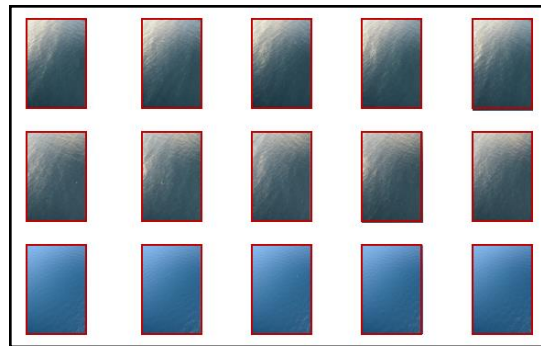


Product Fact Sheet

Brainlike products reduce sensor data to useful information—automatically, quickly and affordably. This fact sheet describes our latest use case, explains our methods and reviews our applications.

AUTOMATIC WILDLIFE DETECTION

In order to get oil exploration permits, Shell Oil was required to survey whale activity. Their high resolution cameras captured images from an aircraft flying at an altitude of 1,000 ft. Shell hired an expert team of marine biologist observers to find whales within the images. The observers looked for whales by manually zooming in on images like those shown on the right with a goal of finding sectors containing whales as shown below.



Shell aircraft made over 80 flights during the survey. During each flight, aircraft cameras captured over 10,000 images. The time that the observers took to find marine mammals manually from the images averaged 18 observer work-weeks per flight!

Detecting the whales took a long time because observers had look at 1.5 million sectors from each flight. Looking for whales manually from all 80 survey flights would have required about three analyst-years. They simply could not afford enough time and money to finish the job.



Last year, the observer team leader asked Brainlike to deliver a computing product that would save time and money by pinpointing whale locations. The product automatically identified only target sectors like those shown above and presented them to observers for validation. The overall amount of time the team took to find whales from the target sectors averaged under four work-hours per flight—50 times faster than before. Beyond saving analysis time and money, finding whales and other target events that quickly will enable observers to initiate mitigation immediately after, or even during, data collection.

PRODUCT FACTS

Our product, called PixMin™, reduces billions of raw image pixels to manageable levels. PixMin™:

- ✓ Receives large raw images (50 megapixels in the above use case) from sensors
- ✓ Produces small target sectors (called “chips”) for analyst display
- ✓ Creates chips as full resolution png files (0.75 megabytes in the use case)
- ✓ Creates chips at a low frame rate (one chip per image in the use case)
- ✓ Creates chips at a high processing rate (5 seconds per image in the use case)
- ✓ Runs as a custom application on affordable PCs (quad-core in the use case)
- ✓ Creates chips that can be easily processed, uploaded, transmitted and stored
- ✓ Can be readily implemented on parallel processors for faster operation
- ✓ Can be readily reconfigured to detect other events of interest
- ✓ Can be readily implemented on low SWaP processors for remote sensor operation
- ✓ Can be readily integrated with remote sensors, processors and transmitters to produce real-time, automatic operation, upstream of telemetry

Triage is the word that best describes what PixMin™ does. When disasters happen, limited field resources must be focused on identifying casualties that need immediate attention. First responders begin by identifying and treating them first. Many image processing applications require much more selective attention, because so much image data is gathered that only a small proportion can be processed. In both cases, effective triage adds big value. While medical triage finds those with urgent needs among many casualties, PixMin™ triage identifies events that need attention within many images.

BRAINLIKE METHODS

First, we learn about your specific monitoring needs, especially:

- Reduced analyst workload
- Increased detection precision
- Reduced transmission bandwidth
- Longer sensor battery life
- Lower delivery cost
- High return on investment

Next, we schedule a planning engagement to design solutions that will meet your requirements. Deliverables may include our basic PixMin™ product with minor modifications; custom versions of PixMin™ for on-board use; data and analysis to evaluate product performance; or toolkit delivery that will let you to roll out your own solutions. Along the way, we agree on delivery details, timing and pricing.

