of process architecture, pipeline, and algorithms for crafting virtual 3D models in C++. The design and implementation of the UI on Qt for configuring various preplan parameters have also been successfully accomplished. Calculated data is seamlessly conveyed to web reports using Javascript, HTML, and CSS. Notably, the Blocking stage has been integrated, facilitating the initial processing of facets on the crown and pavilion of the diamond. The creation of a virtual model for the Sawing stage, involving the division of a raw stone into several parts, has been executed successfully. Thorough testing procedures were employed to ensure the accuracy and reliability of each stage in the pipeline. Comprehensive documentation and client-oriented videos have been produced. I have successfully implemented all stages of this concept.


Remove Semipolished Diamond from Dop
Scan in HP Carbon
Correction of Actual Model
Recognition
Fix Semipolished Diamond in Dop
Make Imported Model the Main Scan
1
Processing orders for Crown and Pavilion
Establishing the processing orders for Crown and Pavilion within the Facet Types.
Plan
A-A
Side view
2
Safe Processing orders
1st facet for Crown and Pavilion
Ensure minimal risk of cutter error by recommending a secure choice for the 1st facets in the processing orders for Crown and Pavilion.
3
Galahad
Create a preplan
for blocking of the target Plan both the Crown and Pavilion.
A-A
Simplified top view in a horizontal section
Side view
Plan
Semipolished diamond
Preplan with facet azimuths aligned with the dop click
4.1
Fix Semipolished Diamond in Dop
4.2
Galahad
1st facet for Crown
Making the 1st facet from the Facet Types processing orders for Crown.
Correction of Actual Model
5
Repeat the step 4.2 for Pavilion
6
Compass Autostop
Adjust 1st facet for Crown
to align with the initial Plan.
Correction of Actual Model
7
Galahad Autostop
Make remaining facets for Crown
Making all facets, except the first one, of Simplified Plan with facet azimuths aligned with the dop click in the processing order for Crown.
Correction of Actual Model
8
Compass Autostop
Adjust all facets for Crown
Finalizing the semipolished model based on the original Plan.
Correction of Actual Model
9
Repeat the steps 6-8 for Pavilion


Generate Next Stage
Blocking
Polished
Align facet azimuths with the dop click
Facet Types processing order
Crown
Pavilion
Facet processing mode:
All facets
Dop click count:
96
1 click equals 3.75°.
Allowance
Slope:
0.00°
Depth:
20.0µm
Create Preplan
Generate Stage


Generate Next Stage
Blocking
Polished
Align facet azimuths with the dop click
Facet type:
Crown Main
First facet azimuth on the Plan:
#10| 36.1°
Facet order:
Crosswise
Dop click count:
96
1 click equals 3.75°.
Processing direction
Azimuth increase: Pavilion (CCW), Crown (CW)
Azimuth decrease: Pavilion (CW), Crown (CCW)
Allowance
Slope:
0.00°
Depth:
0.0µm
Create Preplan
Generate Stage

5. Embedded Software development for control panel

Period: December 2022 – February 2023

Category: Embedded software development

Company: Proekspert AS, Tallinn, Estonia

Technology: C, C++, MyDrive® Insight, Azure pipelines, JTAG, Hardware

Description:

I actively participated in the development of a control panel for Danfoss frequency converters, which play a crucial role in controlling the speed of different motor types, including asynchronous, PM, and Synchronous Reluctance motors. Our primary objective was to create a next-generation Danfoss control panel with an enhanced user interface, improved fonts, intuitive navigation, and optimized utilization of RAM and flash resources. We aimed to deliver a solution that not only provided a superior user experience but also minimized resource requirements.
In my role, my focus revolved around various aspects, including elaborating on system architecture, assembling boards, wiring components, creating models, establishing hardware connections, creating the menu structure, and diligently identifying as well as resolving any encountered bugs or issues.

6. Embedded Software development for frequency converters

Period: June 2022 – November 2022

Category: Embedded software development

Company: Proekspert AS, Tallinn, Estonia

Technology: C, C++, MyDrive® Insight, Azure pipelines, JTAG, Xilinx Vivado, Lauterbach debugger and TRACE32

Description:

Worked on embedded software development for Danfoss frequency converters, which are utilized to control the speed of various types of motors including asynchronous, PM, and Synchronous Reluctance motors. My focus was primarily on engineering, commissioning, and monitoring activities related to the iC7 Series drive products. This encompassed various tasks, such as assembling boards, conducting thorough feature testing, and diligently identifying and resolving any encountered bugs or issues.

One significant bug that I addressed was in the hardware abstraction layer unit tests. By troubleshooting and debugging the issue, I successfully resolved the bug, ensuring the proper functioning of the software.

Additionally, I integrated a RAM driver without overprovisioning, optimizing the utilization of available resources. This integration helped enhance the performance and efficiency of the software running on the frequency converters.

7. Desktop application for creating a custom file type

Period: January 2022 – May 2022

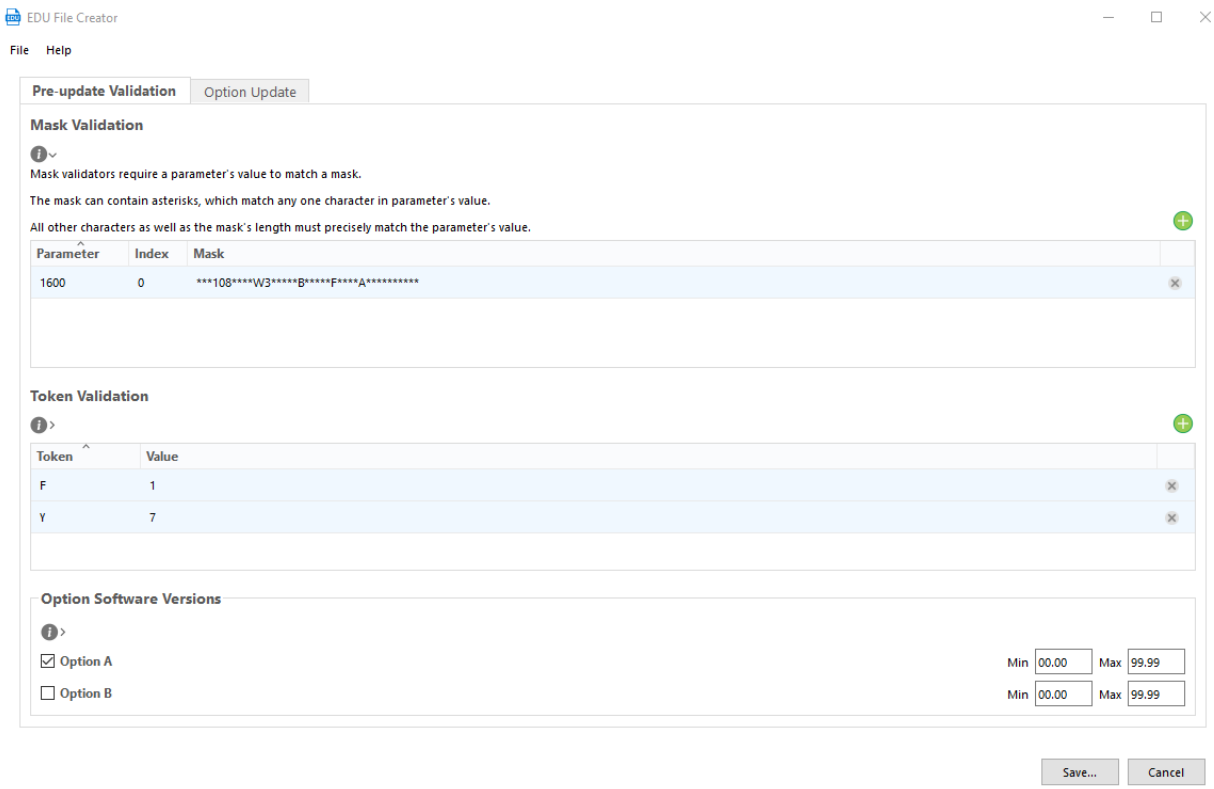
Category: Desktop application development

Company: Proekspert AS, Tallinn, Estonia

Technology: Qt, C++, Qt Creator

Description:

Designed and developed a desktop application using Qt/C++ specifically for Windows, which enables users to create and manipulate a custom file type. This custom file format incorporates a range of options and binary data related to firmware various types of motors, including asynchronous, PM (Permanent Magnet), and Synchronous Reluctance motors. The application allows users to open and modify the firmware file within the app itself. This feature provides a seamless and user-friendly experience, empowering users to make necessary adjustments to the firmware settings with ease.



8. Smart-home mobile application

Period: August 2021 – January 2022

Category: Mobile application development

Company: Proekspert AS, Tallinn, Estonia

Technology: QML, Qt, C++, Qt Creator, Qt Web Sockets, FlatBuffers

Description:

Developed a Minimum Viable Product (MVP) for a smart-home application designed to manage various types of water heaters for STIEBEL ELTRON GmbH & Co. KG (Germany). The application was developed for both Android and iOS platforms, utilizing the Qt framework, QML for the user interface, and C++ for the underlying logic. To ensure seamless data synchronization between the mobile app and Azure server, Qt Web Sockets were used for efficient real-time communication. This provided up-to-date information on water heaters' status and settings. For data versioning and compatibility, FlatBuffers, a powerful serialization library, was implemented. It reduced memory usage and improved performance while allowing easy definition and evolution of data models using schemas.

9. Porting QML UI to Qt

Period: January – March 2021

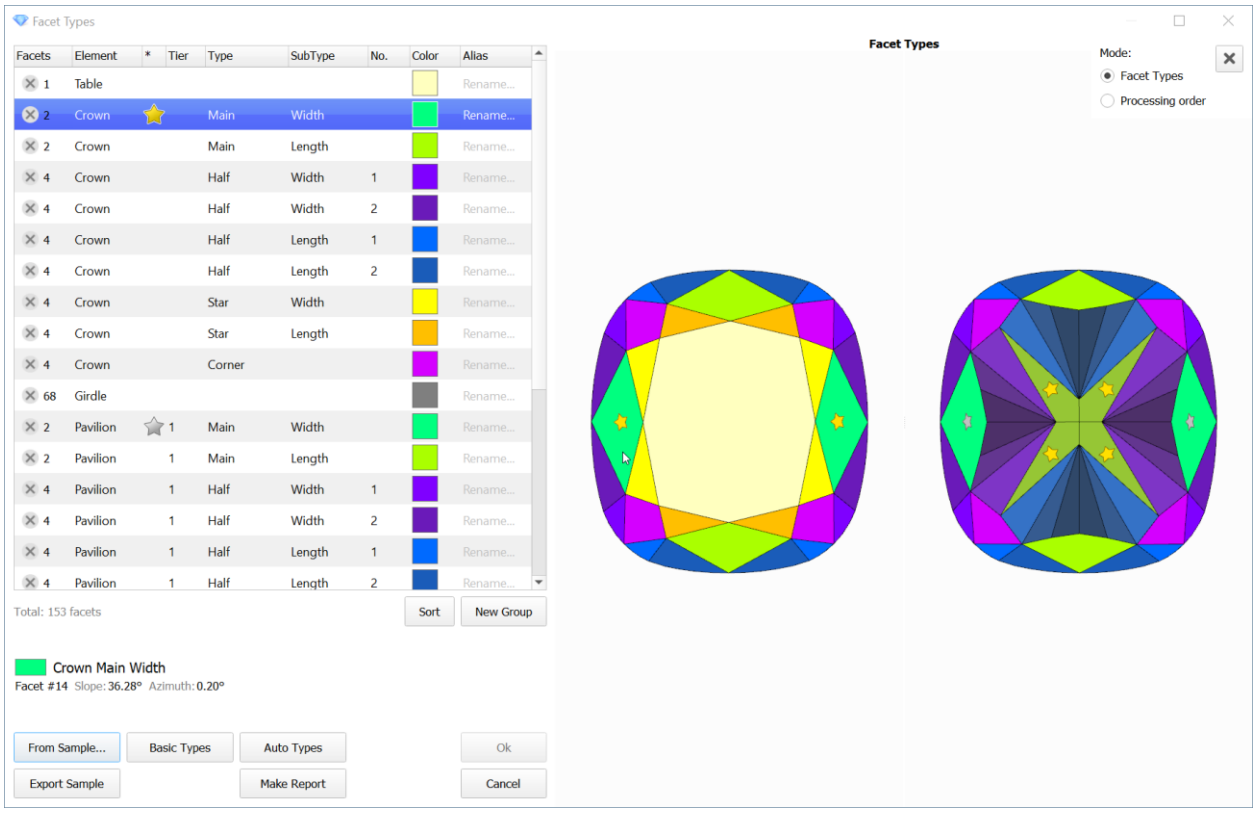
Category: Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: QML, Qt, C++, Visual Studio

Description:

Migrated the UI segment of the diamond model's 'Facet Types' module, responsible for 3D visualization and editing, from QML to Qt (C++). The 'Facet Types' module plays a crucial role in displaying and modifying various facet types along with their properties. It is used in many components and processes of the company's desktop software solution for diamond scanning and processing (HP Carbon), particularly in reports and diamond allocation. This transition enhances user flexibility, allowing them to efficiently create custom facet types tailored to a diverse range of diamond cuttings.



