Oray Sunlogin and OpenVINO™ Join forces to open a New Era of Intelligent Remote Control

Background

In the dynamic digital environment of today, Remote Control technology empowers organizations to oversee and manage devices dispersed across various geographical locations. This technology optimizes resource distribution, enhances operational efficiency, and mitigates operating expenses to a certain extent. Especially in recent years, the demand for remote work and remote technical support has increased significantly, and the importance of Remote Control technology has become increasingly prominent.

As the application landscape of Remote Control technology broadens, it encounters several challenges, such as security issues, stability, real-time data transmission, as well as cross-platform compatibility. In terms of security, ensuring data integrity and confidentiality during remote transmission is a significant challenge. As for the efficiency of data transmission, achieving low-latency and high-reliability data transmission is key. Additionally, with the proliferation of various endpoint devices, ensuring software stability across different operating systems and hardware platforms poses a challenge to the adaptability and flexibility of remote control technologies.

The partnership between Oray(Sunlogin Remote Control) and Intel® is unfolding against this backdrop. By harnessing Intel's open-source AI toolkit, OpenVINO™, Sunlogin facilitates real-time image recognition and in-depth analysis in Remote Control scenarios. This synergy significantly enhances the precision and agility of remote operations, enabling intelligent process tracing. Consequently, it enhances productivity, frees resources and delivers users a more intelligent and efficient service experience.

OpenVINO™ is an open-source toolkit developed by Intel for optimizing deep learning models, accelerating inference, and facilitating rapid deployment. Leveraging OpenVINO™ toolkit, Oray Sunlogin has integrated it into its Remote Control system:

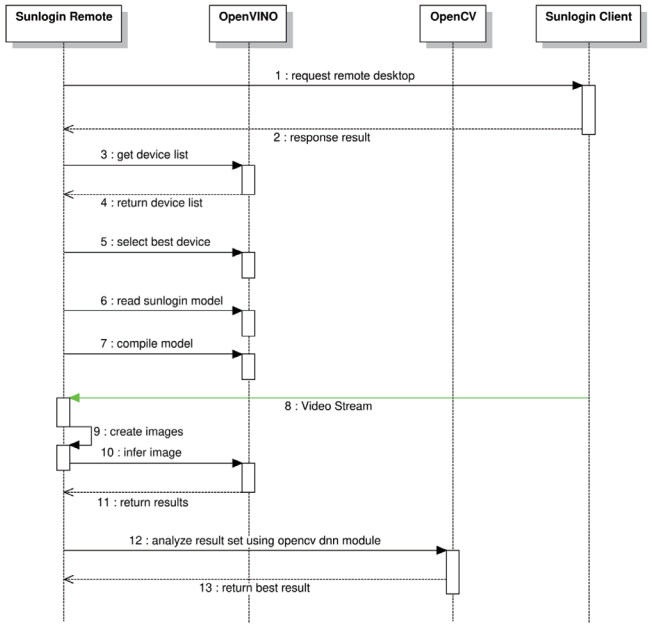
- Real-time optimization and acceleration of remote image recognition through deep learning. OpenVINO™ offers a suite of model optimization tools that effectively reduce model size and enhance inference speed for deep learning models such as those utilized in remote image recognition and analysis, enabling more efficient remote image processing and real-time analysis. This enables Sunlogin's solution to automatically detect crucial remote operations and generate a comprehensive backup report for each completed remote task, thereby optimizing remote management processes.
- OpenVINO™ facilitates rapid model deployment across diverse platforms and seamless transition of inference workloads. Leveraging its "write once, deploy anywhere" capability, multiple deep learning models can be conveniently deployed on various hardware devices, enabling rapid inference load switching across different platforms. For instance, Sunlogin's target detection model in remote image recognition can be executed on the Neural Processing Unit (NPU) within the Intel® Core™ Ultra platform. This not only alleviates the burden on the primary CPU but also reduces overall system power consumption. Additionally, Optical Character Recognition (OCR) models can be operated on the integrated graphics CPU of the Intel® Core™ Ultra processor, delivering high-speed, real-time character recognition.

- Software development acceleration with reduced effort. OpenVINO™ now extends its support to both Intel® architecture and ARM architecture CPUs for executing deep learning model inference. In addition, it supports Intel's integrated graphics, discrete graphics, and deployment on specialized hardware such as NPUs and FPGAs. Thanks to the support for cross-platform, multi-architecture hardware devices, Sunlogin harnesses OpenVINO™ to streamline the development of Remote Control software across different platforms, substantially cutting down on development time and effort.

Sunlogin has joined forces with the OpenVINO™ toolkit and Intel's new generation of Core™ Ultra processors. This software and hardware collaborative approach will further enhance remote connections and bring more convenient, efficient and intelligent Remote Control solutions to more enterprise users.

