# ERISNet: Deep Neural Network for Sargassum detection along the coastline of the Mexican Caribbean
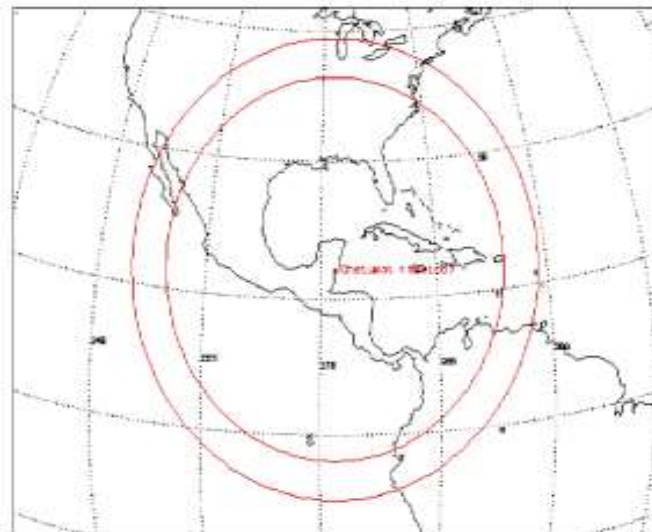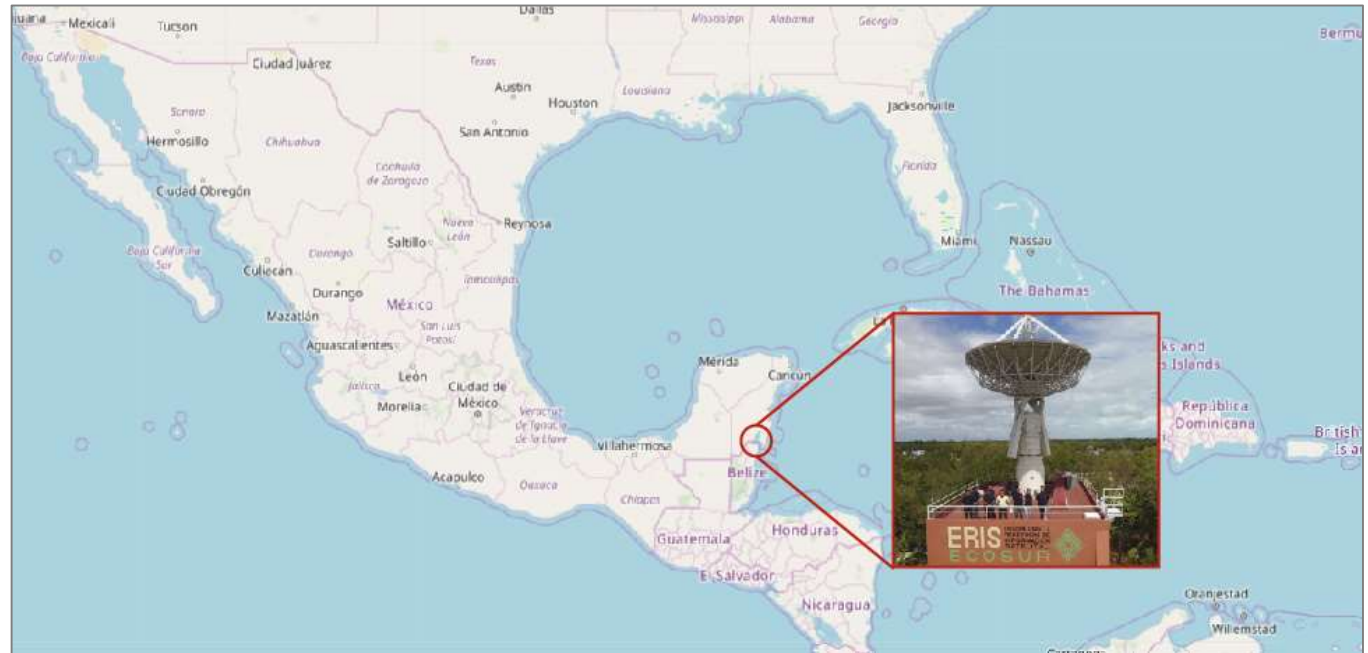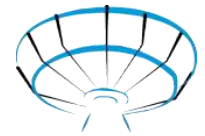
*Javier Arellano-Verdejo Ph.D.*

*Member of the Academic Group of the Station for the Reception of Satellite Information ERIS-Chetumal*
**El Colegio de la Frontera Sur, México**