10. Semipolish Report

Period: October – December 2020

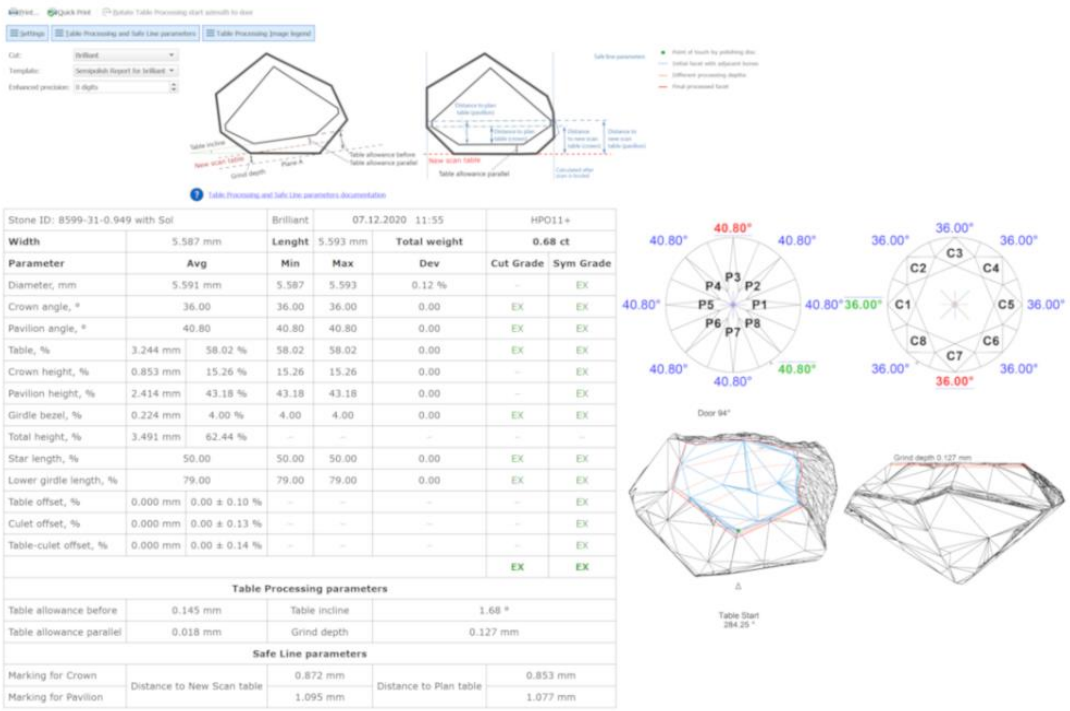
Category: Application Programming, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, GDI+, 2D, 3D-geometry, algorithms, Qt, Qt Web Engine, HTML, CSS, JavaScript, Visual Studio, Qt Visual Studio Add-in

Description:

Designed and implemented the Semipolish Report (HTML/CSS/JavaScript) to provide precise control, both visually and through parameter values, over the Table facet polishing process. This procedure aims to transform a rough stone into a diamond with a flawless Table plane. The Table facet, the large horizontal facet on the top, acts as a window into the interior of the gem. The report includes a feature to rotate the initial azimuth of the table facet processing towards the "door" of the hardware, simplifying Table processing for cutters. Additionally, a user-friendly GUI panel for report navigation has been introduced using Qt WebEngine, seamlessly integrated within the Scene. Reports, dynamically generated based on templates, are filled with calculated data and images crafted using Windows GDI+ and a diverse range of 2D and 3D algorithms.



Stone ID: 8599-31-0.949 with Sol			Brilliant	07.12.2020 11:55		HPO11+	
Width	5.587 mm		**Lenght**	5.593 mm	**Total weight**	**0.68 ct**	
Parameter	**Avg**		**Min**	**Max**	**Dev**	**Cut Grade**	**Sym Grade**
Diameter, mm	5.591 mm		5.587	5.593	0.12 %	-	EX
Crown angle, °	36.00		36.00	36.00	0.00	EX	EX
Pavilion angle, °	40.80		40.80	40.80	0.00	EX	EX
Table, %	3.244 mm	58.02 %	58.02	58.02	0.00	EX	EX
Crown height, %	0.853 mm	15.26 %	15.26	15.26	0.00	-	EX
Pavilion height, %	2.414 mm	43.18 %	43.18	43.18	0.00	-	EX
Girdle bezel, %	0.224 mm	4.00 %	4.00	4.00	0.00	EX	EX
Total height, %	3.491 mm	62.44 %	-	-	-	-	-
Star length, %	50.00		50.00	50.00	0.00	EX	EX
Lower girdle length, %	79.00		79.00	79.00	0.00	EX	EX
Table offset, %	0.000 mm	0.00 ± 0.10 %	-	-	-	-	EX
Culet offset, %	0.000 mm	0.00 ± 0.13 %	-	-	-	-	EX
Table-culet offset, %	0.000 mm	0.00 ± 0.14 %	-	-	-	-	EX
						EX	EX

Table Processing parameters			
Table allowance before	0.145 mm	Table incline	1.68 °
Table allowance parallel	0.018 mm	Grind depth	0.127 mm

Safe Line parameters				
Marking for Crown	Distance to New Scan table	0.872 mm	Distance to Plan table	0.853 mm
Marking for Pavilion		1.095 mm		1.077 mm

11. Distances between Models in Comparative I3D Report

Period: September 2020

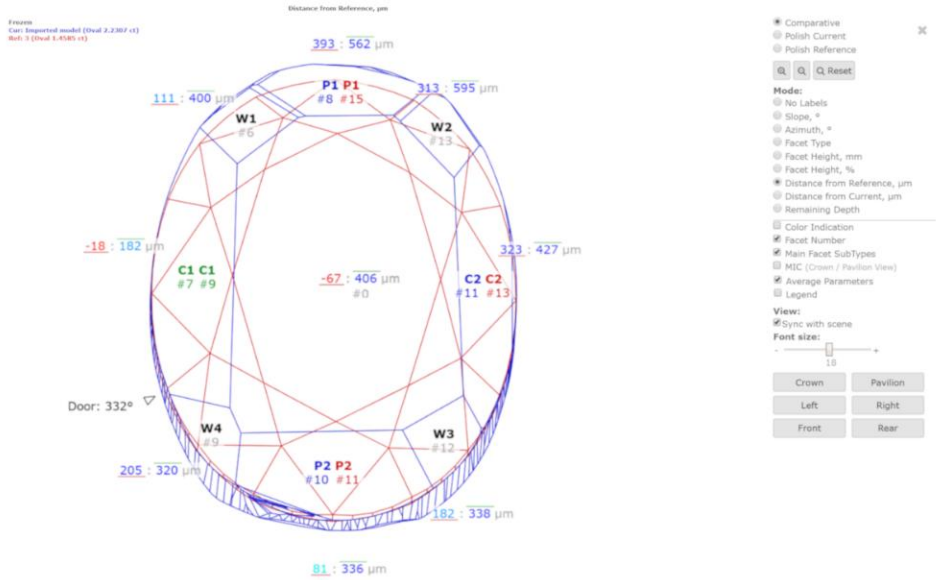
Category: Web Development, 2D, 3D-geometry, algorithms, 3D-Graphics, Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: JavaScript, HTML, CSS, C++

Description:

The Comparative Interactive 3D Report (HTML/CSS/JavaScript) serves as a tool for visualizing diamond models and their various parameters within a 3D scene, enclosed in a GUI panel powered by Qt WebEngine. Two new modes have been incorporated to highlight the distances between models during a side-by-side comparison of the Current and Reference models within the Comparative I3D Report. This feature visually demonstrates the proximity of facets in each pair of corresponding models, assisting in tasks such as identifying the optimal diamond model for processing or monitoring the current stone processing state.



Δ Diameter		Δ Crown angle	Δ Pavilion angle	Δ Table		Δ Culet	Δ Spread
minimum	maximum			Widthwise	Lengthwise		
-0.020 mm	-0.312 mm	-0.54°	0.12°	-6.56 %	-2.43 %	-3.91 %	42.20 %

Δ Ratio (L/W)	Δ Crown height	Δ Pavilion height	Δ Total height	Δ Girdle height		
				Bezel	Bone	Valley
-0.044	9.69 %	5.06 %	-6.35 %	-13.57 %	-21.80 %	-20.60 %

12. Integration of Desktop Application with Cloud

Period: May – August 2020

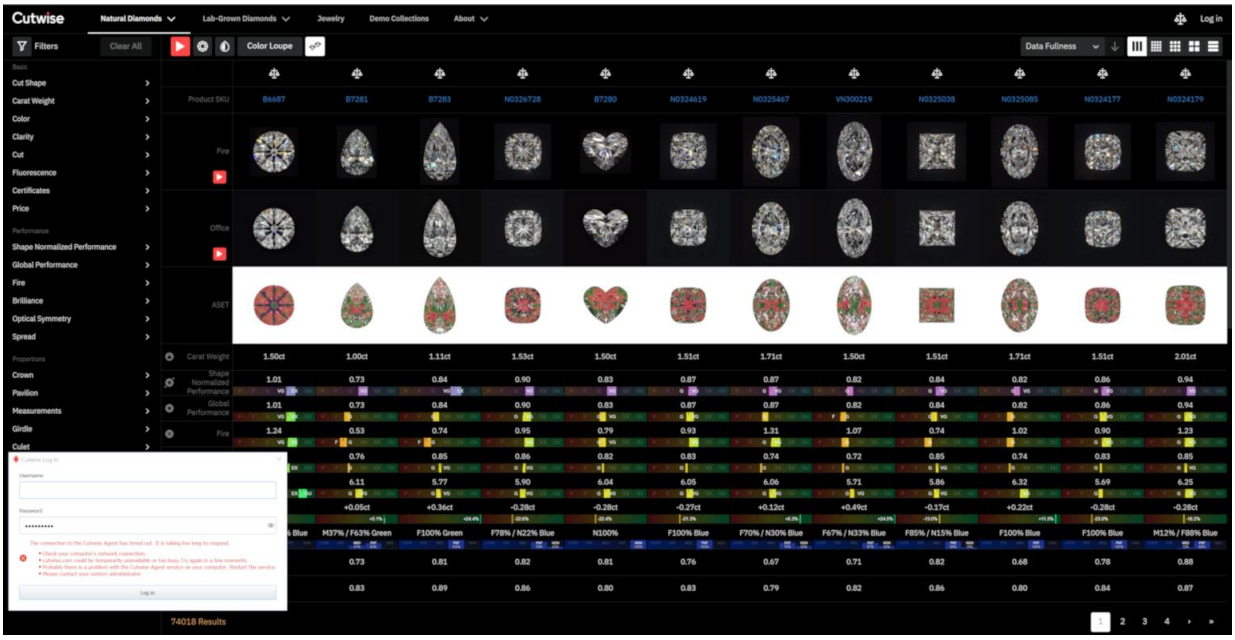
Category: Application Programming, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, Visual Studio, Asynchronous Programming, HTML, CSS, JavaScript, Qt, Qt Visual Studio Add-in

Description:

Developed and implemented an architecture (C++) and a GUI (Qt) to seamlessly integrate the company's desktop software solution for diamond scanning and processing (HP Carbon), designed for operation on the Windows OS, with the company's cloud platform at https://cutwise.com/. The application generates various data types, including scan and diamond 3D models, diverse reports (HTML/CSS/JS), spectrums, and metadata. This data is transmitted to the cloud, making it accessible to different diamond processing companies, distributors, and customers. The application efficiently communicates with a C++ client of a persistent Windows service responsible for user logins, file uploads, and status retrieval. This Windows service, in turn, sends the data to the cloud. My role in the project included developing and implementing components related to data generation and preparation, as well as facilitating the interaction between the desktop application and the Windows service client.



