InnovateFPGA

Design Contest

Join the contest at: www.innovatefpga.com

Connecting the Edge for a Sustainable Future

Applying Technology to Address Global Challenges

We believe that intelligent use of FPGAs in edge and cloud computation can reduce demands on the planet's resources.

The InnovateFPGA Design Contest seeks to inspire and create sustainable solutions that reduce environmental impact.

We invite teams to develop solutions to real-world problems

Inspiration & Innovation

The GEF Small Grants Programme, implemented by UNDP is collaborating with the InnovateFPGA design contest to develop needed solutions for:

- Sustainable Agriculture
- Marine Conservation
- Biodiversity

SGP The GEF Small Grants Programme

The GEF Small Grants Programme embodies the very essence of sustainable development by "thinking globally acting locally". By providing financial and technical support to projects that conserve and restore the environment while enhancing people's well-being and livelihoods, SGP demonstrates that community action can maintain the fine balance between human needs and environmental imperatives.

Marine Conservation

Turkey: Anchor Science for Neptune Sea Grass in the Mediterranean

Summary

Using underwater drones equipped with GPS to map and monitor Neptune's sea grass (*Posidonia oceanica*) distribution and density.

Description

Posidonia oceanica is endemic to the Mediterranean Sea and is a marine plant that provides oxygen and a habitat for several other important marine species . *Posidonia oceanica* has diminished dramatically in the last 20 years due to intentional dredging, repeated anchoring and mooring during fishing and yachting, as well as being threatened by invasive species.

Benefit

Underwater drones equipped with GPS are more efficient than using scuba divers or releasing a cable tethered camera from a boat to map and monitor the sea grasses. This technology can also be used to collect other marine data.

Data, Sensors and Devices

GPS Location data
Maps
Image and sensor data

Sustainable Agriculture

Malaysia: Preservation Of Heritage Agriculture And Biodiversity in Long Semado, Sarawak

Summary

Using smart farm monitoring devices to collect data such as pH, NPK, moisture, light, and rainfall via customizable sensors to improve agricultural data collection and analysis.

Description

This technological solution will help gather data of the surrounding environment for organic farm planning, monitoring and as a proof of concept for the integration of regenerative framing and traditional farming methods practiced by the community.

Benefit

So far the project has increased rice production and improved access to markets for small scale farmers. Automated data collection will further enhance the confidence of Indigenous communities and local farmers to practice regenerative and traditional farming methods and encourage widespread adoption.

Data, Sensors and Devices

pH
NPK: nitrogen (N), phosphorus (P) and potassium (K)
Moisture, Rainfall, Evaporation
Wind
Light

Sustainable Agriculture

Albania: Smart and IoT solutions for agriculture and farming

Summary

Provide smart farming technologies and IOT for all type of greenhouses and farms.

Description

Traditionally, farmers had to monitor their crops and make adjustments based on manual data collection and what they observed. Automated solutions and technology offer greater accuracy based on more efficient data collection and monitoring.

Benefit

More efficient management of greenhouses and farms
Fulfilling EU Standards
Increasing organic production and avoiding excessive use of chemicals
Increasing access to export market

Available Data, Sensors and Devices

Air, temperature, humidity, moisture (via Bluetooth)
Physical plant characteristics- length, height
Pest and plant diseases data
Simple greenhouse data (not digitalized)

Biodiversity

Mauritius: Improving Livelihoods of Communities- Oyster Farming for Jewelry Making in Rodrigues

Summary

A local community group, led by women, has established a small-scale oyster farm in the coastal waters of Rodrigues Island. Regular cleaning and monitoring is mandatory for oyster farming, and currently the women have to hire divers to do this work. This is expensive and time consuming. Remote oyster monitoring allows divers to be employed only when cleaning or net repairs are due and makes the process more efficient.

