

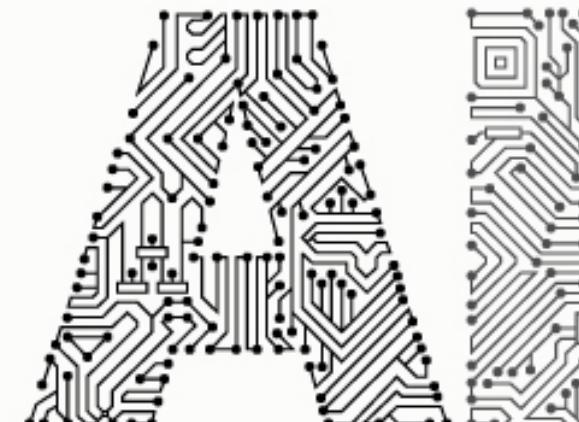


UDA IKASTAROAK  
CURSOS  
DE VERANO  
UPV/EHU

# Detección de cambios a partir de ortofotografías con Inteligencia Artificial



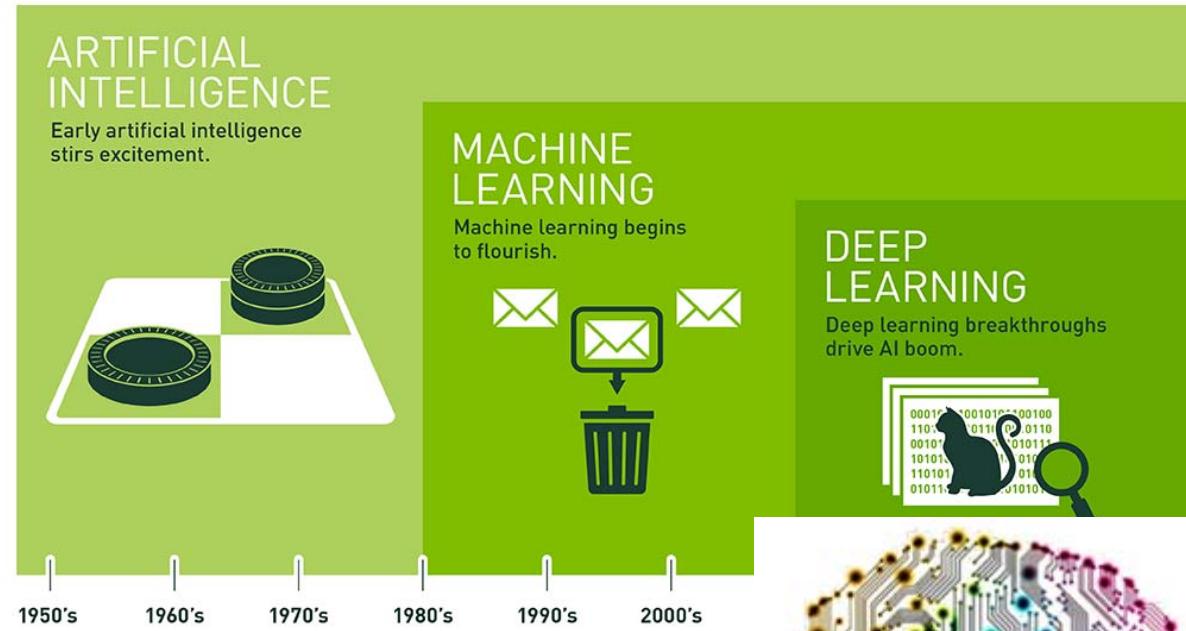