13. Support and Enhance Report Generation Module

Period: January – April 2020

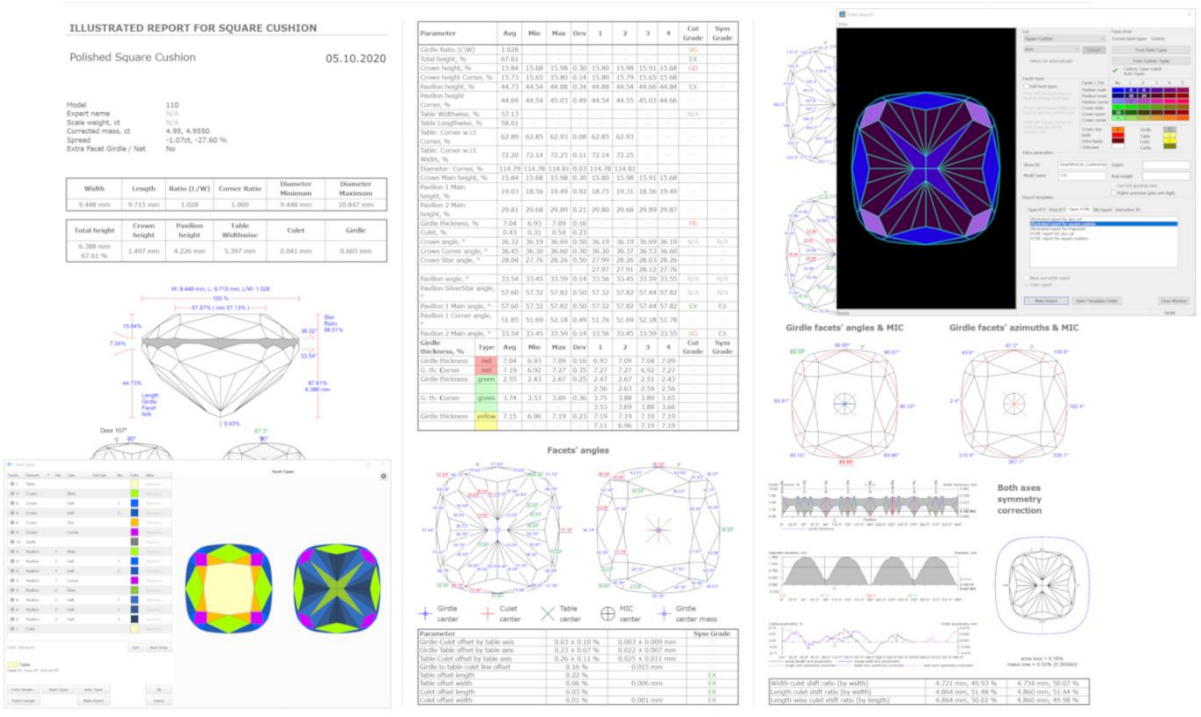
Category: Application Programming, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, Visual Studio, HTML, CSS, JavaScript, QML, Qt

Description:

Enhanced the Report Generation Module within the company's desktop software solution designed for diamond scanning and processing (HP Carbon) on the Windows OS platform. This involved introducing new features and resolving bugs across various report formats, such as HTML and Word-based reports. The improvements encompassed the implementation of logic in C++, GUI enhancements using MFC and QML, and the creation of HTML/CSS/JS report templates. Additionally, I adapted HTML reports to ensure compatibility with mobile devices. Furthermore, I strengthened the module responsible for 3D visualization and editing of facet markings on diamond models. This was achieved through the use of QML, Qt, and C++, and the successful integration of this module with different sections of the application for a more cohesive user experience.



14. Refactoring of Models Comparison Engine

Period: November – December 2019

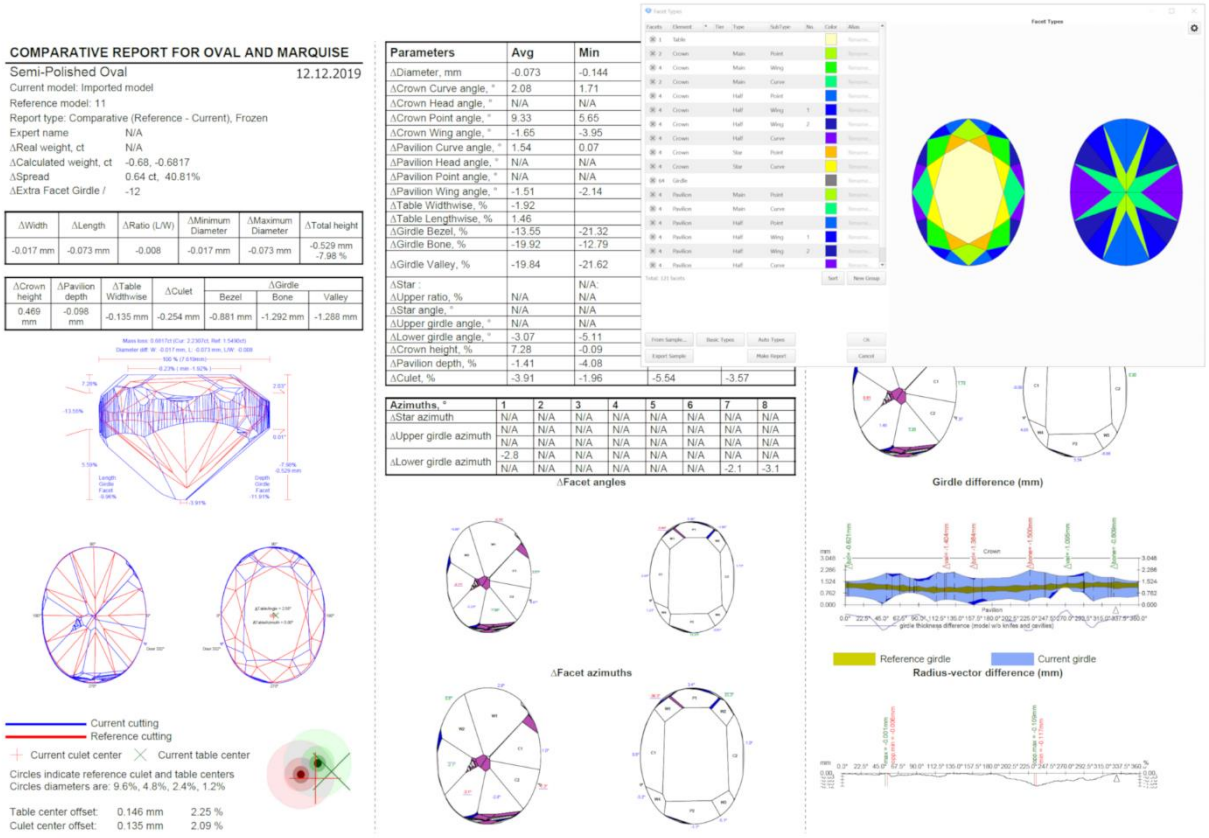
Category: Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: C++, Visual Studio

Description:

Refactored the diamond model comparison engine (C++) within a company's diamond scanning software solution to enhance scalability by organizing it into distinct dynamic libraries. Introduced multithreading support to the engine, ensuring optimal performance. This upgraded engine has seamlessly integrated with several existing software features, contributing to enhanced functionality and efficiency.



15. Solutions Report

Period: July – August 2019

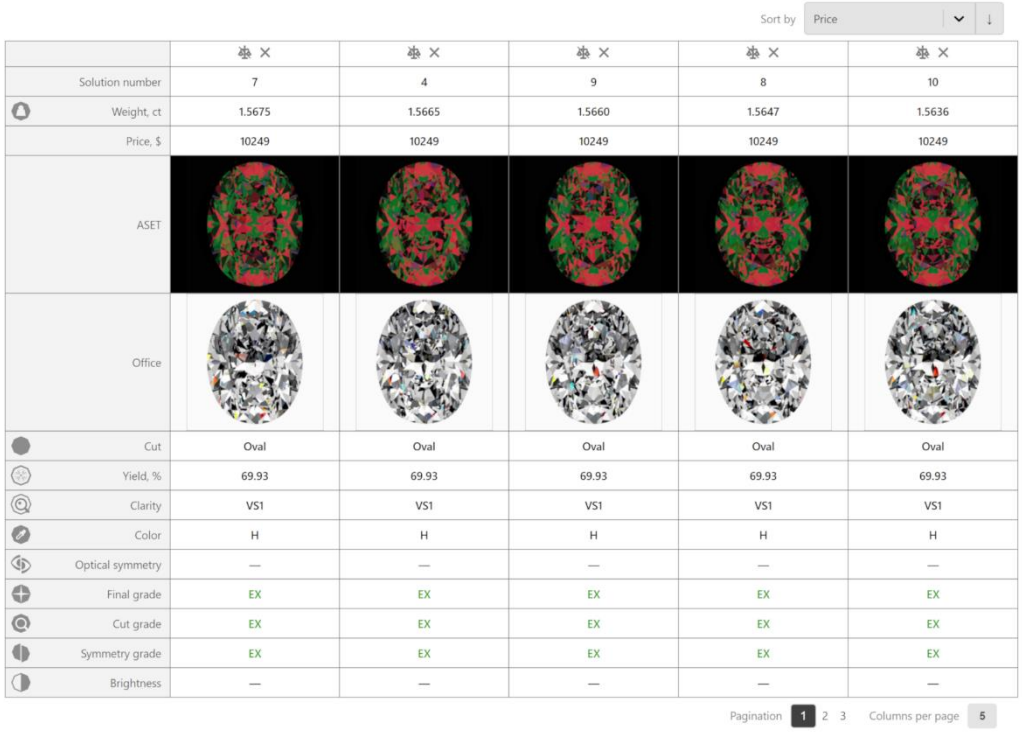
Category: Application Programming, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, Qt, Qt Web Engine, Qt WebChannel, multithreading, ReactJS, HTML, CSS, JavaScript, Visual Studio, Qt Visual Studio Add-in

Description:

Designed and developed Solutions Report (ReactJS/JavaScript/ HTML/CSS) for viewing of photorealistic diamond images and its different parameters in a scene. Developed and implemented a GUI panel for browsing the report using Qt WebEngine. The report exchanges data with the Qt GUI panel and a core C++ program via Qt WebChannel. User can add and remove diamond solutions in/from the report. Photorealistic diamond images are added into the report dynamically when they have been calculated. Integrated the panel in the company's software solution for diamond scanning (HP Oxygen). The panel was developed within the Visual Studio IDE for Windows platform.