24/10/2019

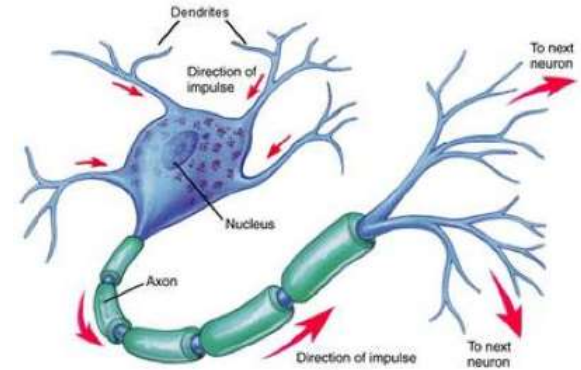# About ERIS-Chetumal



## Station Specs

- Scalable station.
- Parabolic dish of 8 m.
- Download MODIS, Landsat
- Only ground satellite station in Mexico linked with a public research institute
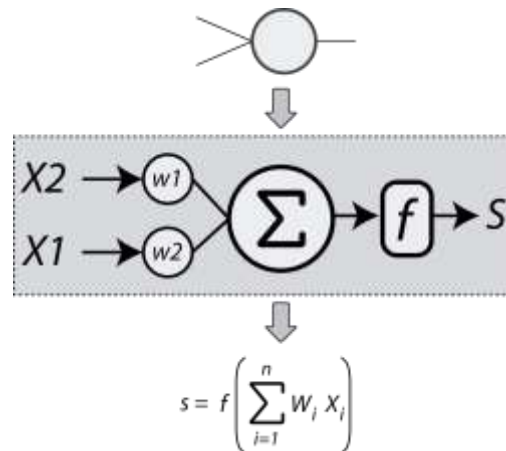- Associated Academic Group
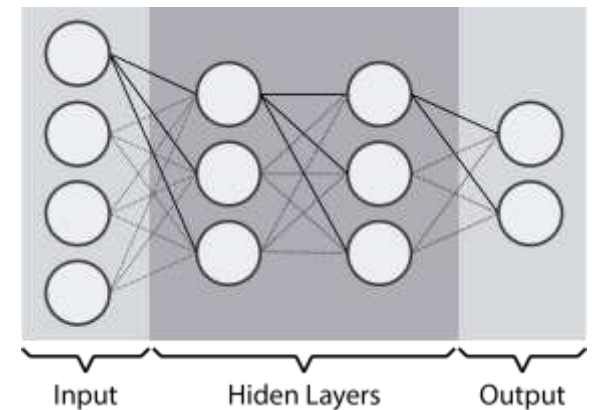
# What are artificial neural networks?