Description

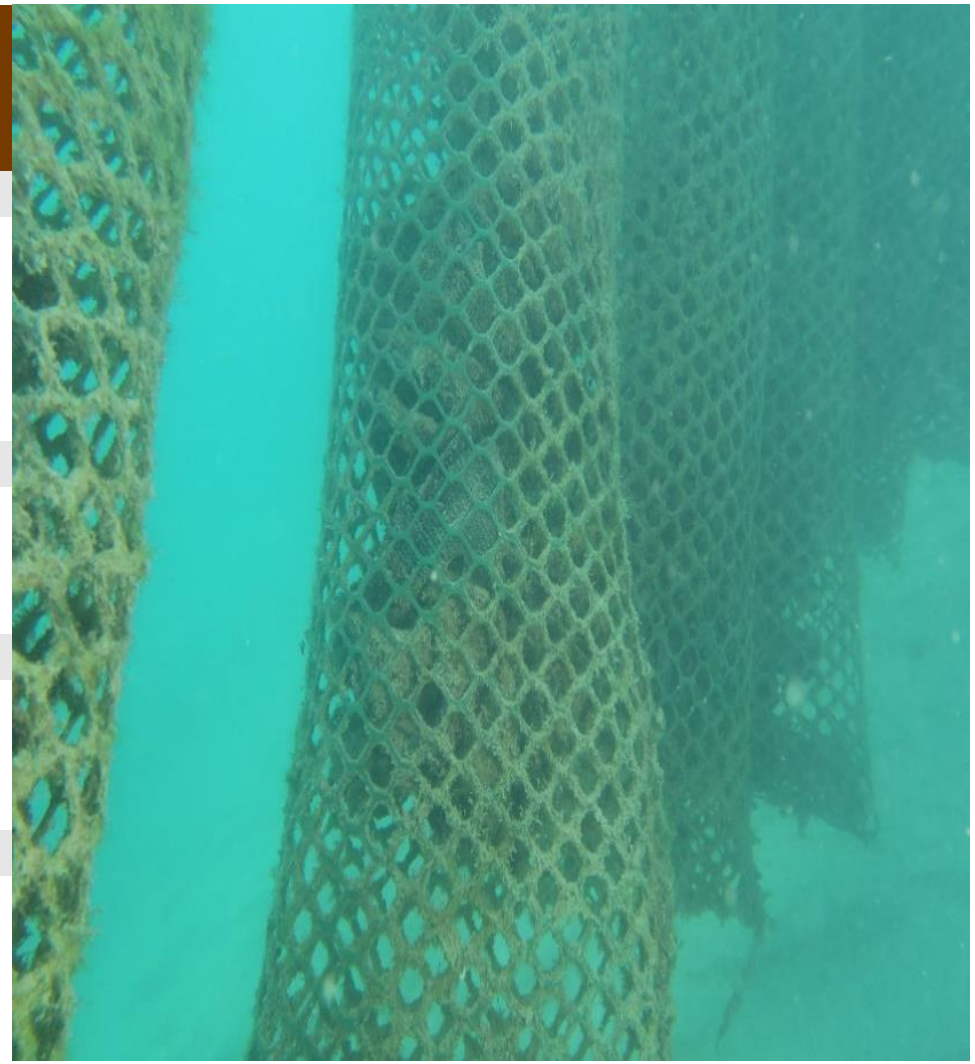
A remote monitoring system at the sea-based oyster farm would use data to send the divers only when cleaning or repairs are due. The system can also warn of swells and theft.

Benefit

Minimize oyster farming maintenance costs- intelligent management will improve efficiency of current activities and help generate more income for women and local community.

Data, Sensors and Devices

pH levels
temperature
salinity
High swell warning
Camera / imaging
Theft warning



Biodiversity

China: IoT and AI-assisted Camera Trapping Monitoring for Snow Leopard Conservation in Sanjiangyuan Region

Summary

Apply new technologies in the monitoring of Snow Leopards, in order to increase the efficiency of data collection, management and analysis.