16. Visualization of Diamond Girdle Thickness in Interactive 3D Report

Period: May 2019

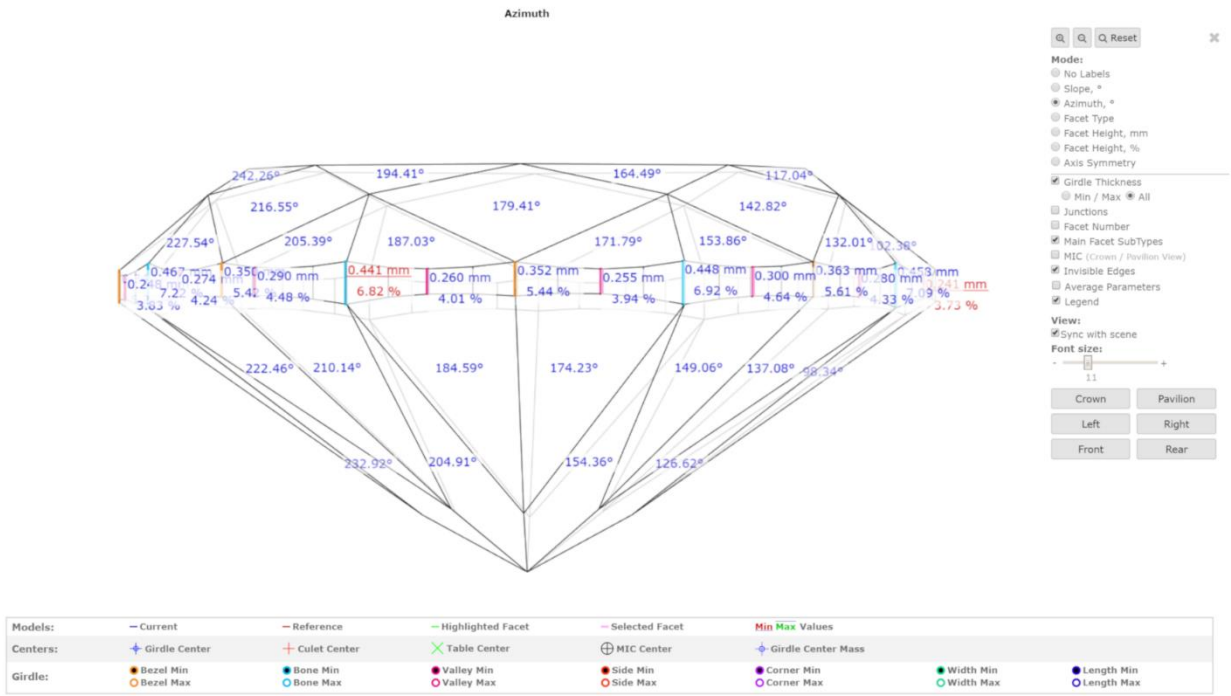
Category: Web Development, 3D-Graphics, Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: JavaScript, HTML, CSS

Description:

The Interactive 3D Report (HTML/CSS/JavaScript) serves as a tool for viewing diamond models and their various parameters within a 3D scene, encapsulated in a GUI panel powered by Qt WebEngine. I addressed an issue related to the visualization of diamond girdle thickness in the Interactive 3D Report, ensuring accurate representation across different diamond shapes. I further refined the report by developing final calculations for girdle thicknesses, utilizing precalculated data to enhance precision. Additionally, I implemented a legend within the report, providing a comprehensive reference guide for users.



17. Report for Comparison Scanned Diamond Models

Period: April 2019

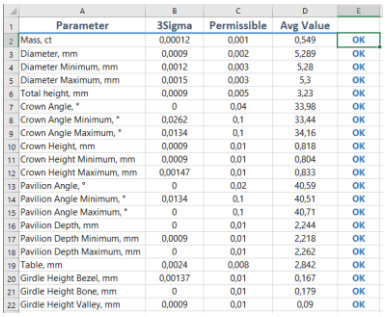
Category: Application Programming

Company: OctoNus Software, Moscow, Russia

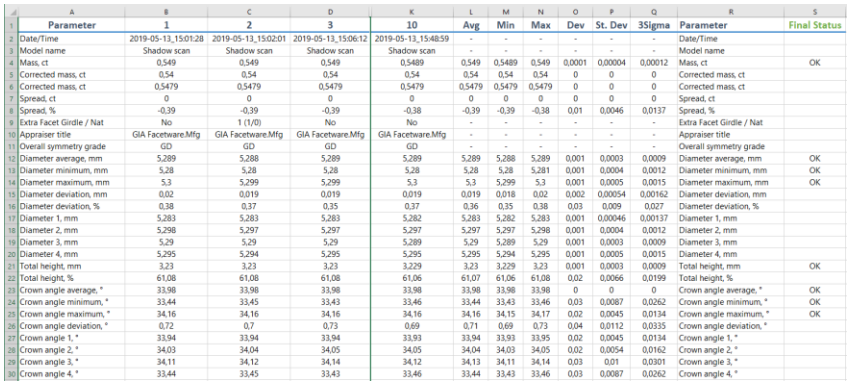
Technology: C++, Qt, Visual Studio, Qt Visual Studio Add-in

Description:

Designed and developed a comprehensive report for comparing scanned diamond models using C++. This report plays a crucial role in verifying the repeatability of model building by our scanning equipment. The report is dynamically generated to a text file, utilizing INI templates that accommodate various diamond parameters. To cater to different needs, I created both detailed and concise report templates, each providing essential diamond parameters.
To enhance the utility of the report, I implemented a robust calculation mechanism for generating statistical data on parameters. Moreover, I facilitated the export of cumulated reports to Microsoft Excel, allowing for convenient data analysis. This report generation feature has been seamlessly integrated into the company's software solution for diamond scanning (HP Oxygen), augmenting its functionality and providing valuable insights into the performance of the scanning equipment.



Parameter	3Sigma	Permissible	Avg Value	
Mass, ct	0,00012	0,001	0,549	OK
Diameter, mm	0,0009	0,002	5,289	OK
Diameter Minimum, mm	0,0012	0,003	5,28	OK
Diameter Maximum, mm	0,0015	0,003	5,3	OK
Total height, mm	0,0009	0,005	3,23	OK
Crown Angle, °	0	0,04	33,98	OK
Crown Angle Minimum, °	0,0262	0,1	33,44	OK
Crown Angle Maximum, °	0,0134	0,1	34,16	OK
Crown Height, mm	0,0009	0,01	0,818	OK
Crown Height Minimum, mm	0,0009	0,01	0,804	OK
Crown Height Maximum, mm	0,00147	0,01	0,833	OK
Pavilion Angle, °	0	0,02	40,59	OK
Pavilion Angle Minimum, °	0,0134	0,1	40,51	OK
Pavilion Angle Maximum, °	0	0,1	40,71	OK
Pavilion Depth, mm	0	0,01	2,244	OK
Pavilion Depth Minimum, mm	0,0009	0,01	2,218	OK
Pavilion Depth Maximum, mm	0	0,01	2,262	OK
Table, mm	0,0024	0,008	2,842	OK
Girdle Height Bezel, mm	0,00137	0,01	0,167	OK
Girdle Height Bone, mm	0	0,01	0,179	OK
Girdle Height Valley, mm	0,0009	0,01	0,09	OK



Parameter	1	2	3	10	Avg	Min	Max	Dev	St. Dev	3Sigma	Parameter	Final Status
Date/Time	2019-05-13_15:01:28	2019-05-13_15:02:01	2019-05-13_15:06:12	2019-05-13_15:48:59	-	-	-	-	-	-	Date/Time	
Model name	Shadow scan	Shadow scan	Shadow scan	Shadow scan	-	-	-	-	-	-	Model name	
Mass, ct	0,549	0,549	0,549	0,5489	0,549	0,5489	0,549	0,0001	0,00004	0,00012	Mass, ct	OK
Corrected mass, ct	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0	0	0	Corrected mass, ct	
Corrected mass, ct	0,5479	0,5479	0,5479	0,5479	0,5479	0,5479	0,5479	0	0	0	Corrected mass, ct	
Spread, ct	0	0	0	0	0	0	0	0	0	0	Spread, ct	
Spread, %	-0,39	-0,39	-0,39	-0,38	-0,39	-0,39	-0,38	0,01	0,0046	0,0137	Spread, %	
Extra Facet Girdle / Nat	No	1 (1/0)	No	No	-	-	-	-	-	-	Extra Facet Girdle / Nat	
Appraiser title	GIA Facetware.Mfg	GIA Facetware.Mfg	GIA Facetware.Mfg	GIA Facetware.Mfg	-	-	-	-	-	-	Appraiser title	
Overall symmetry grade	GD	GD	GD	GD	-	-	-	-	-	-	Overall symmetry grade	
Diameter average, mm	5,289	5,288	5,289	5,289	5,289	5,288	5,289	0,001	0,0003	0,0009	Diameter average, mm	OK
Diameter minimum, mm	5,28	5,28	5,28	5,28	5,28	5,28	5,281	0,001	0,0004	0,0012	Diameter minimum, mm	OK
Diameter maximum, mm	5,3	5,299	5,299	5,3	5,3	5,299	5,3	0,001	0,0005	0,0015	Diameter maximum, mm	OK
Diameter deviation, mm	0,02	0,019	0,019	0,019	0,019	0,018	0,02	0,002	0,00054	0,00162	Diameter deviation, mm	
Diameter deviation, %	0,38	0,37	0,35	0,37	0,36	0,35	0,38	0,03	0,009	0,027	Diameter deviation, %	
Diameter 1, mm	5,283	5,283	5,283	5,282	5,283	5,282	5,283	0,001	0,00046	0,00137	Diameter 1, mm	
Diameter 2, mm	5,298	5,297	5,297	5,297	5,297	5,297	5,298	0,001	0,0004	0,0012	Diameter 2, mm	
Diameter 3, mm	5,29	5,29	5,29	5,289	5,29	5,289	5,29	0,001	0,0003	0,0009	Diameter 3, mm	
Diameter 4, mm	5,295	5,294	5,295	5,295	5,295	5,294	5,295	0,001	0,0005	0,0015	Diameter 4, mm	
Total height, mm	3,23	3,23	3,23	3,229	3,23	3,229	3,23	0,001	0,0003	0,0009	Total height, mm	OK
Total height, %	61,08	61,08	61,08	61,06	61,07	61,06	61,08	0,02	0,0066	0,0199	Total height, %	
Crown angle average, °	33,98	33,98	33,98	33,98	33,98	33,98	33,98	0	0	0	Crown angle average, °	OK
Crown angle minimum, °	33,44	33,45	33,43	33,46	33,44	33,43	33,46	0,03	0,0087	0,0262	Crown angle minimum, °	OK
Crown angle maximum, °	34,16	34,16	34,16	34,16	34,16	34,15	34,17	0,02	0,0045	0,0134	Crown angle maximum, °	OK
Crown angle deviation, °	0,72	0,7	0,73	0,69	0,71	0,69	0,73	0,04	0,0112	0,0335	Crown angle deviation, °	
Crown angle 1, °	33,94	33,94	33,94	33,93	33,94	33,93	33,95	0,02	0,0045	0,0134	Crown angle 1, °	
Crown angle 2, °	34,03	34,04	34,05	34,05	34,04	34,03	34,05	0,02	0,0054	0,0162	Crown angle 2, °	
Crown angle 3, °	34,11	34,12	34,14	34,12	34,13	34,11	34,14	0,03	0,01	0,0301	Crown angle 3, °	
Crown angle 4, °	33,44	33,45	33,43	33,46	33,44	33,43	33,46	0,03	0,0087	0,0262	Crown angle 4, °	

18. Facets Multi-Selection Tool

Period: November 2018 – January 2019

Category: Application Programming, 3D- Graphics, Web Development

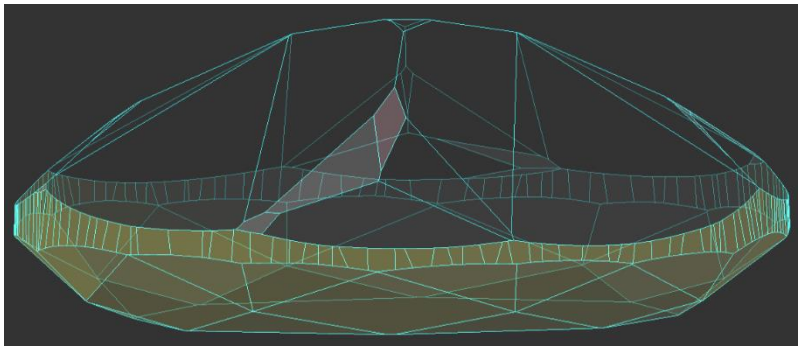
Company: OctoNus Software, Moscow, Russia

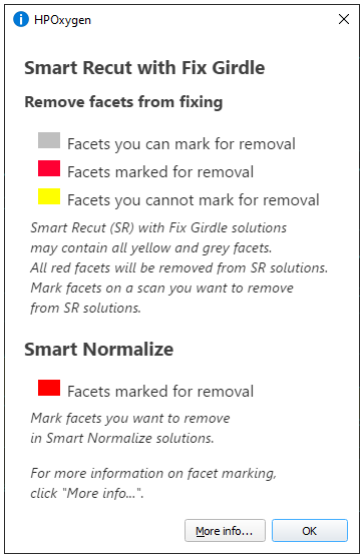
Technology: C++, OpenGL, Qt, Qt Web Engine, Visual Studio, Qt Visual Studio Add-in, HTML, CSS, JavaScript

Description:

I conceived and built a tool for the multi-selection of facets within a 3D scene using C++, leveraging containers and algorithms, along with OpenGL. This user-friendly tool empowers users to rotate a diamond model and selectively mark "undesirable" facets. The chosen facets play a pivotal role in various algorithms employed for the creation of diamond models, with specialized processing methods applied specifically to these marked facets.

