

Co-invent with Seeed



seed studio

Transform Your Business Delivering Real-World AI Together

Integrate your unique AI technique into our current hardware: resell or co-brand licensed devices at our channels.

Build your next-gen AI product powered by the NVIDIA Jetson module and bring your product concept to the market with Seeed's Agile Manufacturing 0-∞

Work with Seeed Amazing Ecosystem Partners

Seeed is NVIDIA's official reseller and ecosystem hardware partner. By consolidating our best-in-class hardware and cutting-edge technology from our software partners and the community, we aim at helping both developers and enterprises deploy ML in the real world across industries. Contact us at <mailto:edgeai@seeed.cc>

We are looking forward to working with AI experts, community developers, software enterprises, and system integrators:

- Integrating your unique technology, resell or co-brand licensed solution with us.
- Building next-gen AI products powered by the NVIDIA Jetson module, one-stop bringing your product to the market with Seeed's manufacturing, fulfillment, and distribution.
- Working with Seeed Amazing Ecosystem Partners together, unlocking more AI possibilities.

Meet our partners:



seed studio

deci.
Break the AI Barrier

Deci

Empowers deep learning developers to accelerate inference on edge or cloud, reach production faster, and maximize hardware potential.

Find our partner » deci.ai

Application:

Deep learning, model optimization, inference

Supported Hardware

All Seeed's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit

Getting Started with Deci on NVIDIA® Jetson Devices

Our collaboration with Seeed will empower countless users with optimized deep learning models ready for instant deployment,” said Yonatan Geifman, CEO and co-founder of Deci. “No matter the hardware, nor if deploying on the edge or cloud, developers should have full accessibility to the latest developments in deep learning; this partnership brings us one step closer to that goal.”

Deci's platform includes several modules, one being a cloud-based runtime optimization engine which enables users to automate the manual model compilation and quantization processes (OpenVino and TensorRT) on a wide variety of hardware types with just a few clicks. The result is an optimized model for the user's inference hardware. Users can also use the platform to optimize models for edge devices, a process that typically can only be carried out after users have purchased the devices themselves.



seed studio

allxon

Allxon

Allxon is the market's first to provide powerful remote edge AI device management and disaster recovery solutions with Out-Of-Band (OOB) technology. As a partner of NVIDIA Jetson Ecosystem, Allxon delivers highly compatible solutions onto any branded Jetson platform.

Find our partner »» allxon.com

Application:

OTA
Device Management

Device Support:

All Seeed's Nvidia compatible carrier boards and devices, Official NVIDIA dev kit

Efficient remote AI system based on NVIDIA Jetson platform

Edge AI Transforming Agricultural Landscapes

Farmers installed AI-driven cameras all around the farmstead to record, detect, and monitor livestock health and their lifecycle in real-time. These cameras are connected to and powered by edge devices, enabling the farmer to make informed data-driven decisions, be alerted to, and stay ahead of crisis situations, ultimately leading to the improvement of cattle management and economic growth.

Allxon Out-Of-Band (OOB) technology provides rapid disaster preventive measures. Seeed's Jetson Powered edge devices that enable data-driven smart farming are highly safeguarded in an electrical enclosure, forming the nucleus where "ALL" data is perpetually collected and processed 24/7, 365 days a year.

It is imperative that the systems work seamlessly and uninterruptedly for a high-functioning farmstead.



seed studio

YOLOv5

YoloV5

YOLO is an algorithm that detects and recognizes various objects in an image in real-time. It only needs few samples for training, while providing faster training times and high accuracy.

YOLOv5 is the latest version and it is now based on the PyTorch framework. Find our partner >>> ultralytics.com

Application:

Object Detection

Device Support:

All Seed's Nvidia compatible carrier boards and devices, Official NVIDIA dev kit

Facing The Gap between AI's PoC to Production: Fewer Datasets, Faster Training

Machine learning is quite widely adopted in software industry applications like social media, YouTube, and E-commerce. It is not tough to acquire a billion level data through the internet experience. However, looking into real-world applications, there are many other industries that only have access to small data, for example, medical imaging, manufacturing, and environmental research .

