NVIDIA

REBOTNIX
CREATOR OF INTELLIGENT HARDWARE

Challenge

> Create a compact, inexpensive mobile-based platform for collection of city events

> Integrate full remote control capabilities

> Control power consumption for in-vehicle or fixed installation

> Provide over-the-Air firmware and AI model updates

> Reduce data-transmission costs for existing infrastructures like wifi local networks

NVIDIA Solution

> Guaranteed data privacy

> Fast on-premises inference solution on an embedded platform

> In-house training of complex AI models by the customer

> NVIDIA desktop GPU cards to train and optimize AI models

> NVIDIA® TensorRT™ deep learning interface on embedded NVIDIA Jetson™ devices

> Retrained own models with NVIDIA Transfer Learning toolkit

> NVIDIA VisionWorks™ SDK for image processing

Results

> The ability to automatically detect greater classes and events in a city

> 1 - 4 Terabytes of storage, allowing analysis of over 10 million stored datasets without transferring themdaily into the cloud platform

> The ability to run different jobs, such as collecting training data to create new AI models, with a Remote Model Manager

LOW-POWER DATA ANALYTICS FOR SMART CITY SOLUTIONS

"The smart-city overall solution from REBOTNIX makes it possible to reliably record a comparison of visual events combined with intelligent sensor data protection all processed directly in the edge system. Companies can optimize their own processes or to open up a new business field with the highest efficiency and lowest power."

— **Gary Hilgemann,** CEO, REBOTNIX

Gustav Smart City Solutions

REBOTNIX offers a complete solution of hardware, software like AI Model building, in-house labeling, training machines, and sensors. The total solution provides a complete platform for the customers that lets them build their data models economically.

NVIDIA Platform

We see NVIDIA not as a product vendor, but as a platform vendor. The combined development of hardware and software enables companies like REBOTNIX to develop products quickly, and we can be confident that we will get the best support and lifetime of several years. This gives us the investment protection we need.

REBOTNIX Results

The result of this solution is a scalable product that can be applied to all industry sectors of smart city business sectors. The customer can easily build and scale their business model with this system.

We can help companies with vehicles run their own cost-effective data fleet — from one vehicle to an infinite number of vehicles. Each vehicle can have different daily jobs and be an independent intelligence. The reduction in costs stem from each vehicle being a data center on wheels. Training data is collected in one day, in accordance with the highest data protection

Products Used

> NVIDIA Jetson Xavier™ NX (next-gen)
> NVIDIA Jetson TX2
> NVIDIA TITAN GPU Desktop
> NVIDIA V100 in the Cloud

Processing Engines Used

REBOTNIX AI Visiontools, including:

> USB3 capture over GSTREAMER pipeline
> Video compression over NVIDIA video acceleration SDK
> Image compression over custom JPG and JPEG2000 CUDA engine
> Encryption over custom CUDA SSL engine
> Native NodeJS for VPN-based web application (front-end control)
> REBOTNIX C++ inference engine for TensorRT.bin models
> Custom Python/Cython wrapper for REBOTNIX C++ engine for faster development
> Several custom CUDA Kernels for cropping/scaling
> Custom VPN server backbone for secure data transmission
> REBOTNIX time manager for remote rebooting, self-repair, recovery, and updates over the air

Software Used

> NVIDIA TensorRT 6
> NVIDIA JetPack™ SDK 4.3
> NVIDIA CUDA/CUDNN
> NVIDIA Visionworks SDK
> NVIDIA Transfer Learning Toolkit
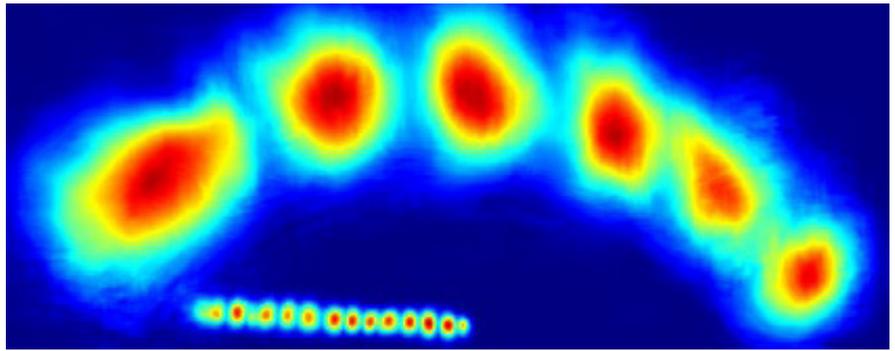
standards, then the conditions over a road information and billboard recognition are recorded over the next few days. Real-time congestion measurement data can be transmitted, and an ample list of other measurement criterias can be met.

For the automotive industry, REBOTNIX can test hundreds of miles of models or generate training data like Tesla does with their customers with installed cameras. All image pre-processing is done directly on the edge device, without the need for the cloud. Even the retraining of new models is possible on the device over night or in a cluster (vehicle to vehicle).

The business impact is a new business model—the intelligent data fleet. For example, a company that previously removed only household waste will become a data supplier tomorrow.

About REBOTNIX www.rebotnix.com

REBOTNIX focuses in the area of end products in connection with software and hardware for the industrial sector from the field of manufacturing and global visual computing. The main focus is the visual acquisition of data, but also the merging of this data with all other possible sources like sensors and machines. We see the use of artificial intelligence as a tool that has to be in harmony with many other components. REBTONIX offers software and hardware from one source and has a stable partner network with all major industry partners worldwide to provide the customer with a complete system.

LEARN MORE

Contact us: **jetson@nvidia.com**

Learn more: **www.nvidia.com/robotics**

Learn more about REBOTNIX: **www.rebotnix.com/gustavsmart-city-solutions**