Additionally, I designed a hint dialog for this functionality, employing Qt WebEngine, HTML, CSS, and JavaScript. This dialog provides users with informative cues, enhancing the overall user experience. The seamless integration of this facet multi-selection tool and accompanying hint dialog contributes to the versatility and effectiveness of the application.





19. Polish Report for Cylinder

Period: October 2018

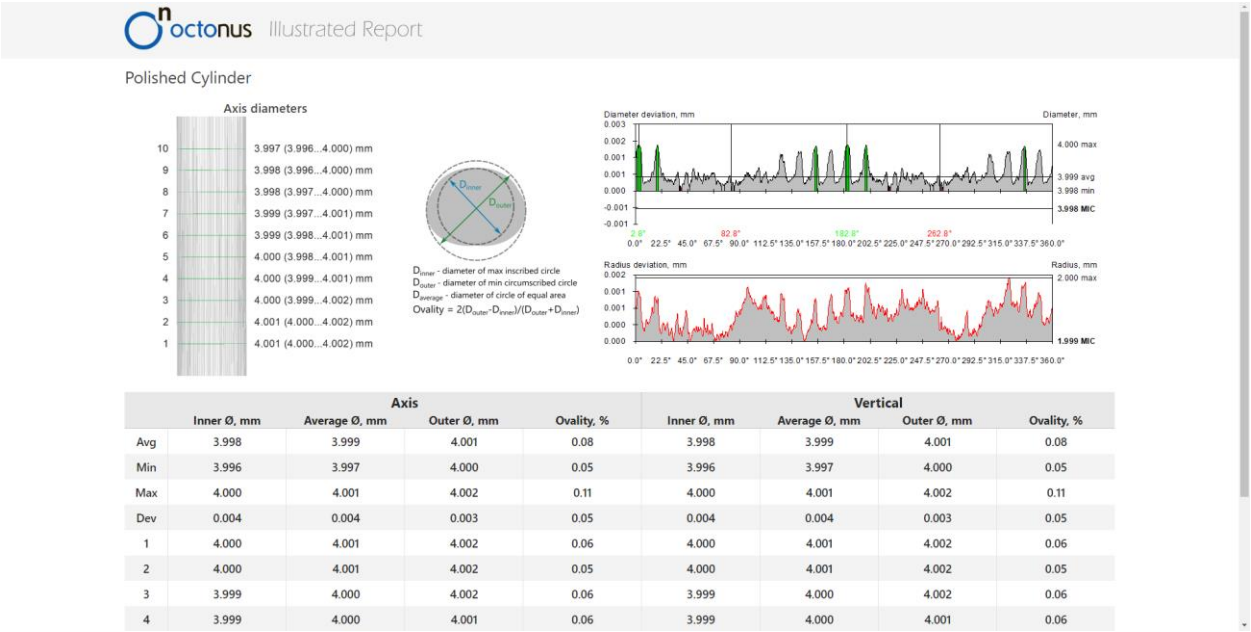
Category: Application Programming, 2D- Graphics, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, GDI+, HTML, CSS, JavaScript, Visual Studio

Description:

Designed and developed an HTML/CSS/JavaScript report template tailored for the examination of a polished cylinder's parameters, specifically its diameters. This template forms the foundation for generating reports, dynamically populated with calculated data and images. The drawing functionality was realized using C++ in conjunction with GDI+. Implemented the drawing of a comprehensive cylinder illustration within the report, showcasing sections perpendicular to the cylinder axis and vertical segments.
Upon generation, the resulting report seamlessly opens in the default system browser, ensuring easy accessibility and immediate viewing for users. This comprehensive solution enhances the analysis and understanding of polished cylinder parameters.



	Axis				Vertical			
	Inner Ø, mm	Average Ø, mm	Outer Ø, mm	Ovality, %	Inner Ø, mm	Average Ø, mm	Outer Ø, mm	Ovality, %
Avg	3.998	3.999	4.001	0.08	3.998	3.999	4.001	0.08
Min	3.996	3.997	4.000	0.05	3.996	3.997	4.000	0.05
Max	4.000	4.001	4.002	0.11	4.000	4.001	4.002	0.11
Dev	0.004	0.004	0.003	0.05	0.004	0.004	0.003	0.05
1	4.000	4.001	4.002	0.06	4.000	4.001	4.002	0.06
2	4.000	4.001	4.002	0.05	4.000	4.001	4.002	0.05
3	3.999	4.000	4.002	0.06	3.999	4.000	4.002	0.06
4	3.999	4.000	4.001	0.06	3.999	4.000	4.001	0.06

20. Interactive 3D Report

Period: October 2017 – July 2018

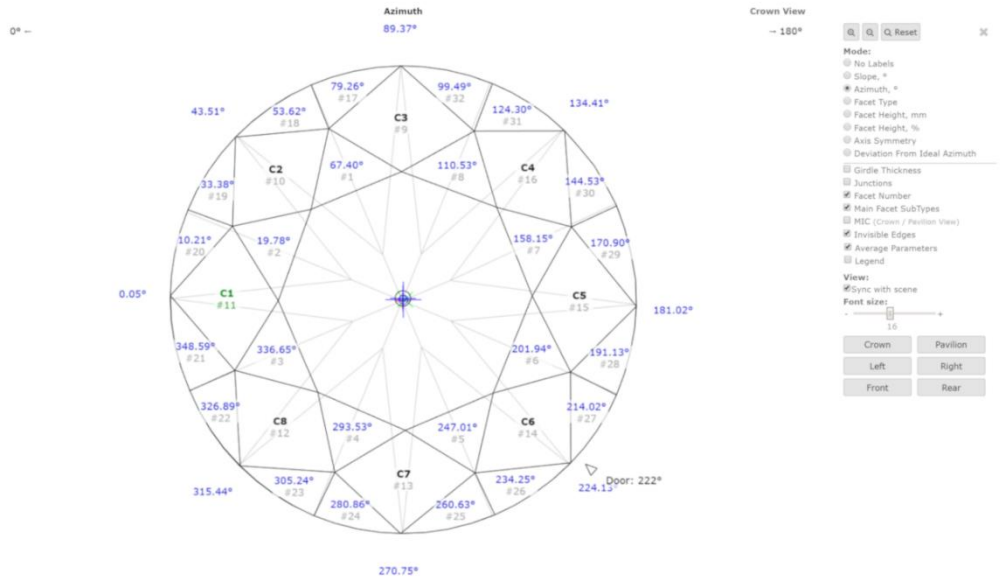
Category: Web Development, 3D-Graphics, Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: HTML, CSS, JavaScript, C++, Qt, Qt Web Engine, Qt WebChannel, Visual Studio, Qt Visual Studio Add-in

Description:

Integrated Interactive 3D Reports (HTML/CSS/JavaScript) to facilitate the viewing of diamond models and various parameters within a scene. Developed and implemented a GUI panel, utilizing Qt WebEngine, for seamless navigation of HTML-based reports. Addressed Axis Symmetry issues and introduced a GUI for comparing two models in Interactive 3D mode within the reports. The exchange of data between reports, the Qt GUI panel, and the core C++ program occurs via Qt WebChannel. Successfully integrated the panel into the company's diamond scanning software solution (HP Oxygen), developed within the Visual Studio IDE for the Windows platform.



Diameter			Crown angle	Pavilion angle	Table	Culet	Spread	Extra facet girdle / Nat
minimum	maximum	average						
6.318 mm	6.355 mm	6.344 mm	36.70°	40.65°	55.11 %	0.48 %	-6.45 %	No

Width	Length	Ratio (L/W)	Crown height	Pavilion height	Total height	Girdle height		
						Bezel	Bone	Valley
6.318 mm	6.355 mm	1.006	16.75 %	42.77 %	63.24 %	3.72 %	4.13 %	2.17 %

21. HTML-based Faceting Report

Period: July 2017 – September 2017

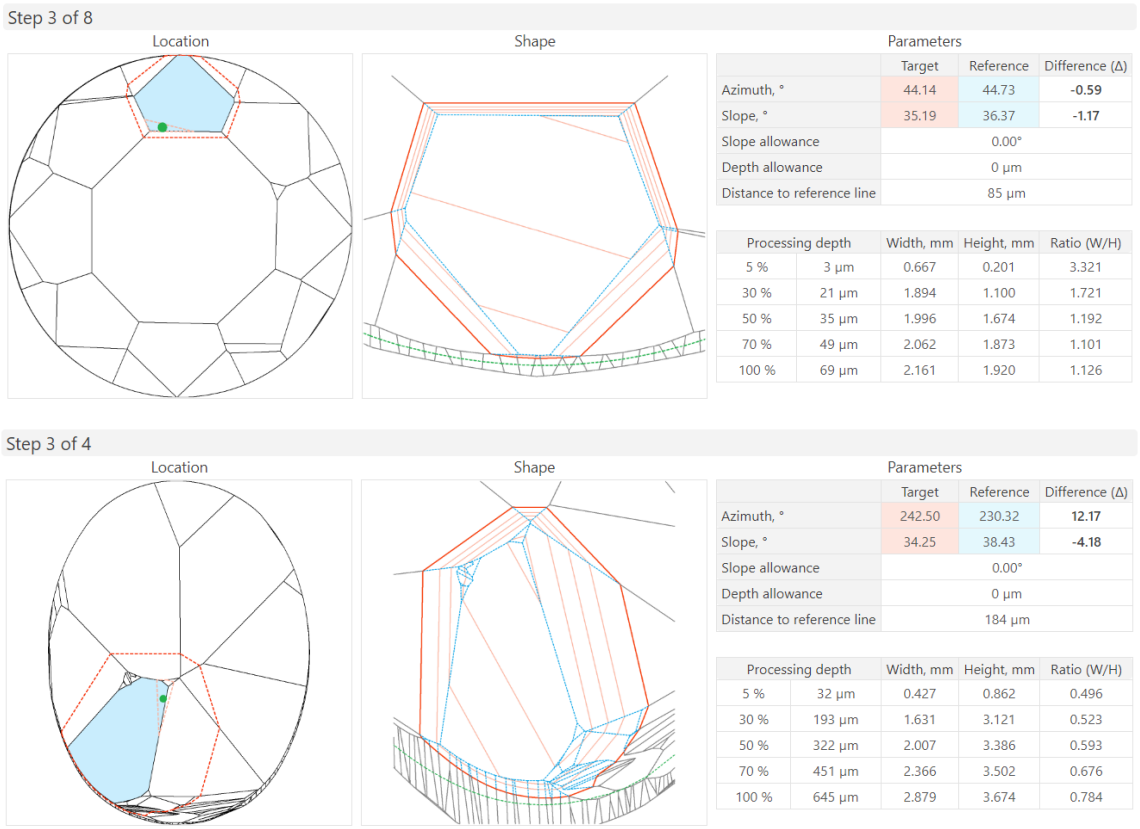
Category: Application Programming, 2D-Graphics, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, GDI+, HTML, CSS, JavaScript, JSON, Qt, Visual Studio

Description:

Conceived and crafted an HTML/CSS/JavaScript/JSON report template for examining faceting plans, detailing the processing sequence of facets and cutting results. Developed a report manager to facilitate report generation and a Qt GUI panel for seamless configuration. Reports are dynamically generated based on the template, populated with JSON data, and enriched with images crafted using Windows GDI+. The resulting report is automatically opened in the default system browser. Successfully integrated this workflow into the company's diamond scanning software solution (HP Oxygen).



