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Brainlike®

Automatic Caribou Detection from Airborne Imagery

Ranchers and environmentalists often search for livestock or wild animals. Searches based on airborne imagery can save money and time compared to ground observation. Cloud-based deep learning solutions can also find targets among thousands of aerial photos. But uploading imagery to the cloud, configuring the solutions and running them on servers can take time and cost money. That's why Brainlike developed PixMin™ solutions that can quickly triage imagery, in the field and on the spot. Resulting triaged images can be either validated in the field or uploaded for quick validation. This report highlights an animal detection use case—one among several readily available solutions for doing just that.

Figure (a) on the next page shows an orthomosaic tile. The tile was built by combining many photos that were shot at about 10 cm GSD resolution from a flight, covering about 2 km^2 of land. The orange box in Figure (a) and its detail in Figure (b) cover a region where caribou were present. The box shows 18 caribou clearly, along with five other "maybes." The Figure (b) image was input to a laptop version of PixMin™, which detected 17 out of the18 caribou. Along the way, PixMin™ created sub-images (called chips) like the one above and in Figure (c) below. PixMin™ also found five chips like the one shown in Figure (d) that could contain caribou, along with 13 chips that did not. PixMin™ took less than a second to process the image.

Acquiring the images for this use-case was very affordable. Flying time was only a few hours. Better still, two drones could have shot over ten times as many photos over the same region, producing about10 times better GSD resolution in a less than a day. But again, cloud-based methods would cost more money and take more time—much more in high resolution drone-based applications.

PixMin™ offers a simple, field-based complement to cloud solutions in cases like this one where fast, inexpensive triage adds value. PixMin™ uses edge-based template matching instead of cloud-based deep learning. PixMin™ could be configured for more precise detection by using many signature features such as distinctive colors, shapes and shadows. However, doing so can take too much processing time to keep up with incoming imagery, especially on low-power, field-based processors. Instead, PixMin™ triages images quickly using simple templates (small head/tail signatures in this case).

Resulting chips can readily be either validated on the spot or uploaded via low bandwidth links, or both.

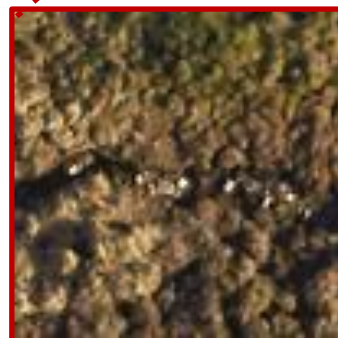To learn more about how we can help you meet related needs, feel free to contact us.
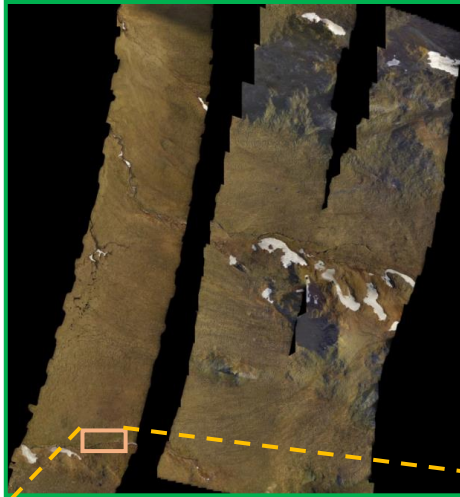
(a)

This tile was kindly provided by Dana Slaymaker from Resource Mapping.

(b)

(c)

(d)