Gobierno  
de Canarias



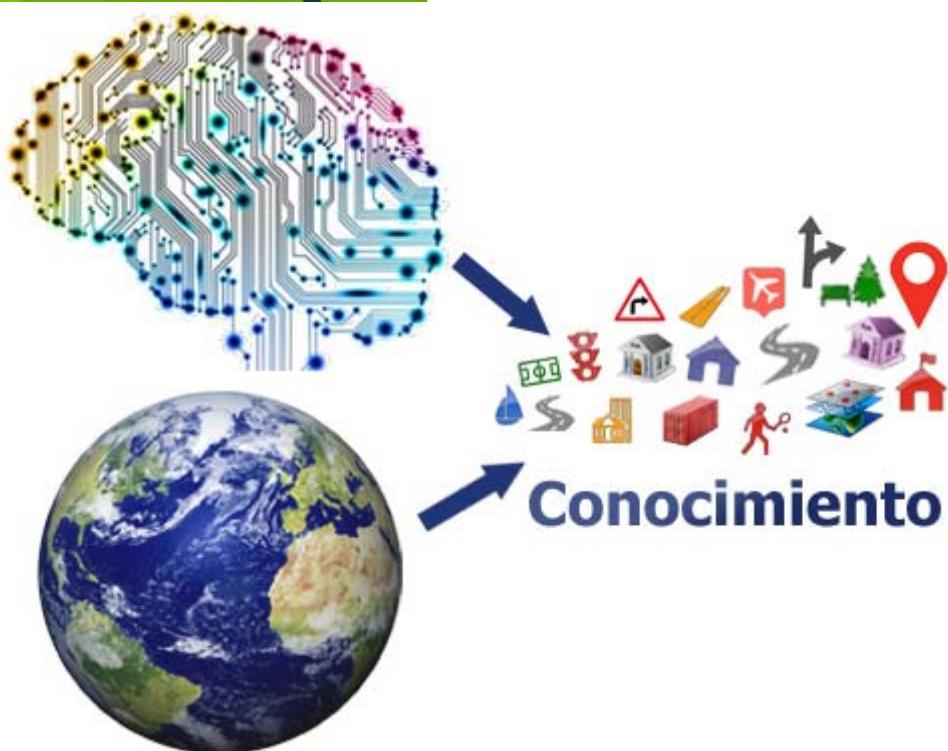
ARTIFICIAL INTELLIGENCE



**GRAFCAN**

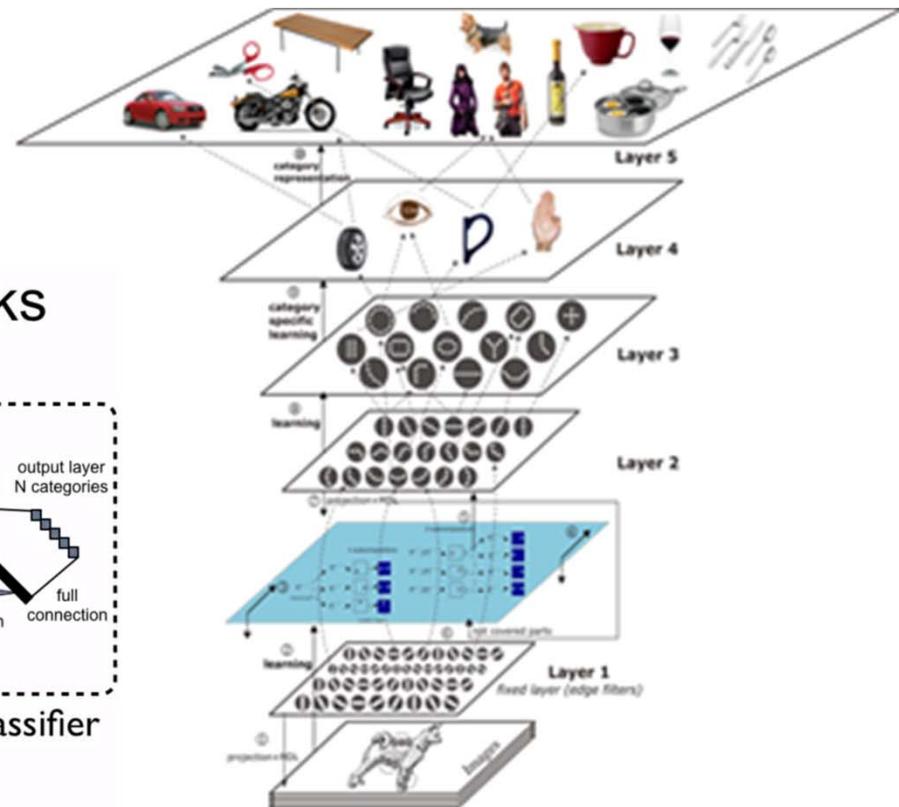
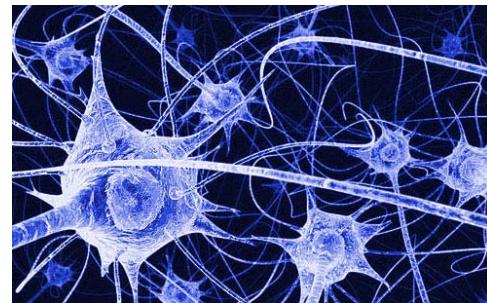