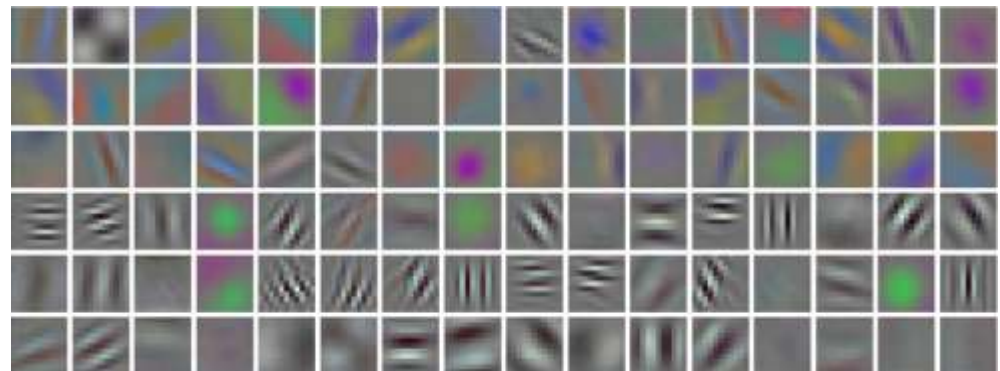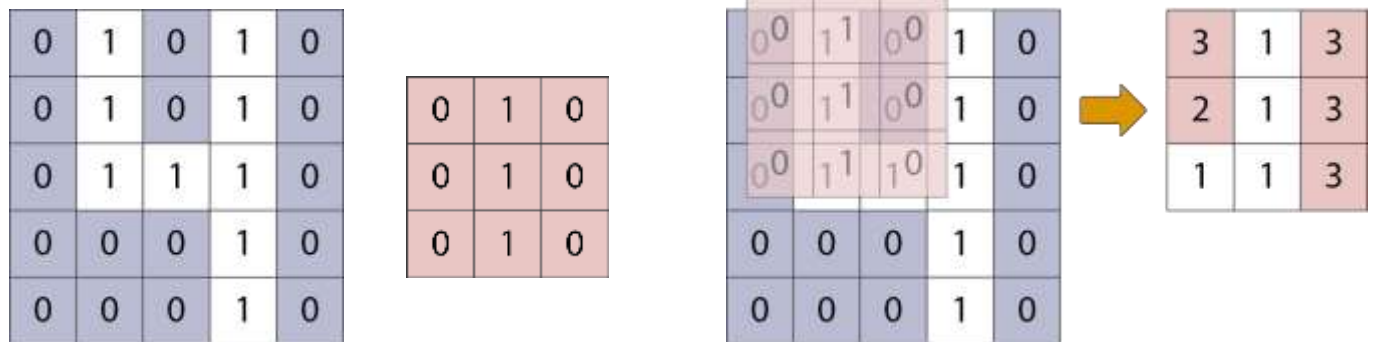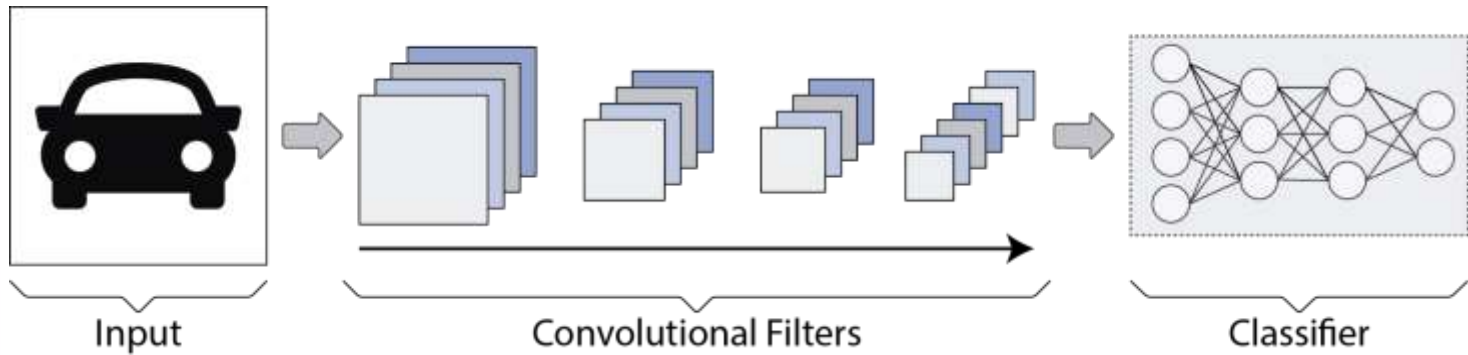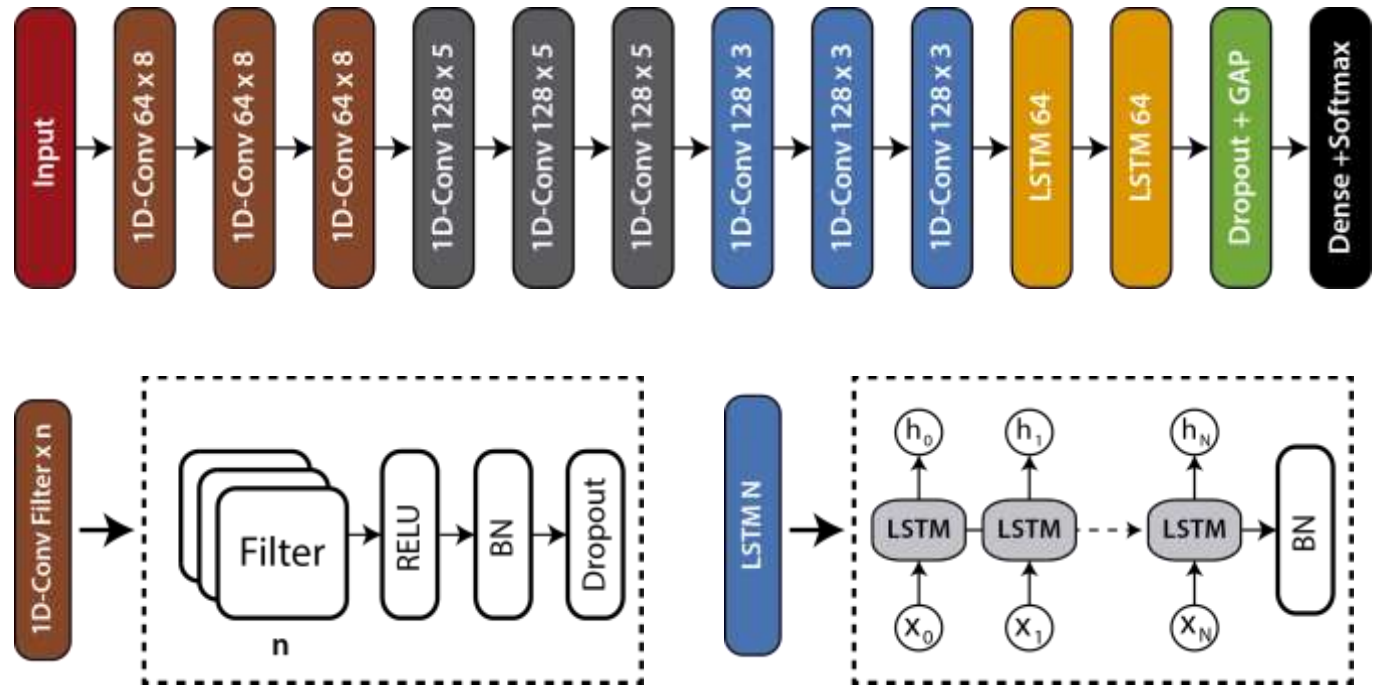Inspired in biological nets