Use transfer learning along with Ultralytics YOLOv5 and Roboflow to train a dataset with very few samples. We first initialize a model with weights from a pre-trained model and then start training the machine learning model that we need using a dataset as small as 200 images.

FEWER DATASETS
FASTER TRAINING

Few-Shot Object
Detection using transfer
learning with YOLOv5
and Roboflow

YOLOv5 roboflow

seed studio

10K images or
200 images?

yellowFlower: 0.95
yellowFlower: 0.93
yellowFlower: 0.94
leaf: 0.89
leaf: 0.75
leaf: 0.86
leaf: 0.89
leaf: 0.89
leaf: 0.86
leaf: 0.93
leaf: 0.89
leaf: 0.86
leaf: 0.92
leaf: 0.92
leaf: 0.89
leaf: 0.91
leaf: 0.89

seed studio

roboflow

roboflow

Roboflow empowers developers to build their own computer vision applications, no matter their skillset or experience. You can host a trained model with a single click or build your own custom models. Roboflow Annotate detects objects in your images and places bounding boxes around them. If an annotation is misaligned, it's easy to adjust its size and position. Find our partner »» roboflow.com

Industry:

Retail; Traffic Management; Manufacturing

Application:

Computer Vision

Hardware used:

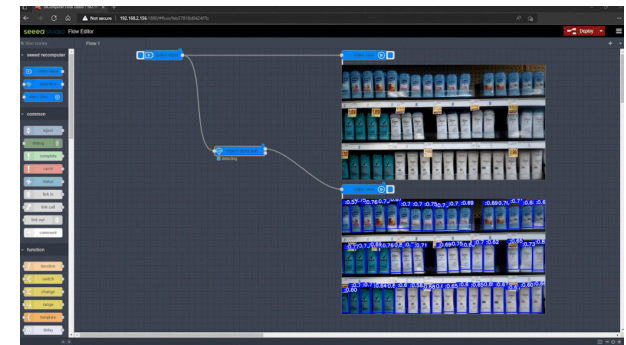
All Seeed's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit

Train a working computer vision model with fewer images

We work with Roboflow to annotate images, directly import images or videos. Roboflow help distribute the dataset into "training, validation, and testing", as well as add further processing to these images after labeling them. Furthermore, it can easily export the labeled dataset into YOLOV5 PyTorch format which is what we exactly need for fewer dataset needed!



You can download a number of publically available datasets such as the **COCO dataset**, **Pascal VOC dataset** and much more. Roboflow Universe is a recommended platform which provides a wide-range of datasets and it has **90,000+ datasets with 66+ million images** available for building computer vision models.



seeed studio



alwaysAI

alwaysAI is a leading computer vision development platform for creating and deploying machine learning applications on edge devices like the NVIDIA® Jetson™. alwaysAI removes barriers, making creating computer vision apps easier, faster and more effective across all industries
Find our partner »» alwaysai.co

Industry:

Retail, Construction, Transportation

Application:

Computer Vision

Device Support:

All Seeed's Nvidia compatible carrier boards and devices,
Official NVIDIA dev kit

Seed and alwaysAI Partner to Accelerate Deploying Computer Vision at The Edge

Seed and alwaysAI began their cooperation with NVIDIA® Jetson™ powered devices. The partnership makes computer vision come alive on the edge - where work and life happen:

Retail

Using data from existing cameras (such as IP or surveillance cameras) retailers are leveraging alwaysAI to count customers in their store in real-time, see time-based and seasonal trends from customer occupancy, customer movement, and dwell time.

Construction

alwaysAI is deploying applications in construction to help assess real-time progress of construction projects as well as track safety through personal protective equipment monitoring such as hardhats, safety glasses, and reflective vests.

Transportation

alwaysAI solutions within Transportation are helping the world transition to cleaner vehicles and helping fleet managers understand more about their passengers. Through passenger counting, queue counting, and in-cabin analytics, alwaysAI customers have used computer vision to increase revenue and decrease costs with computer vision AI.