I + D + i

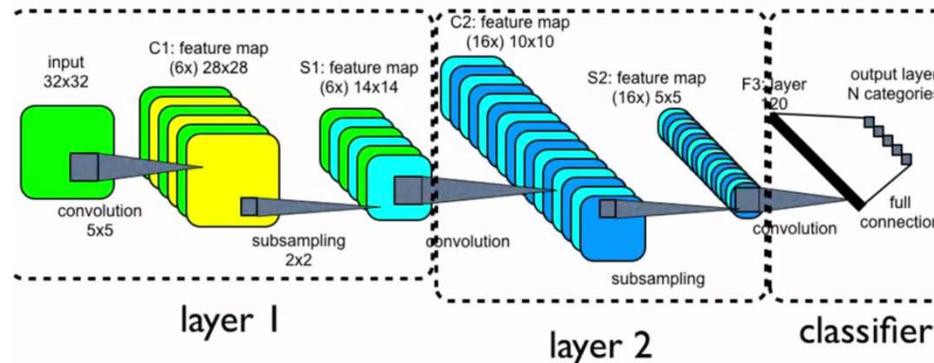




# Deep learning...



## Convolutional Neural Networks





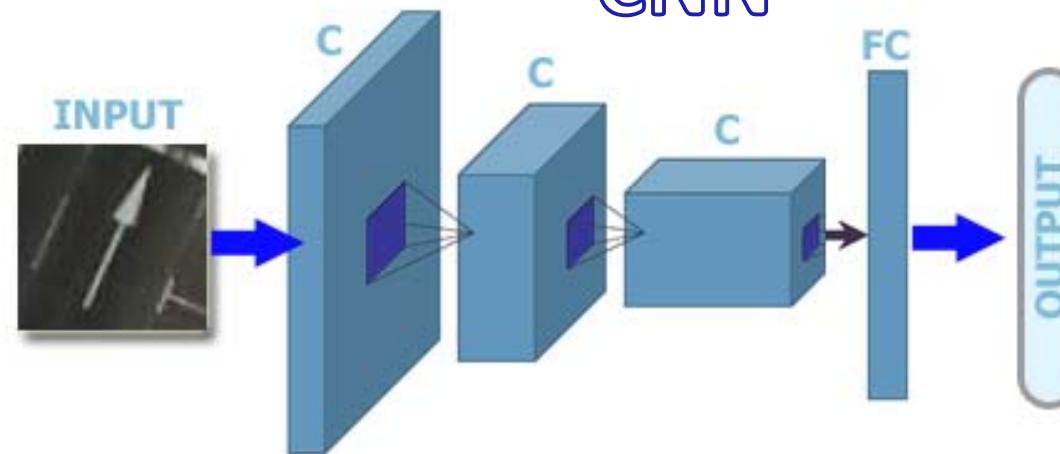
# Primer proyecto...