PRODUCT APPLICATIONS

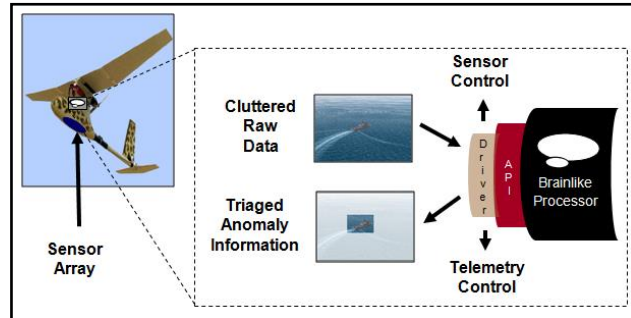
Brainlike currently focuses on identifying wildlife within airborne survey images and identifying equipment faults within airborne inspection images. In recent years, our

What is “Brainlike?” Please visit <http://www.brainlike.com/>

experts have developed, evaluated and delivered solutions to meet many related needs, including the following:

UAS surveillance triage—commercial monitoring prospects. We partnered with a radio manufacturer to implement our image triage code on a Texas Instruments DaVinci™ chip, for use on a surveillance UAS.

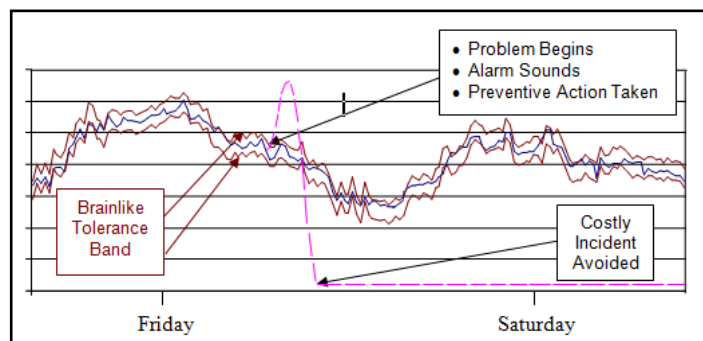
Our military customer wanted to identify emerging threats as seen on the UAS, in a form that could be identified and transmitted to warfighters below, over low bandwidth channels and in real time. Our solution allowed observers on the ground to see only regions of interest in real time. Commercial applications include identifying, oil slicks, marine or land animals, right-of-way encroachments, damaged transmission lines, pipelines and other industrial equipment, quickly enough to preclude major damage. We are now developing related applications on affordable devices like cell phone chips.



Capillary wave detection—commercial event detection prospects. We delivered a product to the U.S. Navy that identifies tiny capillary waves within high resolution camera images. The product may readily be refined for use with other sensors for oil slick detection, where capillary waves play a major role. The product may also be refined for sensitive land-based inspection applications, such as monitoring solar panels for industrial pollution buildup that reduces their efficiency.

Continuous electricity demand evaluation—commercial inspection prospects. We delivered products that continuously monitor and forecast electricity price and demand.

Our process used correlations among meter readings to identify developing problems and make near-term forecasts. In one case study, we showed that Brainlike processing can readily detect electricity demand excursions like the one shown on the right, even when background conditions change.



Future products may be refined for pinpointing sudden electricity power drops and pipeline pressure drop, quickly enough to trigger immediate corrective action.

General-purpose, automated event detection: broad commercial prospects. We have developed and patented technology to cover many sensing applications such as computer processor performance monitoring, cyber threat detection, cell phone acceleration, magnetic submarine detection, photonic environmental sensing and atmospheric

tomography. Many case studies have shown that Brainlike technology can highlight important events from a broad variety of data sources—automatically, quickly and affordably.

NEXT STEPS

Now that you have seen some Brainlike product facts, you may be wondering exactly how we can help solve your own monitoring problems. Once you [contact us](#), we will be happy to discuss how Brainlike solutions can save you time and money.