Step 3 of 8

Location

Shape

Parameters

	Target	Reference	Difference (Δ)
Azimuth, °	44.14	44.73	-0.59
Slope, °	35.19	36.37	-1.17
Slope allowance	0.00°		
Depth allowance	0 µm		
Distance to reference line	85 µm		

Processing depth		Width, mm	Height, mm	Ratio (W/H)
5 %	3 µm	0.667	0.201	3.321
30 %	21 µm	1.894	1.100	1.721
50 %	35 µm	1.996	1.674	1.192
70 %	49 µm	2.062	1.873	1.101
100 %	69 µm	2.161	1.920	1.126

Step 3 of 4

Location

Shape

Parameters

	Target	Reference	Difference (Δ)
Azimuth, °	242.50	230.32	12.17
Slope, °	34.25	38.43	-4.18
Slope allowance	0.00°		
Depth allowance	0 µm		
Distance to reference line	184 µm		

Processing depth		Width, mm	Height, mm	Ratio (W/H)
5 %	32 µm	0.427	0.862	0.496
30 %	193 µm	1.631	3.121	0.523
50 %	322 µm	2.007	3.386	0.593
70 %	451 µm	2.366	3.502	0.676
100 %	645 µm	2.879	3.674	0.784

22. Centralized Settings of Diamond Scanning Software

Period: August 2016 – July 2017

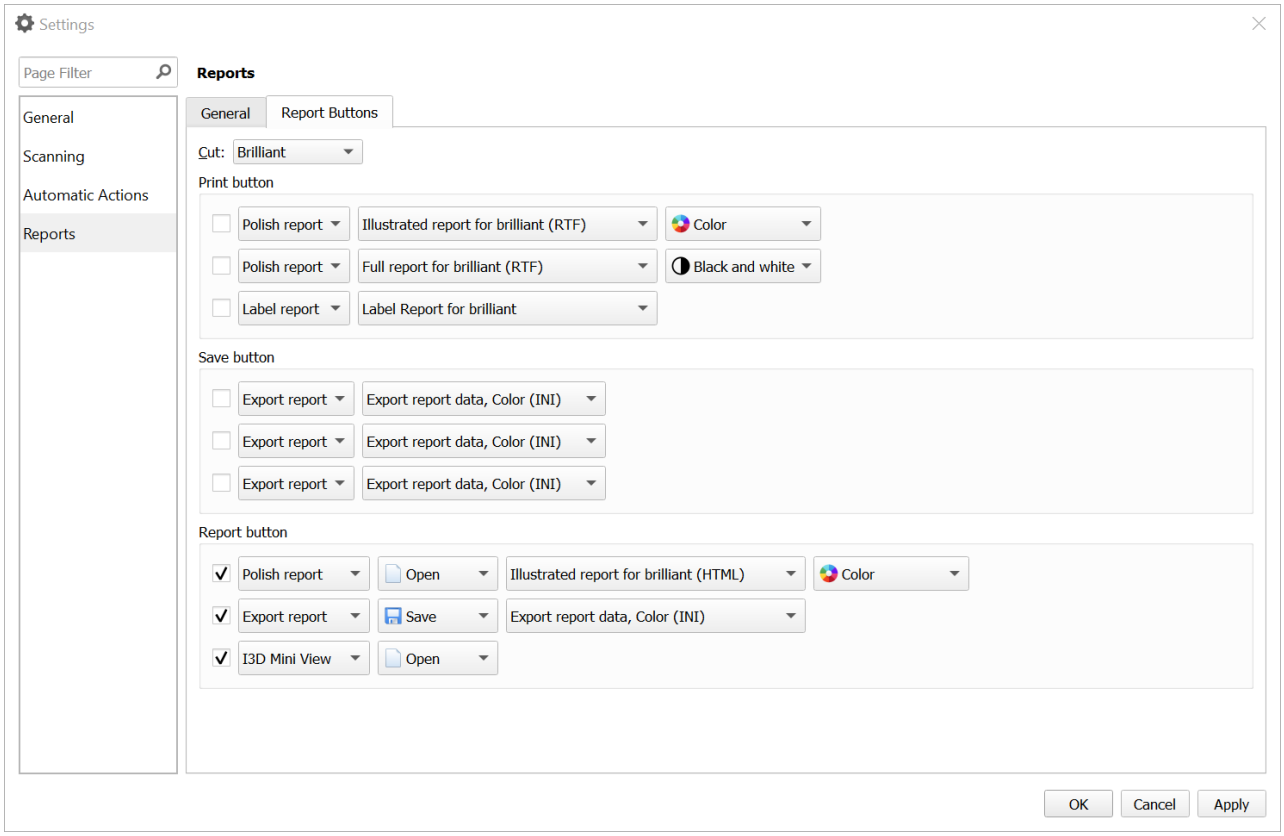
Category: Architecture Design, Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: C++11, STL, Qt, Qt Creator, Visual Studio, QtWinMigrate, Qt Visual Studio Add-in

Description:

Designed, developed, and implemented a comprehensive architecture and graphical user interface (GUI) for centralized settings within the company's software solution for diamond scanning (HP Oxygen). The settings dialog is structured with categories and pages, organized by weight coefficients, offering a user-friendly interface. This GUI supports efficient filtering of pages through key phrases. Pages, exportable from various plugins (libraries) of the program, can seamlessly integrate into the settings dialog. The GUI was crafted within the Qt Creator IDE and subsequently transitioned into a standalone library using the Visual Studio IDE.



23. HTML-based Diamond Reports

Period: February 2016 – June 2016

Category: Application Programming, Web Development

Company: OctoNus Software, Moscow, Russia

Technology: C++, Qt, Qt WebEngine, Visual Studio, QtWinMigrate, Qt Visual Studio Add-in, HTML, CSS, JavaScript

Description:

Conceived and created HTML/CSS/JavaScript report templates tailored for the examination of diamond parameters and grades, specifically designed for various diamond cuttings. Developed and implemented a GUI panel using Qt WebEngine for seamless navigation through HTML-based reports. Successfully integrated the panel into the company's diamond scanning software solution, HP Oxygen, allowing for automatic launch after each scanning process. The panel was developed within the Visual Studio IDE, optimized for the Windows platform.


Settings Print... Quick Print

Cut: Brilliant

Template: Standard Report for brilliant

Enhanced precision: 0 digits

Cut	Brilliant	Model	2
Spread	-0.06 ct, -6.40 %	Scale weight, ct	N/A
Extra Facet Girdle / Nat	No	Corrected mass, ct	1.00, 1.0032
Cut appraiser	GIA Facetware.Mfg	Cut grade	EX
Symmetry appraiser	GIA Facetware.Mfg	Sym grade	EX
Model building info	N/A	Final grade	EX

Parameter	Avg	GIA Rounded	Min	Max	Dev	Cut Grade	Sym Grade
Diameter, mm	6.343	6.33	6.315	6.353	0.59 %	–	EX
Table, %	3.490 mm 55.02 %	55	54.45	55.33	0.88	EX	EX
Crown angle, °	36.70	36.5	36.21	37.11	0.90	EX	EX
Pavilion angle, °	40.65	40.6	40.50	40.79	0.29	EX	EX
Star length, %	57.40	55	55.38	58.49	3.12	EX	EX
Lower girdle length, %	78.26	80	77.28	78.99	1.71	EX	EX
Girdle bezel, %	0.236 mm 3.72 %	3.5	3.27	3.91	0.64	EX	EX
Girdle bone, %	0.257 mm 4.04 %	–	3.68	4.34	0.66	–	–
Girdle valley, %	0.134 mm 2.12 %	–	1.51	2.35	0.84	–	–
Girdle valley minimum, %	1.51	MED	–	–	–	EX	–
Girdle valley maximum, %	2.35	STK	–	–	–	EX	–
Culet, %	0.030 mm 0.48 %	NON	0.46	0.49	0.03	EX	–
Crown painting, °	0.79	0.8	–	1.05	1.34	EX	–
Pavilion painting, °	0.12	0.1	–	-0.78	1.35	EX	–
Sum painting, °	0.91	0.9	–	–	–	EX	–
Crown height, %	1.064 mm 16.77 %	17.0	16.53	17.12	0.60	–	EX
Pavilion height, %	2.713 mm 42.77 %	43.0	42.49	43.07	0.59	–	EX
Total height, %	4.013 mm 63.27 %	63.4	–	–	–	–	–
Table offset, %	0.020 mm 0.31 %	–	–	–	–	–	EX
Culet offset, %	0.021 mm 0.33 %	–	–	–	–	–	EX
Table-culet offset, %	0.037 mm 0.58 %	–	–	–	–	–	EX
Star angle, °	25.45	25.5	24.24	26.49	2.24	–	EX
Upper girdle angle, °	43.72	43.7	42.47	44.85	2.38	–	EX
Lower girdle angle, °	41.78	41.8	41.57	42.18	0.61	–	EX
Facet twist, °	0.44	–	0.00	0.77	0.77	–	–
Junction bezel twist, °	-0.06	–	-0.48	0.27	0.75	–	–
Junction bone twist, °	-0.15	–	-0.48	0.48	0.96	–	–
Misalignment (ALN), °	0.48	0.5	–	–	–	–	EX
Z*radius roundness, %	–	–	–	–	–	–	VG
15°	0.36	–	–	–	–	–	EX
22.5°	0.42	–	–	–	–	–	EX
30°	0.52	–	–	–	–	–	VG
45°	0.61	–	–	–	–	–	EX
90°	0.63	–	–	–	–	–	EX
Model table edge, %	21.06	–	20.37	22.33	1.96	–	–
Table edge (TEV), %	21.06	21.1	20.37	22.33	1.96	–	EX
Table edge junction, %	0.00	–	0.00	0.00	0.00	–	–
Table angle, °	135.0	–	132.4	136.9	4.5	–	–
Bezel width, %	30.26	–	28.88	31.03	2.15	–	–

24. Asynchronous Logger and GUI Panel for Log Messages

Period: November 2015 – February 2016

Category: Architecture Design, Application Programming

Company: OctoNus Software, Moscow, Russia

Technology: C++11, g3log, STL, Qt, Qt Creator, Visual Studio, QtWinMigrate, Qt Visual Studio Add-in

Description:

Integrated an asynchronous C++11 logger (g3log) into the company's diamond scanning software solution (HP Oxygen). Designed, developed, and implemented a submodule within a separate library responsible for logging messages to files and a GUI panel. This logger captures messages from all program libraries, providing valuable insights into the current state of the scanning workflow. The implementation includes a rotation policy for log files.
Additionally, designed, developed, and implemented a GUI panel within a separate library for real-time viewing of log messages. The panel supports advanced features such as message filtering by log levels, keyword-based searches, and sorting based on log parameters. The GUI was created using the Qt Creator IDE and seamlessly integrated into an MFC panel using the QtWinMigrate framework. Both the logger and GUI panel were developed within the Visual Studio IDE, optimized for the Windows platform.