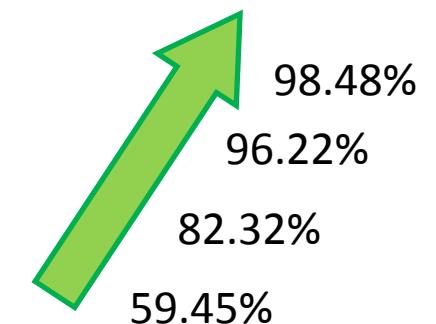
Entrenamiento



CNN

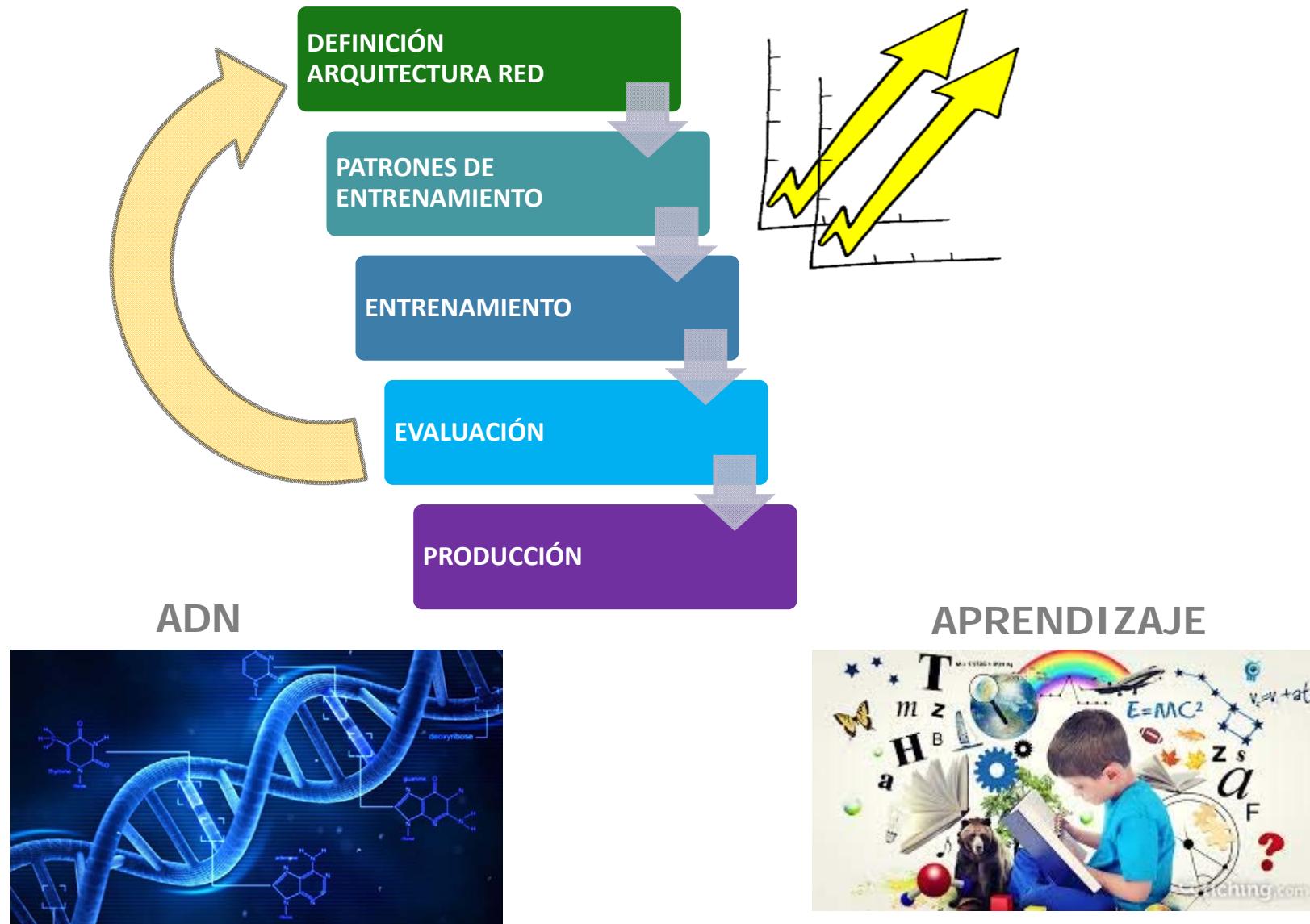


Evaluación



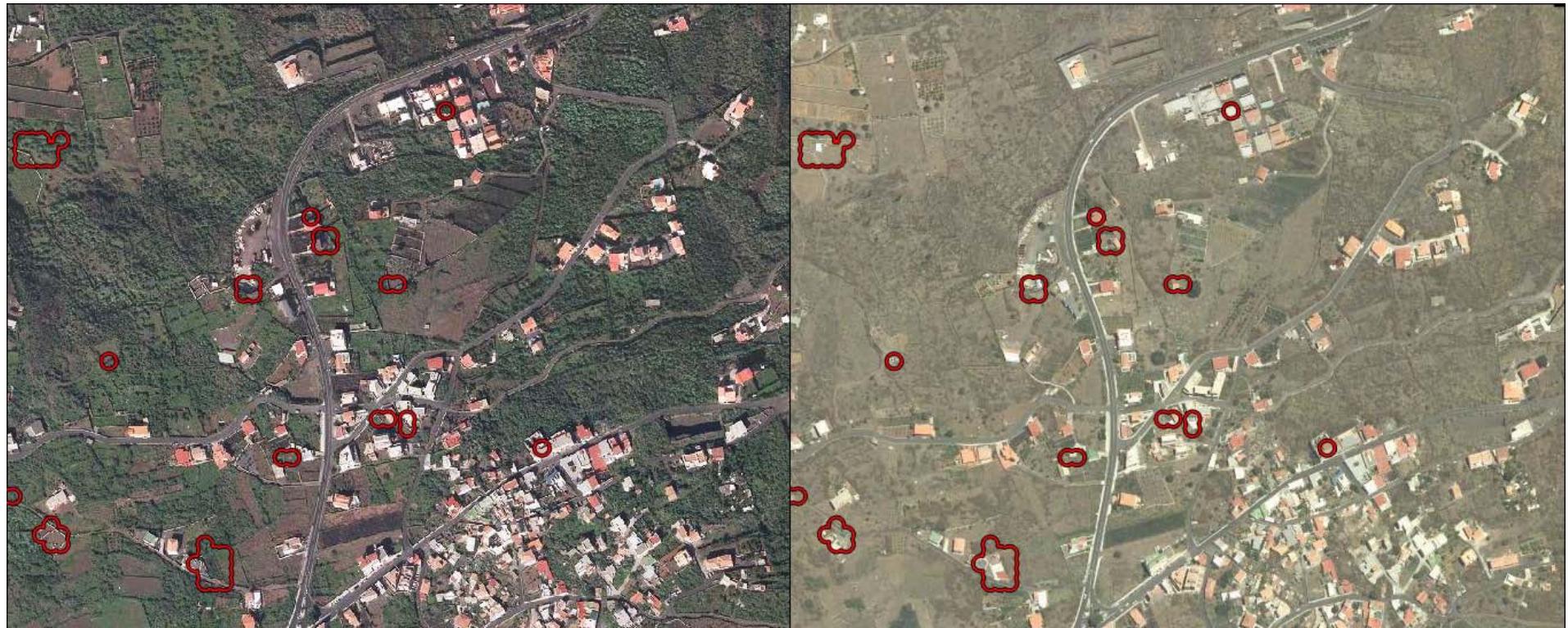


# Procesos IA





# Detección de cambios en Ortofotos



Complejo !!!