The advertisement features a city street scene with several people and bicycles. Green bounding boxes are overlaid on the image, identifying individuals and vehicles. In the top right corner, the logos for 'seeed studio' and 'alwaysAI' are displayed. Below the logos, four right-pointing chevrons (»»») are shown. The main text of the advertisement reads: 'Accelerate Deploying Computer Vision onto Edge Devices'.

seeed studio

EDGE IMPULSE

Edge Impulse

Edge Impulse is the leading development platform for machine learning on edge devices, free for developers and trusted by enterprises. Edge Impulse made ML development easier. Combining compact power-efficient AI systems, the process to deploy the edge AI solving specific workplace safety needs becomes faster and more flexible.

Find our partner »» edgeimpulse.com

Application:

Hard hat detection

Industry:

Industry 4.0

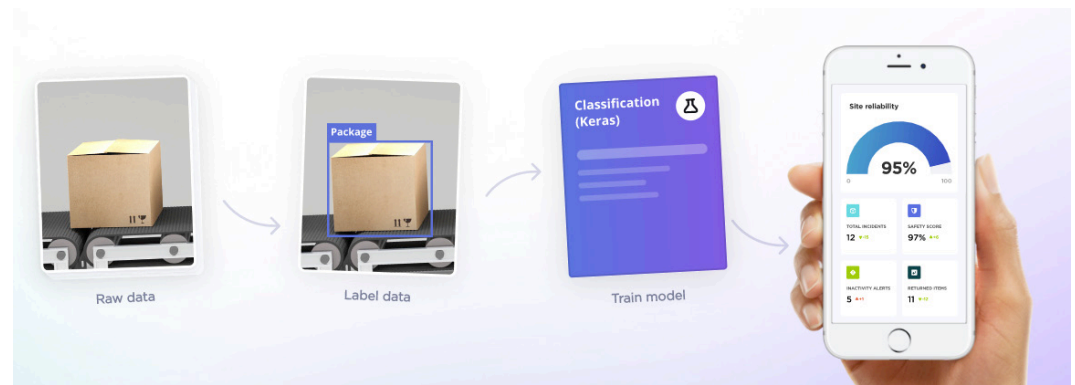
Supported Hardware

NVIDIA Jetson

Build ML pipeline for deploying audio, image classification, and object detection applications at the edge

Users of Edge Impulse can leverage the power of the Jetson Nano for their embedded machine learning applications that demand higher performance, alongside the industry's tleading embedded ML platform that offers:

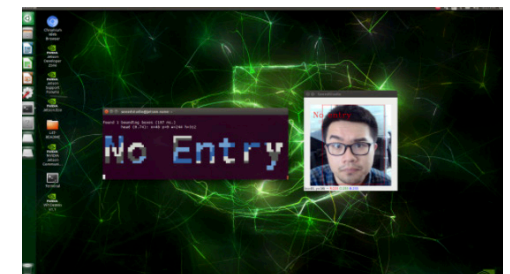
- The easiest-to-use embedded machine learning pipeline for deploying audio, image classification, and object detection applications at the edge with zero dependencies on the cloud
- Streamlined acquisition of critical environmental sensor data, previously discarded or only sent to the cloud, for empowering sensor fusion at the edge.



Deploy hard hat detection for enforcing workplace safety

Edge Impulse is used to upload dataset, acquire custom data, visualize the data, train the machine learning model and validate the inference results. PPE compliance also includes gloves, masks, goggles, etc.

Once you finish custom model training, you can also wrap everything into an image, directly deploy the full PPE detection pipeline right at the workplace.



seeed studio

cogniteam

Cogniteam

Cogniteam is a technology start-up, it brings standout software solutions for autonomous robots.