Description

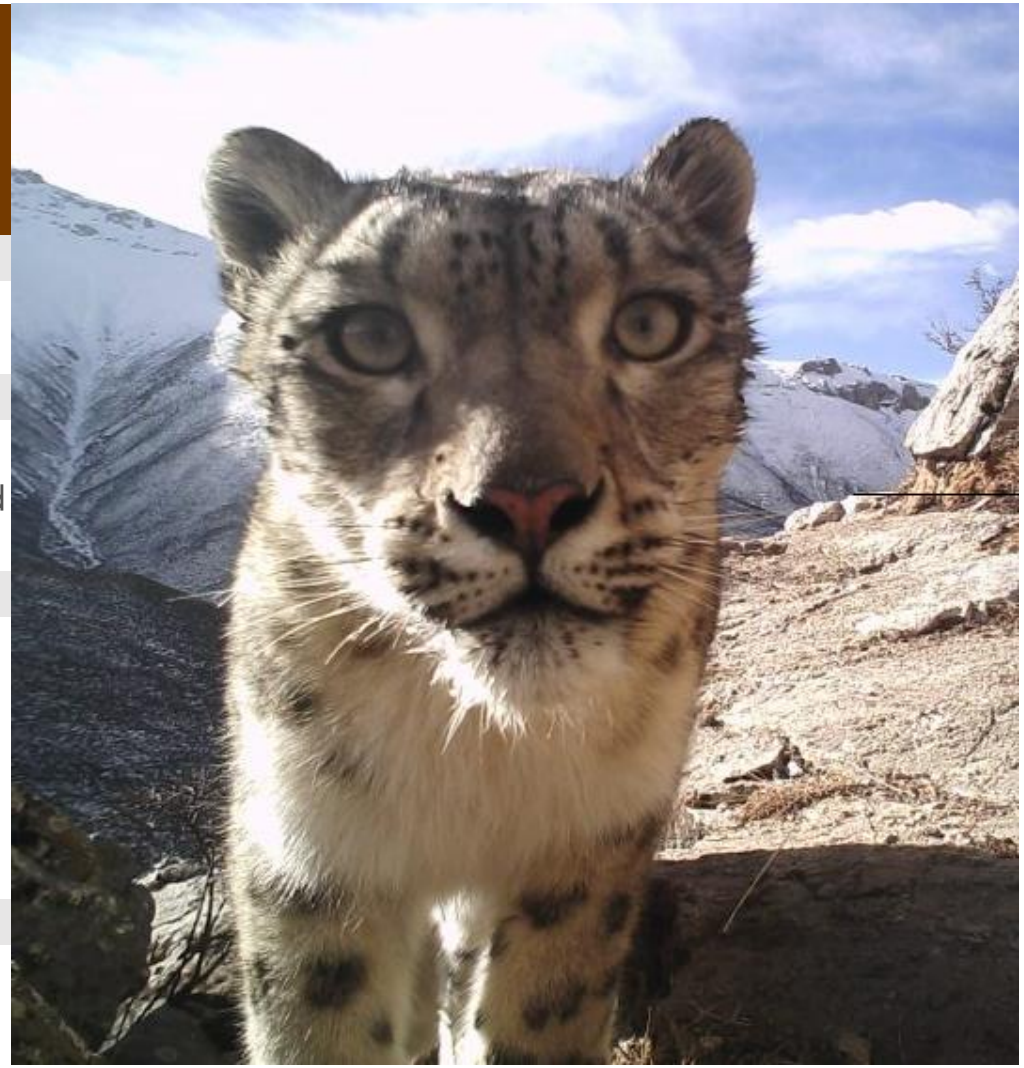
Build a cloud platform to store, process, and visualize camera trapping data collected from Internet-connected cameras with AI photo processing- to speed up species and individual animal identification.

Benefit

Currently, camera trap data are collected, processed, and managed manually, which requires a huge amount of time and human effort. The process from picking up cameras (containing 3-4 months of data) to generating final analysis output can take up to 3 to 5 months, which impedes the development of snow leopard conservation strategies. Connecting camera traps to the Internet along with employing AI technology can significantly enhance the efficiency of our work.

Data, Sensors and Devices

5,000,000 photos and videos of 100 individual snow leopards covering around 6200 km2 snow leopard habitat
IoT devices will upload images and location data



Biodiversity

Uganda: Wildlife Species Monitoring Program- Queen Elizabeth National Park and Kidepo National Park

Summary

Track (temporal and spatial) elephant and lion populations to determine the impact of environmental, human and other stressors.

Description

Drones, active ground sensors, chip monitors, infra-red devices supported by 24hr active visual field observation stations will significantly improve species and habitat monitoring, data collection and analysis. This will improve surveillance, law enforcement and assist with protected area and wildlife management.

Benefit

Increased security of protected areas with reduced poaching and improved habitat assessments would facilitate appropriate proactive environmental interventions. Wildlife numbers will increase, and human wildlife conflict will reduce.

Data, Sensors and Devices

Drone imaging
Active ground sensors
micro-chip transponders
infra-red devices supported by 24hr active visual field observation stations

Biodiversity

Guinea Conakry: Chimpanzee Monitoring

Summary

The chimpanzee is an endangered species. Information is lacking on these individuals (the current number, the trend for increase or decrease, the current state of their habitat and threats to their well-being).