## Ejemplos Cambios



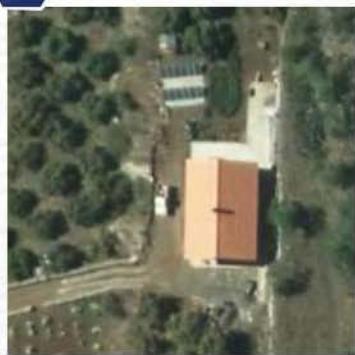
## Ejemplos NO Cambio





# Detección de cambios

## Control de cambios I.A.



## Resultados

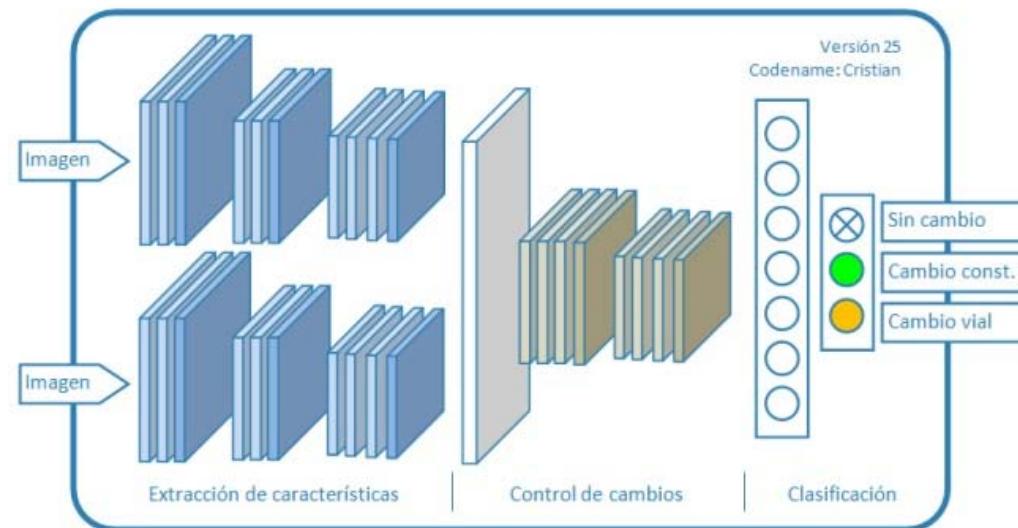