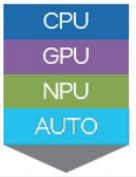
Optimization and Inference Acceleration for Remote Image Recognition and Analysis based on OpenVINO™

The image recognition feature serves as a pivotal technology for enhancing the precision and efficacy of remote operations within Sunlogin's Remote Control system. The utilization of OpenVINO™ to accelerate inference in this Remote Control framework is shown in the following diagram, carried out through a series of steps



By leveraging Intel OpenVINO™ toolkit, Sunlogin was able to significantly optimize its object detection and optical character recognition (OCR) models in remote image recognition.

When a Remote Control request is initiated by the Sunlogin client (controll end), it first establishes a connection with the Sunlogin remote end (controlled device) after successful authentication. Once the connection is established, the Sunlogin client leverages the device query function provided by OpenVINO™ to select the most suitable device from the available options. Then the OpenVINO™ module is initialized, and Sunlogin's pre-trained deep learning models are loaded for model compilation. OpenVINO™ is engineered to accelerate the inference and deployment of deep learning models. During the model loading and compilation process, OpenVINO™ model optimization tools are utilized to perform model conversion. This process significantly reduces the model size while enhancing the inference speed for subsequent operations, thereby optimizing the overall performance of remote image recognition and analysis tasks.




```
compiled_model = core.compile_model(model=model, device_name="AUTO")
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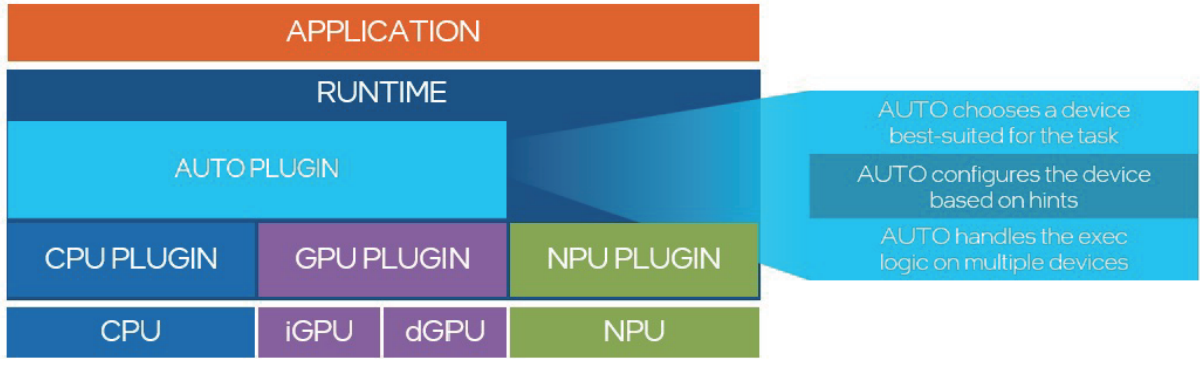


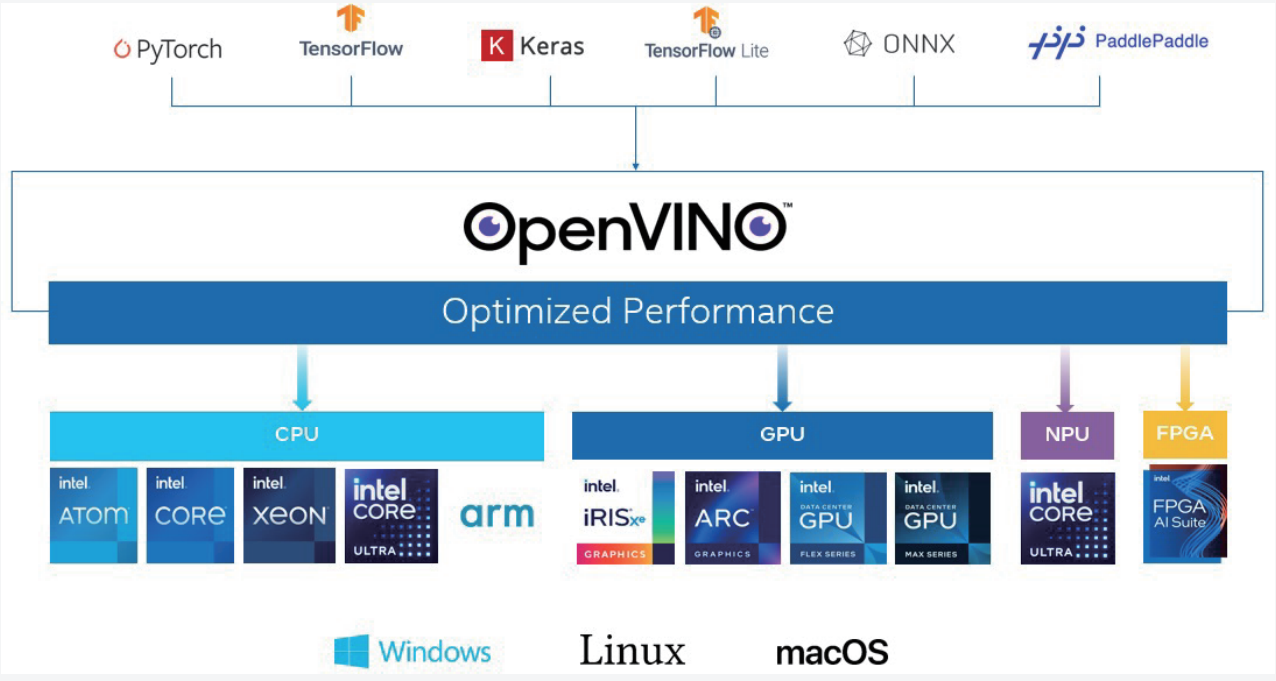
When video streams from the controlled end are received, they are decoded and converted into JPG images. These images are then preprocessed to suit the inference tasks. The preprocessed images are then sent to the OpenVINO™ module for inference acceleration. In this phase, the inference acceleration of the object detection model allows for rapid identification of key objects in the remote video stream, while the OCR model can swiftly and accurately extract text information from the images. The OpenVINO™ capabilities not only enhance the responsiveness of these remote operations but also optimize the data processing workflow, thereby improving overall system performance and user experience with efficient execution and high performance.

Another significant feature of OpenVINO™ is its ability to support cross-platform model deployment without extensive code rewrites, facilitating seamless migration of deep learning models. This is particularly advantageous for deployment on NPUs (Neural Processing Units) in the new generation of Core™ Ultra processors. Sunlogin can easily deploy these optimized deep learning models across different hardware platforms. Specifically, the target detection model can be deployed to run on the NPU, leveraging its high-performance, low-power characteristics to achieve more efficient real-time inference while significantly reducing the overall energy consumption of the system. Simultaneously, the OCR model is deployed on the CPU, utilizing its high-performance capabilities to handle large volumes of image data. The integrated graphics (iGPU) within the Core™ Ultra processor, with its powerful graphics rendering capabilities, provides higher-definition image quality for Remote Control operations, enabling more precise remote manipulations. This optimized deployment of hardware not only enhances the performance of the Remote Control system but also ensures high efficiency while minimizing energy consumption and costs. Furthermore, it allows the system to better adapt to diverse use cases and requirements, providing a more robust and versatile Remote Control solution.

