

Lenovo and NVIDIA Metropolis for Farming

24/7 SaaS and AI-enabled video analytics software and hardware monitoring systems for early disease detection in livestock.

The growing world population is driving an increased demand for meat that is calculated to be more than 65% over the next 40 years. Meat production for more than nine billion people worldwide implies that the size of farms where livestock are raised must dramatically upscale.

The rising number of swine farms induced by the surging meat demand is coming along with equally increased attention for animal welfare. However, declining numbers of farmers constitutes one of the major challenges to achieve the required level of individual animal attention.

When big farming started in Mesopotamia, people used their eyes to monitor the animals and detect signs of sicknesses. Today, we use the same solution. A farmworker has one second per animal per day, and they mostly rely on subjective and incidental methods such as periodic physical inspections. Other than being time-consuming and disruptive of the daily routine, periodic inspections may return an unreliable picture and be one of the main causes of a high mortality rate during outbreaks.

Lenovo and NVIDIA Metropolis have partnered with SERKET to offer a solution that alerts farmers to abnormal behavior spotted within their pig pens. Cameras paired with deep learning algorithms monitor pigs' physical activity, feeding patterns, and overall aggressiveness to inform farmers about their herd's wellbeing.

The Lenovo ThinkSystem SE350 edge server is designed and built to stretch the limitations of server locations, providing a variety of connectivity and security options, and is easily managed with Lenovo XClarity Controller. The NVIDIA T4 Tensor Core GPUs, part of the NVIDIA data center product line, perform video decoding and real-time animal recognition, providing the throughput and fast response times that the scope requires. SERKET's © solution offering is designed for small to large scale deployment, monitoring, and management through NVIDIA EGX stack.



Precision Livestock Farming technologies, such as cutting-edge intersections between IoT and AI, are creating the conditions that enable continuous and automatic close individual animal monitoring and substantial associated cost-savings on farms that continue to upscale the size of their operations.

Lenovo, NVIDIA and SERKET's © solution allows animals to be monitored as a group from minute to minute, 24/7. This systematic monitoring allows certain patterns to be recognized. If those patterns differ from the expected patterns, an early-warning system can be developed based on these signals. The solution:

- Checks animals' performance
- Notifies farmworkers about problems as soon as they appear
- Creates digital reports and reusable data records
- Allows for real-time remote access from anywhere in the world

This solution can seamlessly be deployed at 200+ unit pig pens and helps farmers have more control over their livestock, fine-tune the feeding system, and reduce excessive preventive antibiotic treatments, thus reducing the mortality rate.

${}^{\circ}\!\!\!\!\!\!\!\!\!\!\!\circ}_{\circ}$ Design Components*

Servers	Storage		Networking
ThinkSystem SE350	M.2 1TB P4511 NVMe SED SSD		ThinkSystem 10Gb 4-port Base-T LOM
Accelerator		Software	
NVIDIA T4 GPU 16GB PCIe Passive GPU		 SERKET Tech Platform NVIDIA: CUDA, DeepStream SDK, TensorRT Docker containers Kubeflow 	
*The design components shown here are the minimum requirements for illustrative purposes. Customers have the flexibility to scale up the servers and accelerators based on their unique needs and size of the deployment. Sales representatives can discuss and address customer's unique circumstances.			



The role of the farmer can never be replaced by technology. However, AI solutions make it possible for farmers to more effectively distribute their precious time. With the help of Lenovo, NVIDIA and SERKET's © solution, farmers may direct their attention to the individual animals that need their intervention.

During their daily inspections, farmworkers can focus on the locations that need attention, or where ever there is a potential threat. This will change the lives of farmers and their livestock.

As soon as an animal experiences any problems, farmers can take action. Moreover, they can devote more time to problem prevention so animals can be reared or produced in a healthy and animal-friendly manner.

The solution is easy to deploy, maintain, scale, and use. It can be also integrated with the other existing solutions, such as the feeding and weighing system, to get even more valuable insights allowing for faster and targeted measures.



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