22 capas  
>36M param

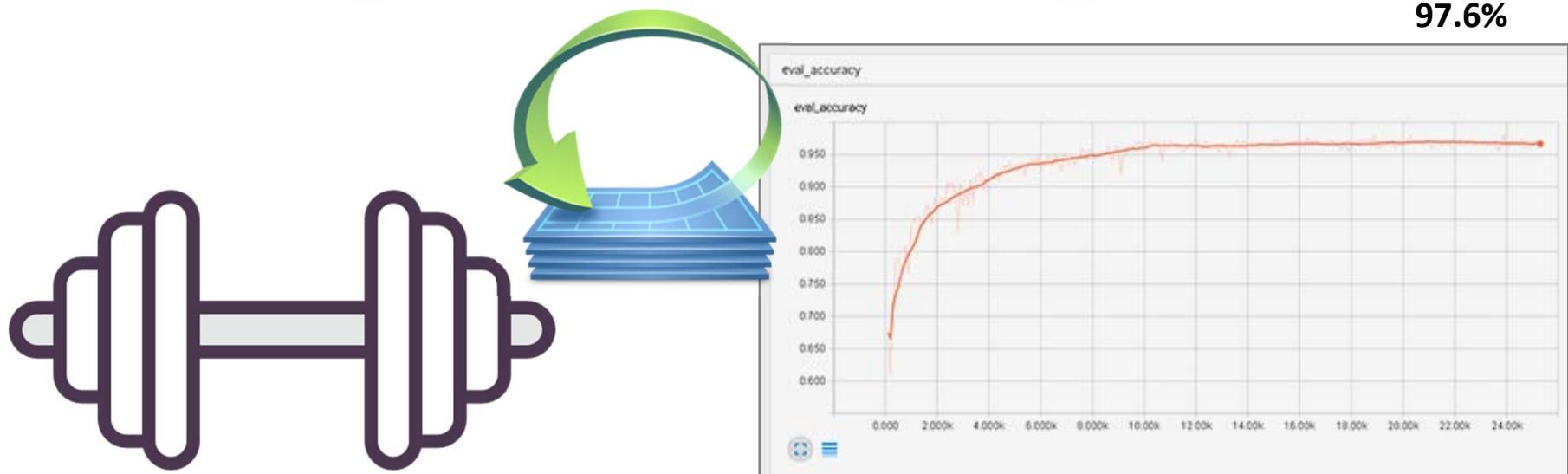
GRAFCAN v 2.5  
codename: cristian



# Entrenamiento-evaluación

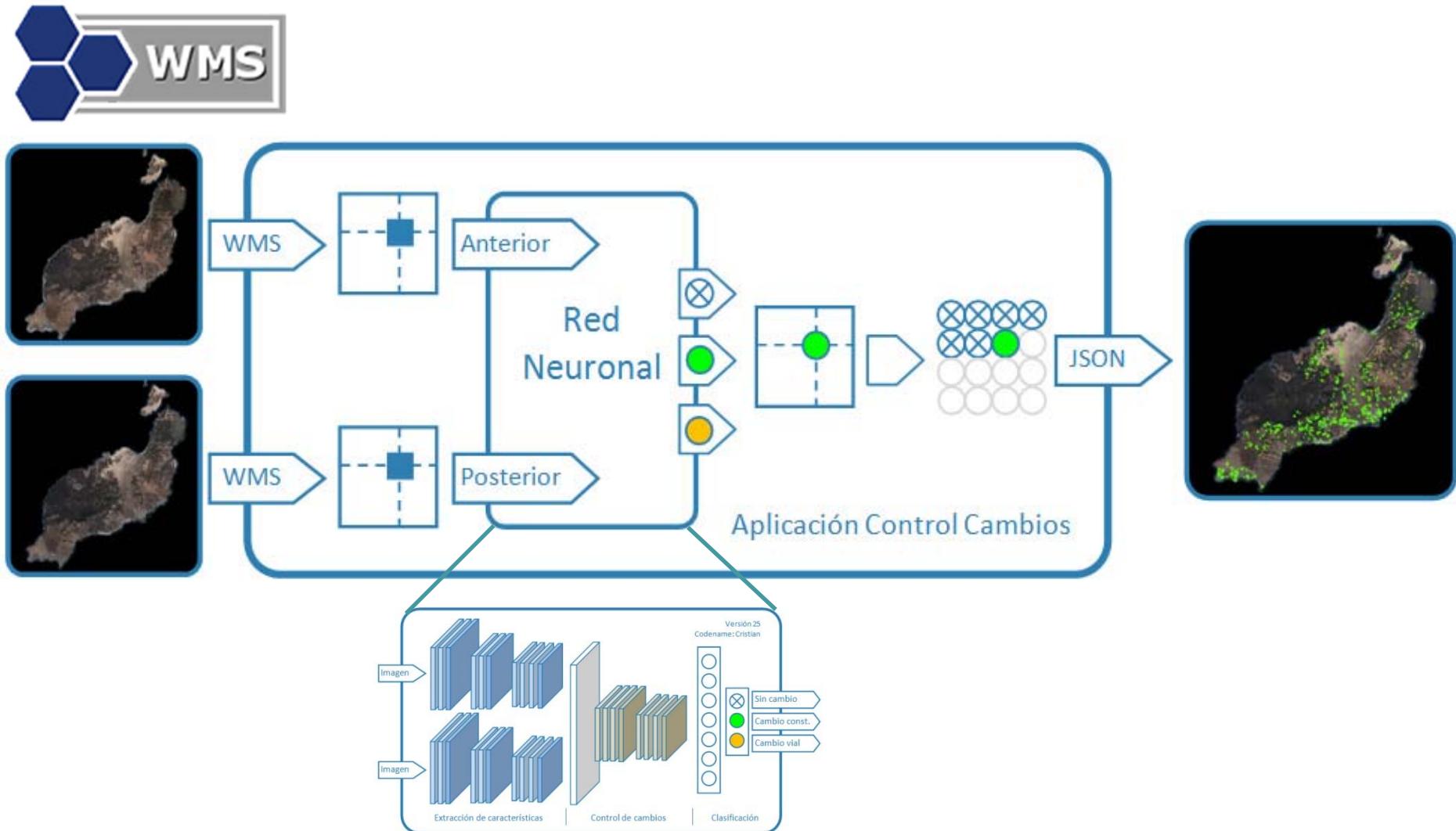