Nimbus by Cogniteam is cloud-based ecosystem for robot fleet configuration, testing, deployment, and operations management. Nimbus makes your ROS journey intuitive using drag and drop tools and a rich set of ready-made AI algorithms that are ROS1/2 compatible. Find our partner » cogniteam.com

Application:

Robotics development

Device Support:

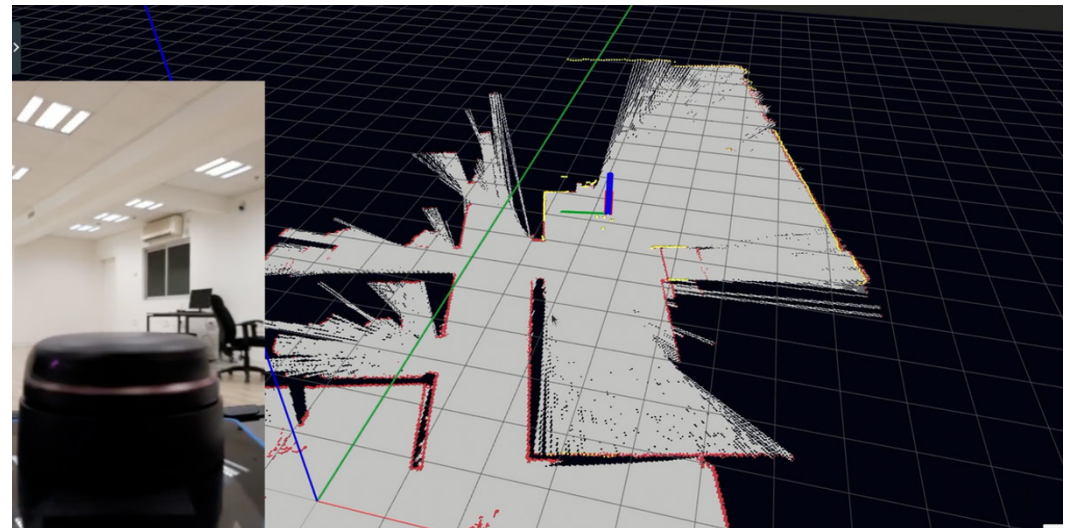
All Seeed's Nvidia compatible carrier boards and devices, Official NVIDIA dev kit

Seed partners with Cogniteam to bring the drag and drop robotics development and deployable solutions for NVIDIA Jetson Platform

Robotics is a field of integrations, not merely development. You need to choose the correct computing power; you need to choose the right sensors, not develop them. It comes down to software integrations. With Nimbus, Cogniteam's cloud-based solution for robot developers and operations, all the above becomes simpler.

We are glad to partner with Cogniteam, aiming at delivering the easiest ever robot development process, from prototyping to production, including configuration, testing, deployment, and operations management.

Nimbus supports Seeed made Jetson powered platform carrier boards and mini PCs, attach sensors such as RPLidar and cameras to build your robotic application from scratch. You can also seamlessly connect your existing ROS projects to Nimbus. Based on the open-source Robot Operating System (ROS), Nimbus is truly a 'plug and play' solution.



seeed studio

tryo.labs

Troylabs

Expert team of advisors, strategists, and engineers focused on making an impact with AI-powered solutions. Their Machine Learning consulting shop offered active R&D division, focused on Deep Learning, Computer Vision, and NLP.

Find our partner »» tryolabs.com

Software:

YOLOV5, DeepStream SDK,
NVIDIA Metropolis

Industry:

Industry 4.0

Application:

Helmet Detection

Device Support:

reComputer J2011/J2022 Powered by
NVIDIA Jetson Xavier NX

Detecting safety helmets in realtime

The goal was to leverage Seeed's hardware, particularly using their reComputer edge devices built with Jetson Xavier NX 8GB module, and develop a computer vision analytics solution that tackles a challenging task in today's industry 4.0 field. More specifically, we picked the challenge of detecting safety helmets in real-time.

YOLOv5 vastly outperformed Faster R-CNN, obtaining better metrics in a much shorter time. In terms of inference time, both models performed similarly, taking around 0.08 seconds for each image on the edge device (12.5 FPS). By leveraging DeepStream SDK, the inference time was boosted to a staggering 0.012 seconds for each image (82.8FPS) on the same NVIDIA Jetson Xavier NX.