Basic neuron's scheme

Artificial neuron

Artificial Neural Network

$$s = f\left(\sum_{i=1}^{n} w_i \, x_i\right)$$

# Convolutional Neural Networks?
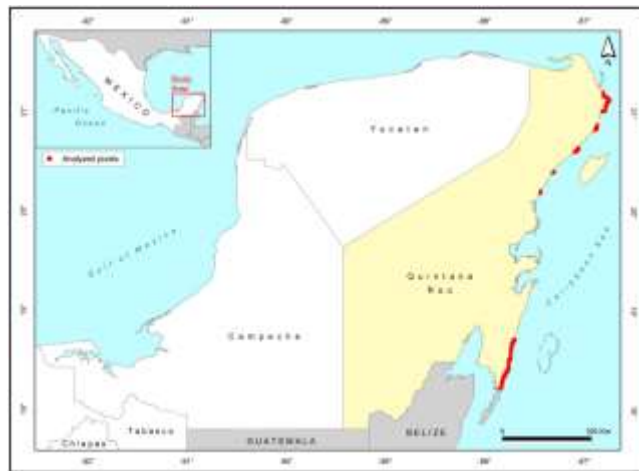


Input | Convolutional Filters | Classifier

# ERISNet Architecture



# 91 % Accuracy

# ERISNet trining



| Dataset features | |
|---|---|
| **Attributes** (7 rhos; 7 rhot) | 14 |
| **Clases** (presence / absence) | 2 |
| **Instances with Sargassum** | 2306 |
| **Instances without Sargassum** | 2209 |
| **Instances** (places at different dates) | 4515 |
| Total data | 63210 |

# Collective View





Summary

Cities
- Puerto Progreso
- Cancun
- Puerto Morelos
- Playa del Carmen
- Mahahual
- Calderitas
- Chetumal
- Chicxulub Puerto
- Chuburna
- Xcalak