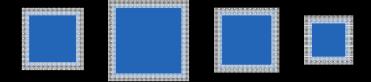
97.6%





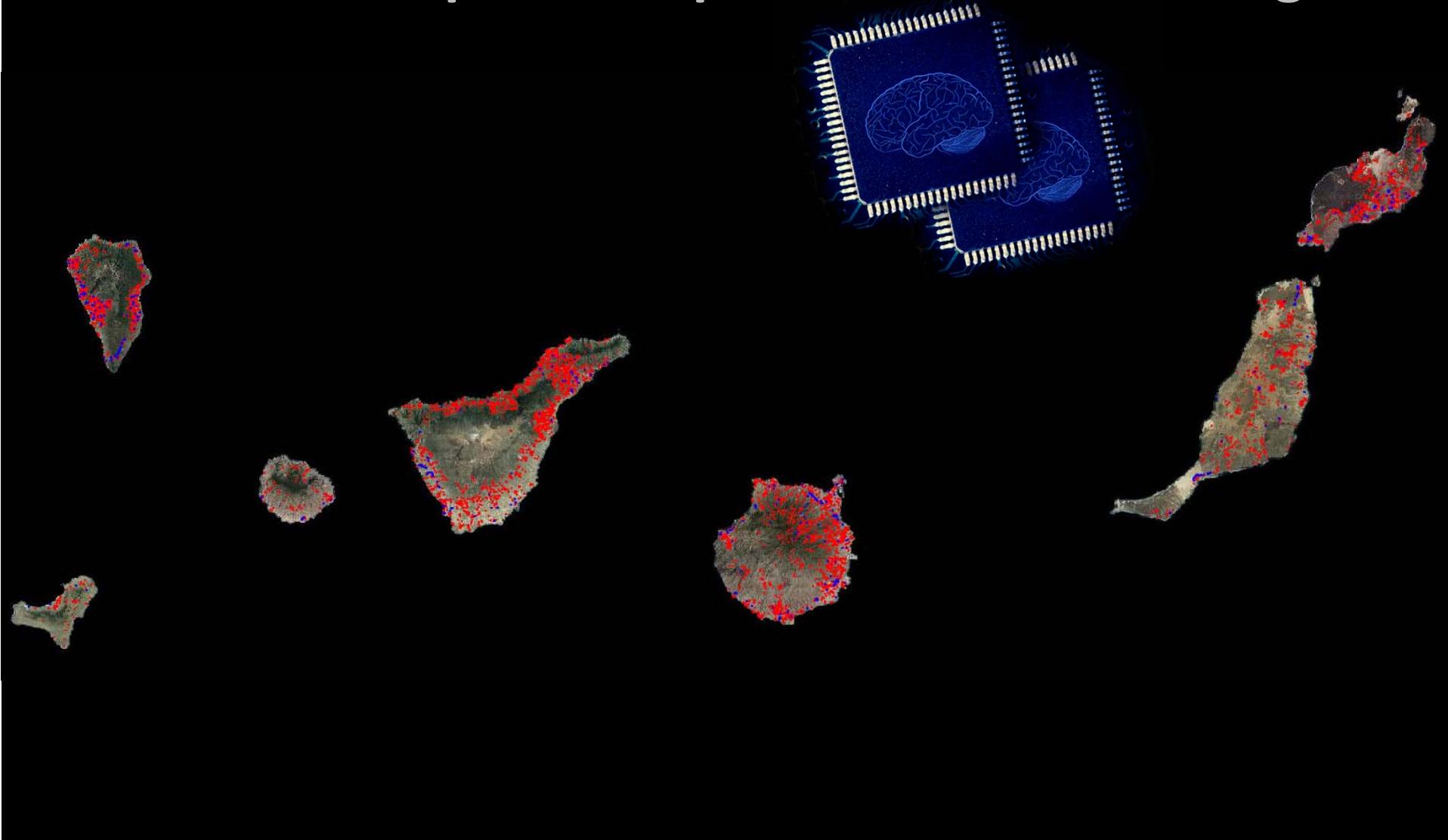
# Puesta en producción

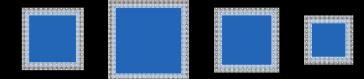




En producción...