* Source: [GDUT-Hardhat Wearing Detection \(GDUT-HWD\)](#)



* Source: [GDUT-Hardhat Wearing Detection \(GDUT-HWD\)](#)



Solution

Malamute

Malamute's mission is to enable efficient communication in the toughest environments. Founded in 2020, the Malamute team sought to combine the industrial communication world with the power of AI, creating the next generation of communication workflow. Malamute has partnered with multiple industry leaders to bring human-centric assisted reality to the front lines.

Industry:

Industry 4.0

Application:

AI-layered audio communication network

Edge Device Used:

NVIDIA Jetson AGX Orin Dev Kit,
NVIDIA Jetson AGX Xavier

Software:

RIVA SDK

NLP simplifies industrial communications and improves manufacturing productivity

Challenge:

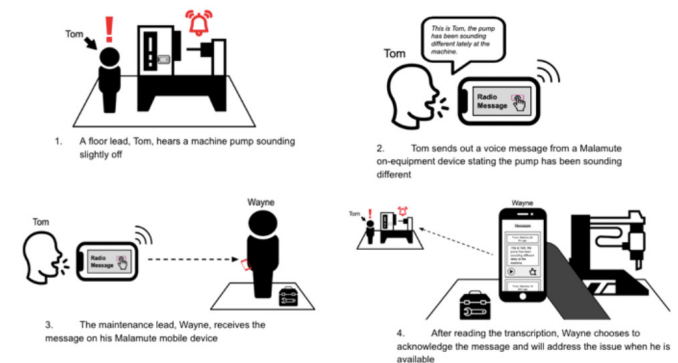
In the industrial manufacturing workplace, workers are constantly having to leave their stations to communicate information. Having to manually locate individuals throughout the facility or use a tedious data input solution prevents workers from completing their jobs. Is there any way we can optimize the workflow of asynchronous communications to benefit both the worker and the workplace?

Solution:

Malamute uses natural language processing (NLP) and spatial computing to help improve workplace productivity and process traceability. Powered by NVIDIA Jetson Orin and AGX Xavier and working with NVIDIA Riva, Malamute's AI-layered audio communication network empowers industrial workers with the right data at the right time. The NLP-powered communication system helps improve overall equipment efficiency by keeping workers focused on their jobs and at their stations. Employees can record voice messages regarding operational situations and processes which get sent to the intended audience. This allows for effortless and efficient communications compared to a Walkie-Talkie, phone call, or email.

Result:

Minimizes worker travel for communications,
Maximizes worker productivity,
Improve workplace efficiency.






Armitage

Established since 1972, Armitage is one of the leading IT services providers in HK and PRC. Over 150 IT professionals, they have 50 years experience and proven track records in delivering quality solutions to various sectors public /private sectors.

Find our partner »» armitage.com.hk

Industry:

Smart City

Application:

Patrol Robot

Hardware used:

- A206 Carrier Board
- reComputer J2011 for NVIDIA Jetson Xavier NX

Robot Security Guard Patrols Hong Kong Parking Lot

Autonomous mobile robots designed for patrolling could reduce, over time, completely eliminate the need for human workers to keep large Armitage's Patrol Robot solution brings 24/7 peace of mind to Hong Kong's underground parking lot with fully automatic robotic security guards without operator supervision.

- License Plate Recognition System (LPRS)
- Operate 24/7 without human intercession
- Facial recognition, people counting
- Fire and smoke alarm

Benefits:

Reliable 24/7 security monitoring, day or night, in any weather.

Capable of identifying various types of objects/situations.

Real-time video and transmission.

Significant savings in manpower and filling the loophole after staff's patrol each time.

Reduced driving, walking, idling, and unnecessary effort in finding a space.



EDGE AI FOR SMART CITY

ROBOT SECURITY GUARD PATROLS HONG KONG PARKING LOT

- License Plate Recognition System (LPRS)
- Operate 24/7 without human intervention
- Facial recognitiaon, people counting
- Advanced fire, smoke detection

Solution

Azimorph

Founded in 2021, Azimorph is a group of passionate engineers based in Singapore who aim to make robotics' delivery the new normal.