After the completion of inference, OpenVINO™ returns the results from target detection and OCR character recognition. The Sunlogin client then utilizes the OpenCV DNN module to post-process these results, extracting the optimal outcomes. This process demonstrates how robust AI tools, such as the OpenVINO™ toolkit, can be seamlessly integrated into existing Remote Control software, enhancing the overall user experience for remote operations by using optimized models for faster and more efficient inferences.

Heterogeneous Architecture Support Saves Time and Effort in Software Development

OpenVINO™ supports a wide range of CPU architectures, including Intel x86 and ARM, providing developers with substantial flexibility and convenience. The support for heterogeneous architectures means that developers can write code once and deploy it across multiple hardware platforms, from PCs to servers. This capability not only simplifies the development process but also enables Sunlogin to easily adapt to a variety of hardware environments, ensuring broad compatibility and efficiency of the software. Furthermore, this support allows Sunlogin to better utilize the specific hardware acceleration capabilities of different devices, significantly enhancing the performance and efficiency of its products.



By incorporating AI technology, Sunlogin remote control solutions can be applied across various industries, such as information technology, smart manufacturing, and medical fields. The application of AI makes Remote Control more accurate, capable of analyzing and processing large amounts of data in real time, providing more detailed and accurate control feedback, and greatly improving the convenience and safety of operation. For example, in the smart manufacturing industry, through Remote Control technology, operators can monitor and adjust the operating status of the production line in real time, discover and solve problems in a timely manner, and greatly improve production efficiency and product quality.

The software and hardware cooperation between Oray Sunlogin and Intel, including OpenVINO™ toolkit and Core™ Ultra processors, is not limited to the current achievements. The two parties will continue to deepen the cooperation and explore more potential of AI applications, promoting the continuous advancement and innovation of Remote Control technology.

About Oray

Established in 2006, Shanghai Best Oray Information Technology Co.,Ltd (Oray) is an innovative SaaS provider specializing in remote connectivity solutions in China. Developing 3 key product portfolios including Remote Control of "Sunflower", Smart Networking of "Dandelion", and Internal Network Penetration of "Peanut Shell" with its independent innovation capabilities, Oray has offered an one-stop solution from smart connectivity products to tailored vertical applications.

About Intel

Intel® (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel's innovations, go to newsroom.intel.cn and intel.cn.

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