25. Interactive 3D Reports Client

Period: August 2015 – October 2015

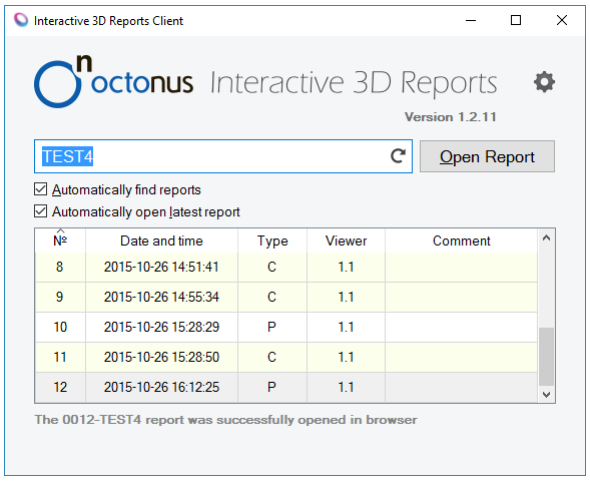
Category: Application Programming, Installer Development

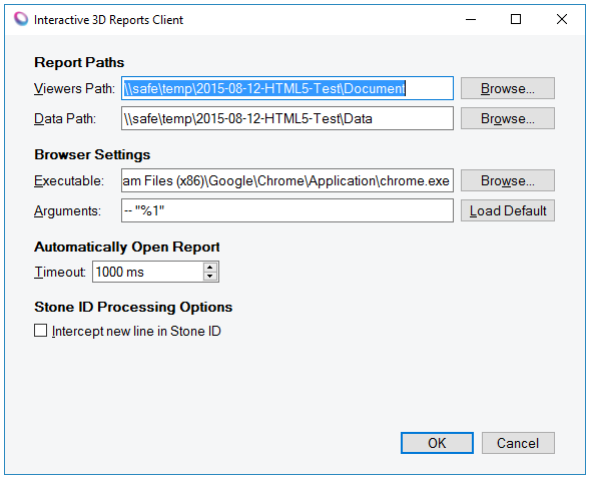
Company: OctoNus Software, Moscow, Russia

Technology: C++11, Qt, Qt Creator, XML, Inno Setup, Web browsers

Description:

Developed and implemented a Windows application enabling scanner operators and cutters to locate, open, and interact with HTML5-based Interactive 3D Reports directly from their workstations. This software streamlines the process of finding and viewing previously generated reports stored on a network location or local disk, utilizing stone-specific identifiers. The metadata of reports is structured in XML format, and the reports client supports compatibility with most modern web browsers. The application was realized within the Qt Creator IDE using C++11, ensuring robust functionality. Additionally, an installer for the software was developed using Inno Setup, contributing to a seamless deployment process.





26. Set-Top Boxes Software

Period: August 2010 – August 2015

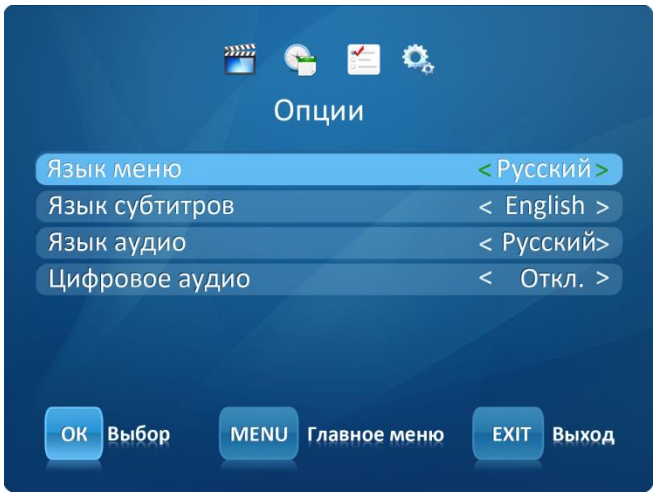
Category: Embedded Software Development and Testing

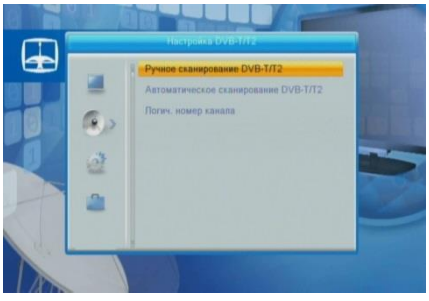
Company: Moscow Scientific Research Television Institute, Moscow, Russia

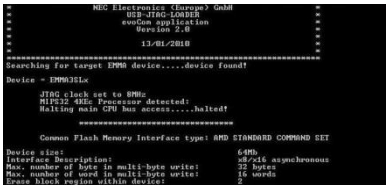
Technology: C, C++, Shell script, Makefiles, DirectFB, Cross Compilers, Embedded Linux, DVB-T/T2, IPTV, VirtualBox, Minicom, JTAG

Description:

I was responsible for the development, refactoring, and testing of applications for DVB-T/T2 set-top boxes, leveraging platforms from Renesas Electronics, ST Electronics, NXP Semiconductors, ALi Corporation, and HiSilicon Technologies. As a part of a dynamic development team, we designed set-top boxes incorporating the latest digital TV technologies. My responsibilities included software development and testing for set-top boxes, utilizing languages such as C, C++, Shell script, Makefiles, and Cross Compilers. These set-top boxes operate on Embedded Linux. I successfully configured and initiated a HiSilicon 4K platform with Android Operating System support. Additionally, I initiated and tested an NXP Semiconductors IPTV set-top box using VLC media player. My role extended to testing Set-Top-Boxes in compliance with Nordig specifications. I configured development environments and installed various Linux distributions, including SUSE Linux, Fedora Linux, and Ubuntu. My troubleshooting efforts involved identifying and rectifying faults in set-top boxes using tools like Minicom and JTAG.







27. Aerodynamic Measurements Software

Period: January 2015 – April 2015

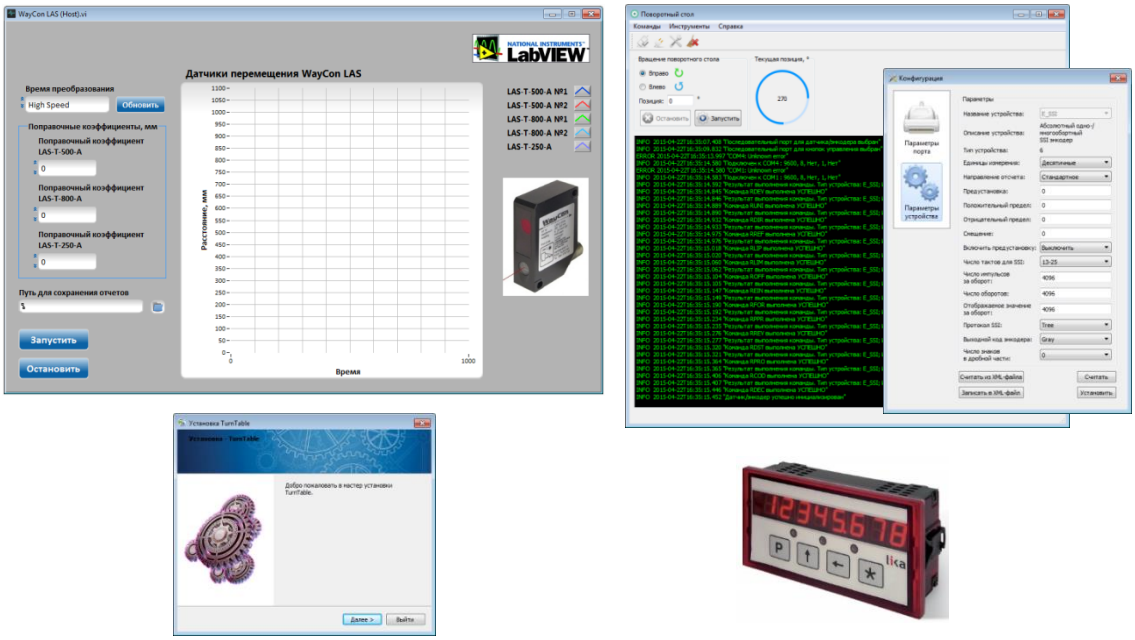
Category: Application Programming

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: NI LabVIEW, C++, Qt, Qt Installer Framework

Description:

Developed and tested aerodynamic measurement control software for the Windows platform, designed for the physical modeling of wind impact on buildings. A model is positioned at the center of a turntable that can be rotated to simulate wind approaching from any azimuth. The model is geometrically scaled to represent a building.
Additionally, an application software for laser sensors, responsible for detecting the distance to the model, was implemented in the NI LabVIEW IDE. These laser sensors are connected to an NI chassis with FPGA, establishing communication with the PC via Ethernet. The obtained results are efficiently saved in Excel files. The turntable management application was created within the Qt Creator IDE using C++, establishing command transmission between the PC and the turntable through a serial port and a universal position display.



28. Algorithm of Character Recognition

Period: March 2013 – June 2014

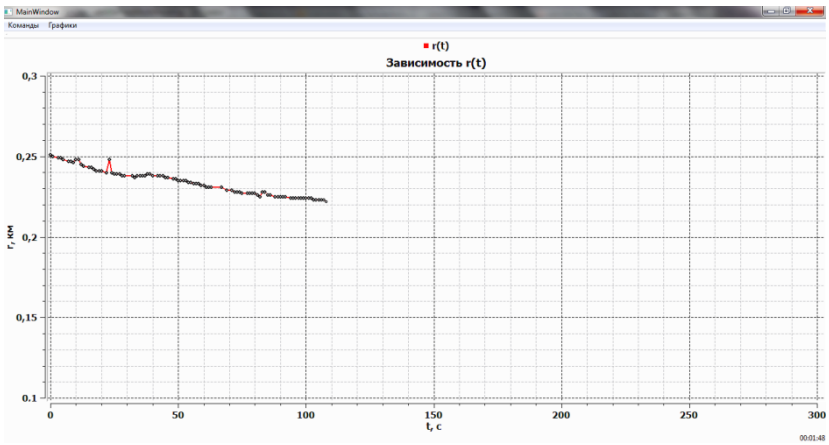
Category: Algorithm Design and Implementation, Research and Development Project

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C++, OpenCV, Qt, Qwt, XML, SQL

Description:

Applied algorithm design principles and theories to develop a character recognition algorithm for TV images from satellites. This algorithm is crucial for extracting telemetry data through binary patterns of characters. The segmentation of characters is achieved through contours, and the degree of similarity between input images and templates is determined using cross-correlation with FFT. The algorithm, primarily written in C++, leverages the OpenCV computer vision library for specific steps. Recognition results are stored in an SQL database, and the application processes a real-time video stream. The program efficiently utilizes multi-threaded processing for all parameters. Its complexity and performance were evaluated against other image recognition solutions. The project was developed in the Qt Creator IDE for the Windows platform.



29. Widget for Samsung Smart TV

Period: June 2012 – November 2012

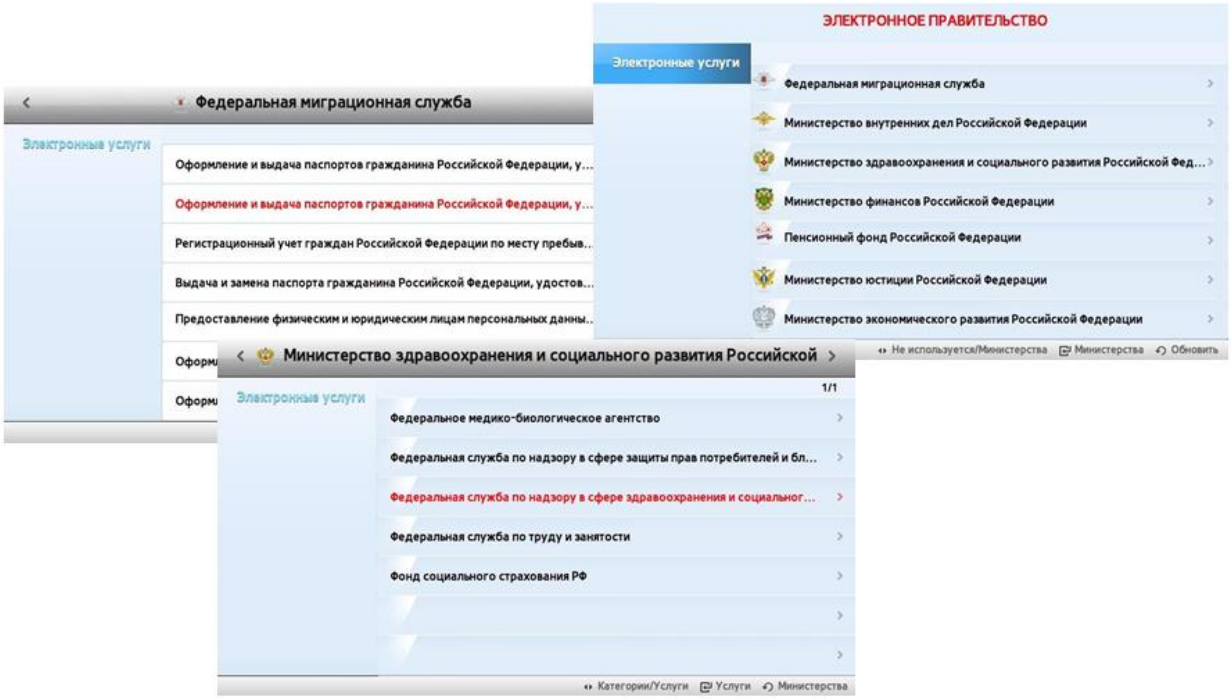
Category: Web Development

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: HTML, JavaScript, XML, AJAX, CSS, Eclipse, Samsung Smart TV SDK

Description:

Designed, developed, and tested a JavaScript-based widget for Samsung Smart TV aimed at providing straightforward and user-friendly information about public services in Russia. The widget displays the hierarchical structure of ministries and departments, along with a comprehensive list of services and associated details. Utilizing various web technologies, resources are extracted from XML files through AJAX requests. The widget is designed to be controlled by a remote, enhancing user accessibility. The project was developed using the Eclipse IDE, incorporating the Samsung Smart TV SDK.