Industry:

Smart Logistics

Application:

Delivery Robot

Edge Device Used:

reComputer J2012, powered by NVIDIA Jetson Xavier 16GB

Meet Techie: on-demand autonomous delivery robot

Challenge:

Many businesses have started to rectify their last-mile delivery operations. Their current operational process is to hire third-party courier companies, and it is very inefficient as it requires an astonishing amount of effort and time. Furthermore, as e-commerce continues to thrive, it will cause an upsurge in parcel deliveries and other issues, especially in densely populated cities.

Solution:

Techie is a smart navigation delivery robot built by Azimorph, seeking to eliminate the need for door-to-door deliveries. The robot would navigate its way toward the consumer's house according to the time selected by the consumer beforehand. After which, Techie will return to the centralized bay to charge or load up more parcels. Techie comes with a safety feature that stops it when danger or unforeseen circumstances are detected, for example, a human in its path, construction zones, or roadblocks.

Result:

- Reduced manpower cost, no need for last mile delivery drivers
- Reduced cars on the road, decreasing traffic congestion
- Reduced vehicle pollution
- Faster than traditional couriers, would not be stuck in the traffic or subjected to any delivery drivers' schedule
- Do not require rest like delivery drivers, able to work 24/7



Solution



KEISUUGIKEN

KEISUUGIKEN is a research and development location where advanced technology specialists from various countries gather together. They are working to expand products and services such as robots, artificial intelligence, and VR in collaboration with overseas companies and researchers.

Industry:

Industry 4.0

Application:

Hard hat detection

Edge Device Used:

Jetson Sub Mini PC powered by Xavier NX

Meet PITAKURU, an Autonomoustowing robot capable of towing loads in the warehouse

Challenge:

Moving businesses online becomes new mainstream trends, making delivery services the new normal. In line with the growth of the online business, the demand for courier services that help deliver the ordered packages has risen significantly. Accordingly, the burden it has on the workers also increased.

Solution:

In face of this new challenge, **KEISUUGIKEN** and Seeed came together to provide an autonomous towing robot called "PITAKURU". "PITAKURU" has the ability to track humans while towing heavy objects and can be operated indoors and outdoors. It uses laser tracking, enabling to follow individuals without being affected by external light, and there is no need to install accessories such as tracking beacons. These features enable "PITAKURU" to be used anywhere with easy access, even if the users are unfamiliar with the use of towing technologies.

Result:

By introducing "PITAKURU", the amount of cargo that can be handled by one worker will increase up to two to three times more, and the time needed to move packages around the warehouse, enhancing visibility of traffic.



seed studio

SMART OCEAN SYSTEMS
 Laboratory

Smart Ocean Systems Laboratory

The SOS lab is found in October 2018 by the Principle Investigator, Mingxi Zhou.

The lab is located at beautiful Narragansett Bay Campus, University of Rhode Island. The lab has various types of marine robotic platforms and a full suite of sensors for conducting research.

Industry:

Ocean Research

Application:

Robotics, ROV

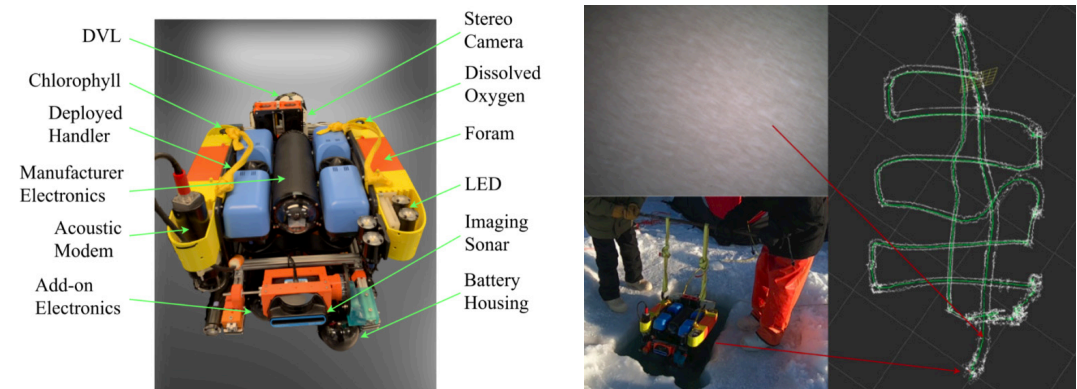
Hardware used:

