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Journey through Our Conservation Work

San Diego Zoo Wildlife Alliance safeguards wildlife in eight Conservation Hubs around the world. To learn more about our collaborative conservation programs, including our wildlife care at the San Diego Zoo and San Diego Zoo Safari Park, visit sdzwa.org.

PHOTOS: (TOP) TAMMY SPRATT/SDZWA, (MIDDLE, BOTTOM) KEN BOHN/SDZWA

On the Cover: Giant panda *Ailuropoda melanoleuca*. Photo by: Ken Bohn, SDZWA photographer

Contents

Cover Story

Features

San Diego Zoo Wildlife Alliance
JOURNAL

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The Zoological Society of San Diego was founded in October 1916 by Harry M. Wegeforth, M.D., as a private, nonprofit corporation, which does business as San Diego Zoo Wildlife Alliance.

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A Legacy of Innovation

For half a century, San Diego Zoo Wildlife Alliance has been at the forefront of groundbreaking science, supporting global biodiversity conservation.

As we celebrate nearly 50 years of transformative work, we honor Dr. Kurt Benirschke, the visionary behind our research department and the Frozen Zoo®, part of the Wildlife Biodiversity Bank. His approach laid the groundwork for our pioneering achievements, from genetic breakthroughs to advanced reproductive techniques, and his legacy continues to inspire us today.

From the forests of Vietnam, where our ecological monitoring is revealing new insights into endangered species, to the frozen tundra of Hudson Bay, where we track polar bears and study climate change, our Conservation Hubs serve as beacons of hope, connecting people with wildlife while driving positive outcomes globally.

At the Conservation Technology Lab, engineers are working with our wildlife care specialists at the Nikita Kahn Rhino Rescue Center, as well as partners at Loisaba Conservancy in Kenya. Together, they are developing cutting-edge camera systems to monitor and protect rhinos, deepening our understanding and enhancing our ability to safeguard their future.

The giant panda, featured on this month's cover, symbolizes our commitment to wildlife's future. For 30 years, our breeding and research programs have contributed to their recovery, helping them move from Endangered to Vulnerable status. Their journey reminds us that through collaboration and science, we can create lasting impacts for wildlife, people, and the planet we share.

Conservation starts with people. This work is only possible through your support. Together, we are making a meaningful difference for wildlife, with a shared commitment to a world where all life thrives.

Onward,

Paul A. Baribault
President and Chief Executive Officer

PHOTOS: KEN BOHN/SDZWA

A Rhino Alliance

Ian Ingram, M.S., a conservation technology scientist for San Diego Zoo Wildlife Alliance (SDZWA) and leader of the Conservation Technology Lab, explores deep learning and its role in protecting wildlife.

A black rhino living on the savanna at our partner facility, Loisaba Conservancy, in Kenya will never meet a white rhino living at the Rhino Rescue Center (RRC) just down the path from the SDZWA Beckman Center for Conservation Science in Escondido, California. But they can help each other. They help each other by helping us build machine learning technologies that contribute to the conservation of both their species.

At the core of these technologies is deep learning—a groundbreaking development in how we humans use the power of computers that has found its way into seemingly every domain of human existence, from healthcare to entertainment.

Software and hardware engineers in the SDZWA Conservation Technology Lab (CTL) have been collaborating with the wildlife care specialists at the RRC and our colleagues at Loisaba to develop tools that use deep learning in conjunction with field camera systems to help us protect and learn about rhinos. Combining camera imagery (both stills and video) and artificial intelligence in this way is often shorthanded as CV/ML, for "computer vision and machine learning."

Specifically, in our work with the two populations of rhinos, we are trying

Combining camera imagery (both stills and video) and artificial intelligence is often shorthanded as CV/ML, for "computer vision and machine learning."

Who's who: When "teaching" computers to see wildlife, we first distinguish animals from the landscape in which they live, then identify the species of those animals. After that, we determine which specific individual each crash member is.

PHOTOS: (OPPOSITE PAGE) RIO THE PHOTOGRAPHER, (THIS PAGE-LEFT) LEWA WILDLIFE CONSERVANCY - JEFF DEKOCK, (TOP RIGHT) TAMMY SPRATT/SDZWA, (BOTTOM RIGHT) SDZWA

to improve our ability to do two things with CV/ML: 1) automatically identify individual rhinos, and 2) automatically determine what behavior a rhino is exhibiting at a given moment.

The automatic identification of individual rhinos is important in Loisaba simply as an aid in ensuring that each of the 21 black rhinos translocated there this past January is accounted for on an almost-daily basis—a necessary and required element of the rhinos management. It also enables us to do science around the social networks of the rhinos in both Kenya and Escondido, monitoring a location important to the rhinos like a midden (a communal dung heap) to see who visits and when and which other individuals they are interacting with—studies that will also benefit from the CV/ML behavior recognition systems.

While some of our computer vision tools can be used with camera devices that are available off-the-shelf, like trail cameras, for some we need custom equipment. Two of the core pieces of made-to-order equipment we employ in this work, the CTL's mobile connection station and the tiny ScrubCam, were developed for use in the SageBRUSH (Bio-Reserve Ubiquitous Sensing in Habitat) system in our Biodiversity Reserve adjacent to the Safari Park. Customizing these devices for use in the context of our Savanna Conservation Hub is the project of our very first fellow in the brand-new SDZWA Kenyan Fellows in Conservation Technology program, Kiraoni Jackson Saruni.

White rhinos and black rhinos, the two extant African rhino species, are of course different from one another. To start, the white rhino is primarily a grazing species, and the black rhino, a browsing species, as reflected in the respective shapes of their lips: broad and square in the white and hooked and nimble in the black. But the two species are morphologically similar enough that the majority of the machine learning techniques we develop for one are transferable to application with the other. In fact, many of these CV/ML techniques and systems have the potential to be transferable to SDZWA projects for many other species we help protect in our eight global Conservation Hubs.

The black rhinos in Loisaba and the white rhinos at the RRC are not just helping each other, but also helping polar bears, burrowing owls, elephants, mountain lions, 'alalās, platypuses, and gorillas, to name just a few. That in itself is quite an alliance.