30. Porting Device Drivers

Period: January 2012 – May 2012

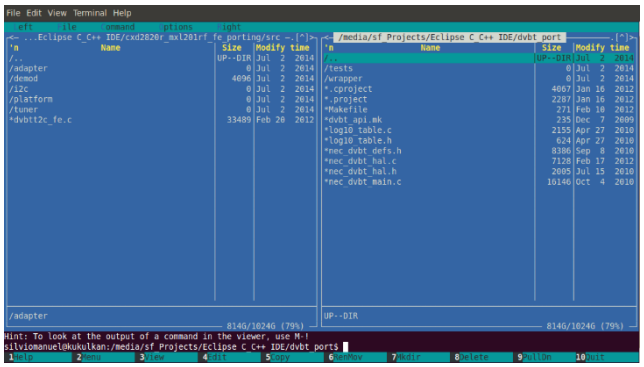
Category: Device Driver Development

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C, C++, Shell script, Linux I2C Core, Embedded Linux, SVN

Description:

Integrated frontend drivers (tuner and demodulator) into DVB-T and DVB-T2 set-top boxes, utilizing the Renesas platform with Embedded Linux. Two frontends were employed:
1) MaxLinear tuner and Sony demodulator; 2) DiBcom tuner and demodulator. Each frontend comprises two channels, housing two tuners and two demodulators. The demodulators communicate with the set-top box CPU via the I2C bus, where the set-top box CPU acts as the master and the demodulators as slaves. Each tuner is paired with a demodulator through the I2C bus, with each demodulator serving as a gateway for its respective tuner. The software, written in C and C++, utilized the Linux I2C Core, and a kernel module wrapper facilitated the calling of open demodulator functions and interaction with user space.



31. Software Engineering for Microcontrollers

Period: August 2009 – July 2010

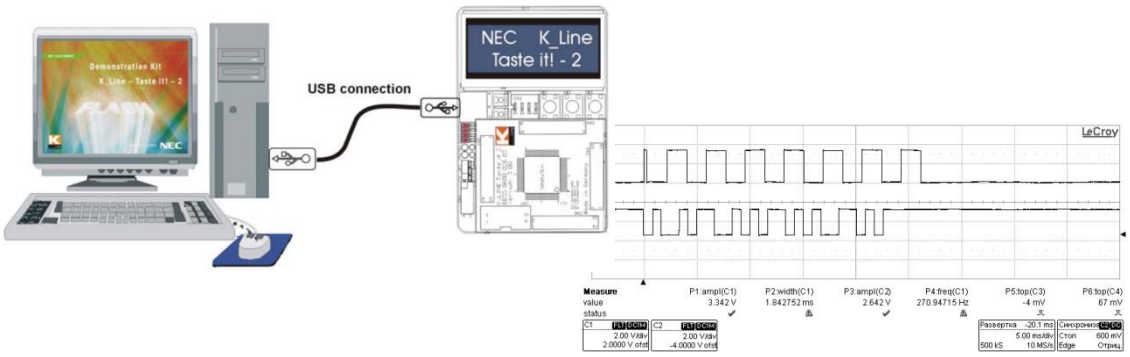
Category: Microcontroller Programming, Embedded Software Development, Low-Level Debugging

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C, I2C, IAR Embedded Workbench EW78K, Green Hills Multi, SVN

Description:

Designed and tested software for the front panel of a digital set-top box within the IAR Embedded Workbench EW78K IDE using the C language. The model relies on Renesas Electronics components, with a microcontroller on the front panel communicating with an LED indicator driver and the set-top box CPU through the I2C bus. The application effectively controls and synchronizes the current time, processes key presses, decodes remote control signals using the Philips RC-5 protocol, and supports standby functionality. Developed a communication protocol between the set-top box CPU and the front panel microcontroller. The software for the set-top box CPU was created in the Green Hills Multi IDE, and low-level debugging utilized an oscilloscope. The developed software is utilized in two set-top boxes (DVB-T and DVB-T2) based on different Renesas Electronics chipsets.



32. Software for Researching of Solar Panels

Period: February 2009 – May 2009

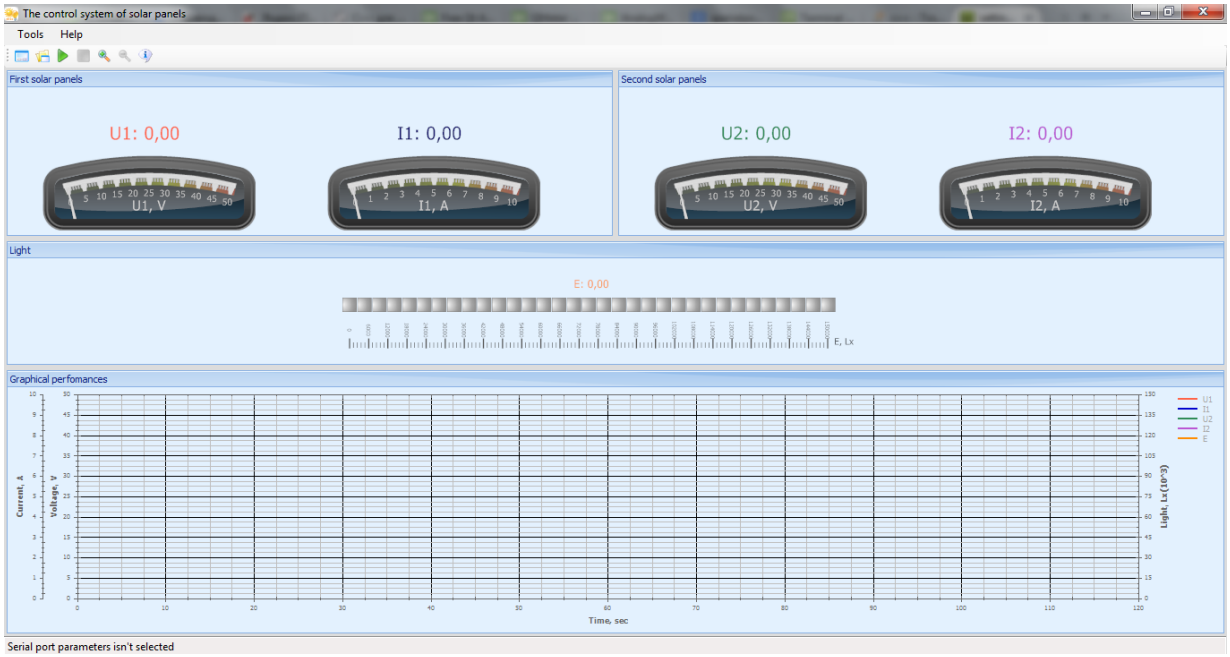
Category: Research and Development Project

Company: Bauman Moscow State Technical University

Technology: C#, Windows Forms, InteropServices (Excel), Visual Studio, InstallShield

Description:

Developed and tested an application for researching the level of insolation and the efficiency of solar panels. The application, written in C#, monitors and controls the output current and voltage of solar panels through sensors connected via a serial port. The collected data is stored in an Excel file, facilitating the calculation of hourly capacity and the creation of various graphs. The project was developed within the Visual Studio IDE, with a focus on implementing the necessary calculations for accurately estimating the real efficiency of solar panels.



33. System of Confidentiality Protection and Data Integrity

Period: January 2008 – November 2008

Category: Application Programming, Architecture Design, Database Development, Installer Development, Testing

Company: Perimetrix, Moscow, Russia

Technology: C++, C#, STL, WinAPI, MFC, UML, SQLite, Visual Studio, WinDbg, SVN, InstallShield, Active Directory, Scrum

Description:

I actively contributed to the development team of the Perimetrix SafeSpace Data Loss Prevention System, specifically focusing on the Perimetrix SafeEdge subsystem. This subsystem serves as a real-time monitoring system for all documents leaving the corporate network perimeter, automatically filtering and classifying outgoing documents to ensure the protection of data in motion. In this role, I developed a client driver, a test utility, static and dynamic class diagrams, a GUI, an installer, unit tests, and database structure. My responsibilities also included testing various modules of the product. The implementation was carried out using C++ and C# within the Visual Studio IDE, and our team adhered to the Scrum software development methodology.

34. Test-System for a Computing Complex

Period: March 2007 – January 2008

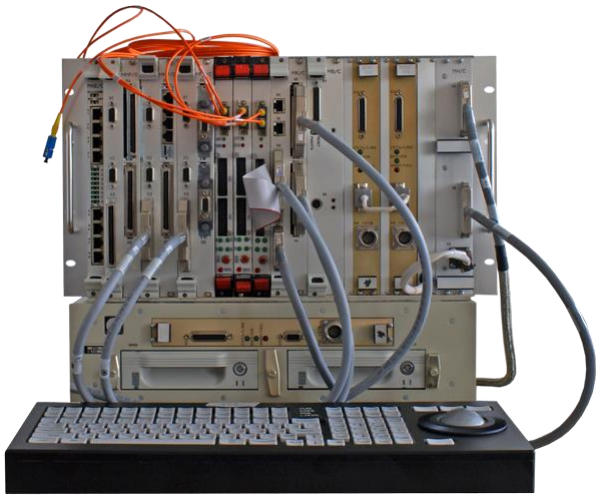
Category: Test-System Development

Company: MCST, Moscow, Russia

Technology: C, Shell script, Linux, CVS

Description:

Worked within a team responsible for software development and testing of a computing complex. Developed and modified tests for main devices this system using C language and Shell script. Installed and configured Linux operating system. I also developed a system for an automation of assemblage and installation Linux kernels using Shell script.



35. Publications

1. Hardware and software development of unified module of management and indication panel for digital set-top-box, 2010.
2. The practical aspects of hardware and software development of unified front panel module for digital set-top-boxes, 2012.
3. Smart TV applications development experience, 2012.
4. Operational selection of telemetry data in TV images, 2013.
5. Recognition of character information in TV images using binary templates, 2014.
6. A recognition system of character information in TV images, 2014.
7. Correlation algorithm of character information recognition in TV images, 2014.

36. Accomplishments

1st prize in Temryuk City Junior Physics Olympiad, Krasnodar Region, Russia, 2000

2st prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2000

3st prize in Slavyansk-na-Kubani Area Junior Physics Olympiad, Krasnodar Region, Russia, 2000

1st prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2002

3st prize in Programming & Research Contest of Young Specialists, Moscow Scientific Research Television Institute, Moscow, Russia, 2014