Description

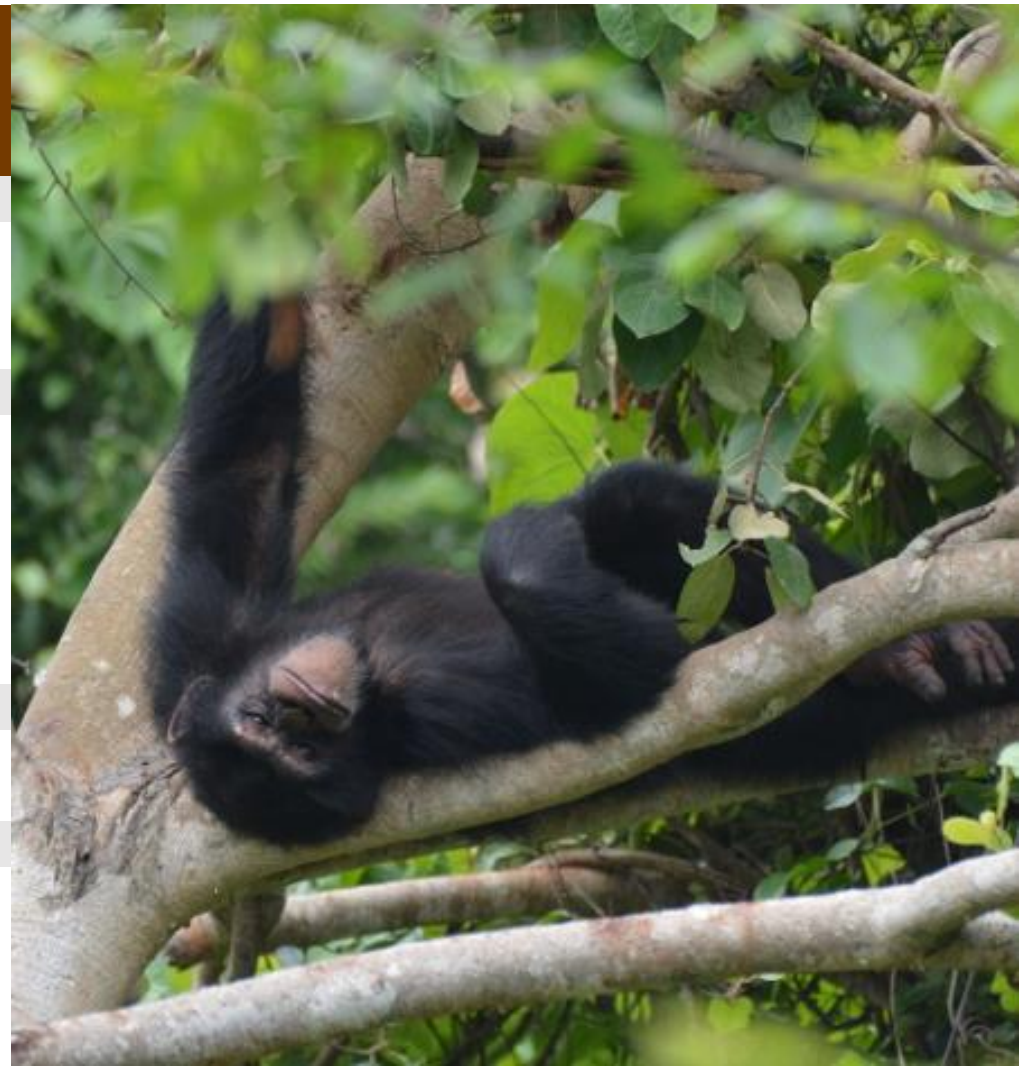
Regular monitoring of their location through GPS, surveillance cameras and other devices can significantly improve current information on the species and other ecosystem data. Currently data collection is manual and via observation. The community group is interested in using technology to improve identification and monitoring of individuals.

Benefit

Enhance chimpanzee species and habitat conservation.

Data, Sensors and Devices

Limited GPS data/camera trap data on actual chimps currently exist.
Maps of forest
Looking for ideas...



How to Get Involved with an SGP Project

Enter the InnovateFPGA Design Contest

Choose an SGP project or Define Your Own!

Enter before October 1st 2021

InnovateFPGA Regional Finals March 2022

The top 3 teams from each of the 4 Regional Finals continue to the Grand Final in San Jose

The best solutions will be introduced to the SGP CSO after the Regional Finals

The contest team may suggest partners and other resources to help successful deployment.

Grand Final June 23rd 2022

Judges evaluate the projects in 3 Categories: Design Concept, Implementation and Performance

Teams introduced to a CSO are not more or less likely to win an InnovateFPGA prize

The CSO will select projects based on their own criteria and schedule

Winning an InnovateFPGA Design Contest prize does not make a project more or less likely to be selected for deployment by a CSO

Contest platform provided at no cost to participating teams by:

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