- BlueROV2
- Add-on sensors
- Jetson Sub Blue mini PC based on NVIDIA Jetson Xavier NX

Towards Under-ice Sensing using a Portable ROV

From 2020, **Smart Ocean Systems Laboratory** from the **University of Rhode Island** is working on the project of **Navigating Unmanned Underwater Vehicles (UUVs) at the Ice-water Boundary**. The project team reported their progress in using a portable ROV for under-ice sensing, and demonstrate the feasibility of using small ROVs (0.7m long and 0.5m wide) to sample the under-ice environment near the coast. The recent field trials were conducted in Utqiagvik, Alaska in March 2022.

Field tests were conducted in March 2022 in Utqiagvik, Alaska on a flat landfast ice about several hundred meters off the coast. The ice thickness was about 1.5 meters. As shown in Fig. 3, ROV was lowered through a rectangle ice hole using straps with hooks at the end. The recovery was done by manually driving the ROV to the hole, then the straps will hook onto the ROV for lifting.



Solution

Intflow

Intflow is a deep-tech startup founded in 2019 with the goal of eliminating industrial inefficiencies by developing the world's best non-contact biometric information analysis technology.

Industry:
Agriculture

Application:
Livestock
management

Edge Device Used:
reComputer J1010 powered
by Jetson Nano

Software:
Intflow EdgeFarm, TensorRT

Precise livestock management helps farmers optimize livestock productivity

“With Seeed’s reComputer J1010, we can reduce the management cost per animal by 98% compared to the competing solution that relies on GPU-cloud because the Edge AI solution with Jetson could provide the lowest inference cost per a camera channel.” said Kwang Myung Jeon, CEO at Intflow Inc.



Challenge:

The livestock industry is huge, however, several issues impede its productivity, such as the soaring feed prices due to extreme weather conditions, disease risk, environmental and pollution regulations.

Solution:

Intflow provides EdgeFarm, an AI solution that perceives livestock injuries and diseases to help farmers manage and optimize livestock productivity. EdgeFarm obtains the biometric data of each 40 piglets for each ceiling-mounted camera.

It measures real-time data of the pigs for example, its eating and exercising habits.

Solution



Zenus

Zenus is an Austin, Texas startup that offers a fully-integrated solution. They packaged powerful AI models into a smart device powered by NVIDIA SoMs.

Zenus leverages the power of Artificial Intelligence to create incredible products while driving the ethical use of facial analysis. Their proprietary technology produces heatmaps and measures engagement without risk of data theft or personal identification, providing safe data capture of consumer behavior in-store retail market.

Industry:

Retail

Edge Device Used:

Seed A206 Carrier Board compatible with Jetson Nano/Xavier NX/TX2 NX

Sentiment analysis in the retail industry becomes more accessible

Challenge:

Brands need to understand their customers on a deeper level. Passive solutions such as facial analysis sit on the cutting edge of AI and provide rich information. But they comprise many bits and pieces, making them hard to deploy in stores. Moreover, brands operate under continuous changes in merchandise display, floorplan layout, audience demographics, and regional trends.

Solution:

Zenus and Seeed came together to provide an all-in-one solution powered by the NVIDIA Jetson to simplify the process and fulfill your needs. Picture a smart device that connects to any camera and processes the video feed. All you need to do is power up the unit, and it works instantly. The device sends the meta-data to the cloud to generate actionable reports. You have access to real-time metrics such as foot traffic, demographics, sentiment analysis, and more. – all ethically sourced and displayed live on an interactive dashboard.

Result:

Improve customer conversion rate (access how happy people are feeling with over 95% accuracy)