1885 points

960
7
47
23
284
12
184
2
89
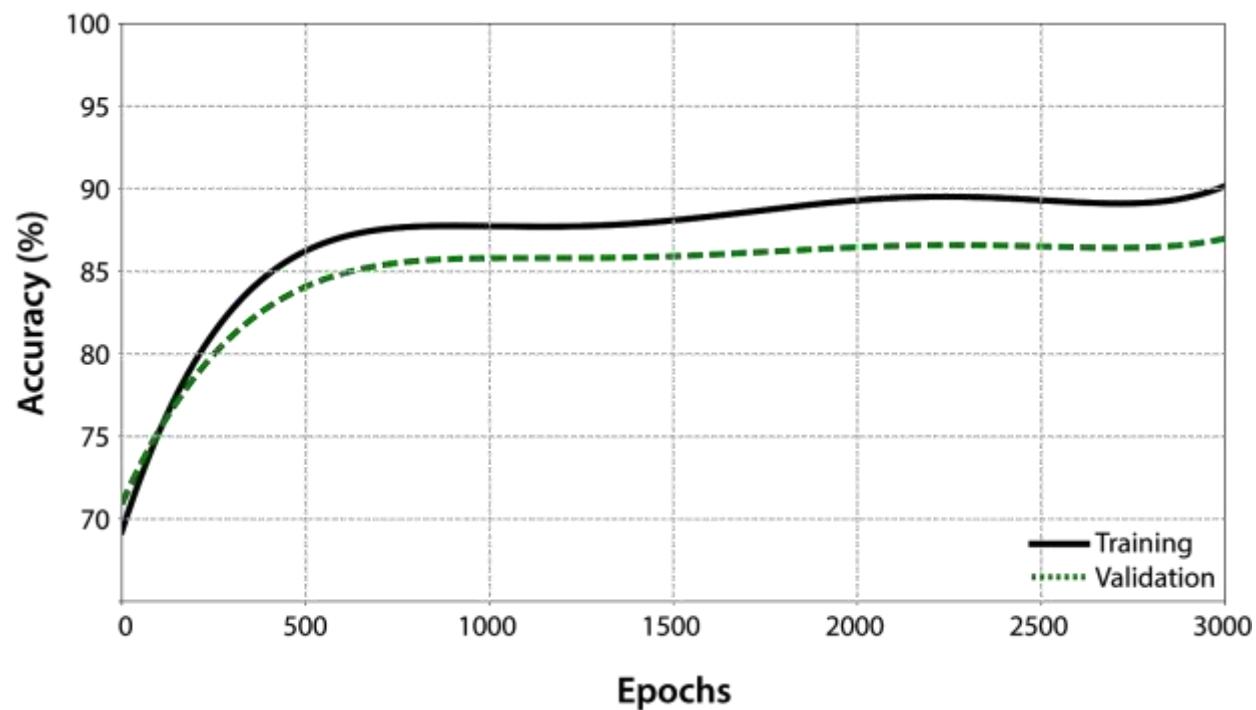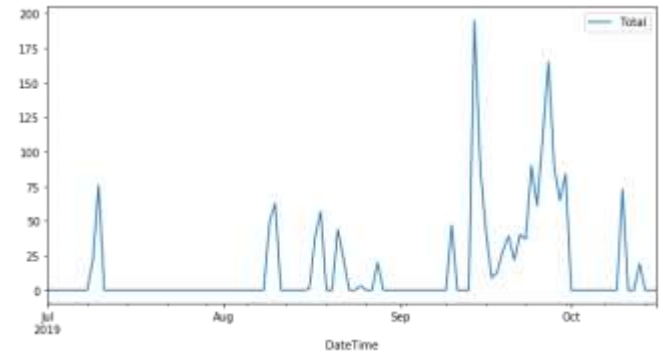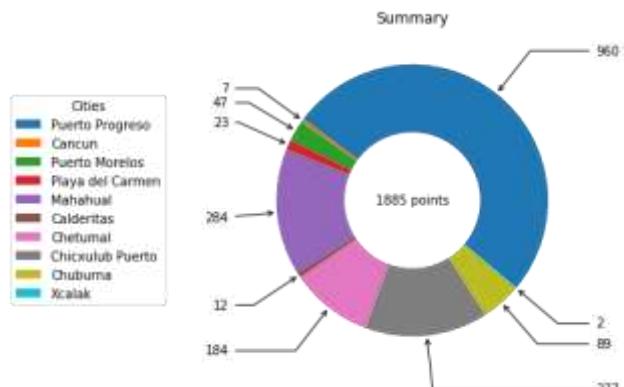
# Other ERISNet applications
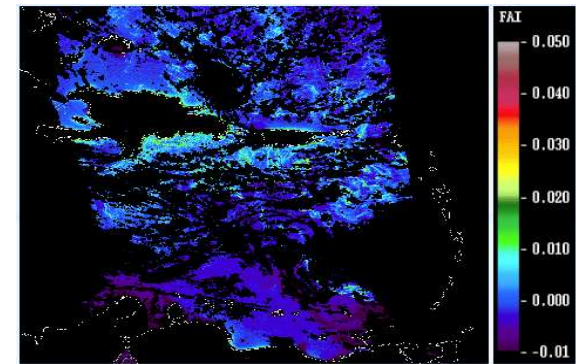
Red tide detection

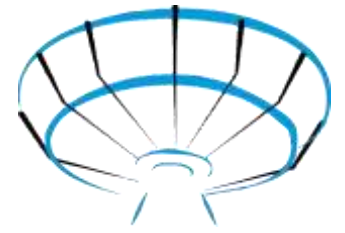Oil spill detection

Forest fire analysis

False positive detection

# Thanks

**Javier Arellano-Verdejo Ph.D.**

javier.arellano@mail.ecosur.mx

**ERIS-Chetumal**