## Servidores específicos para Machine Learning



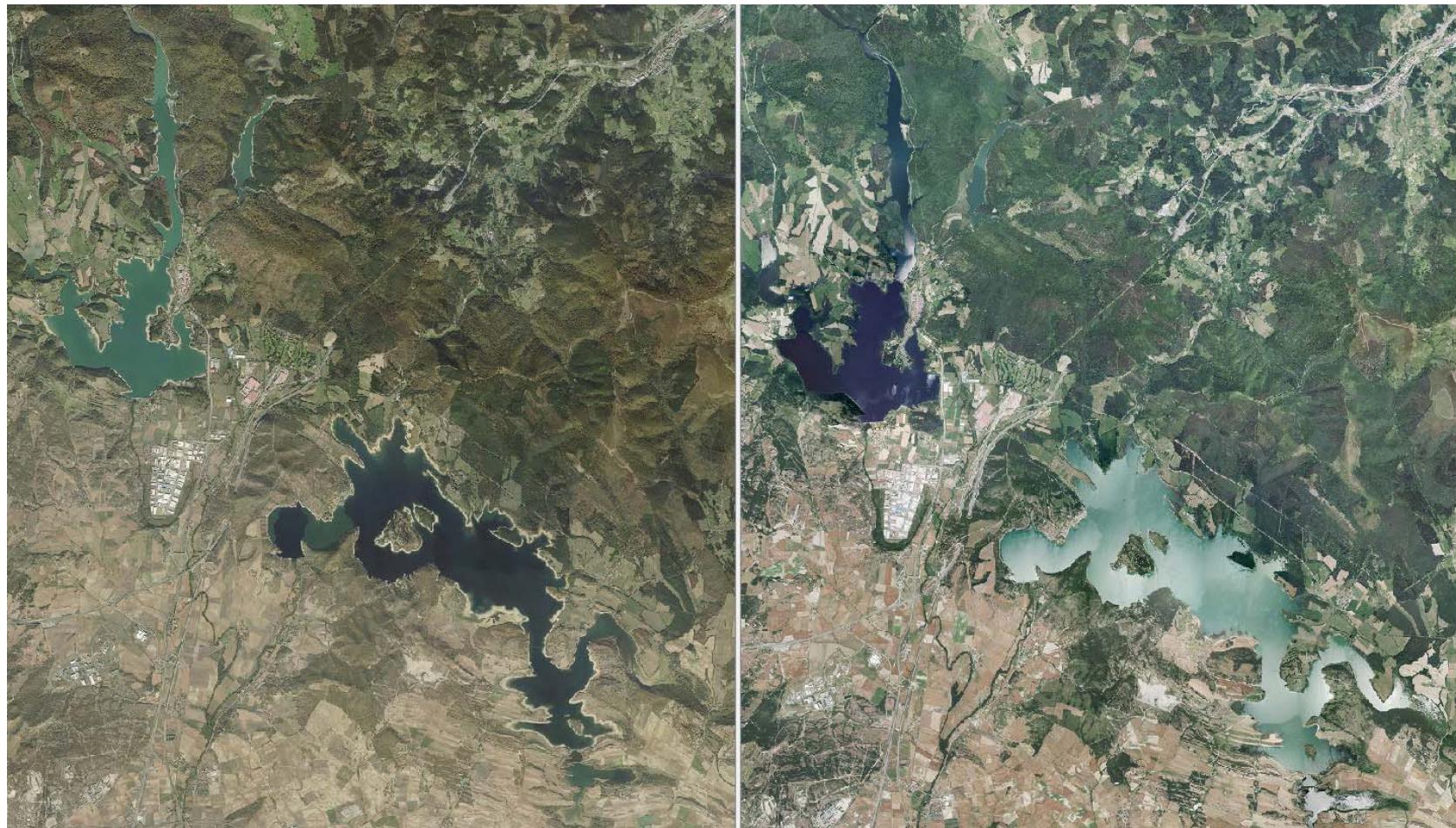


# Ejemplos control de cambios





# Adaptación a otras regiones: Euskadi





# Euskadi. Problemas: sombras





# Euskadi. Problemas: sombras

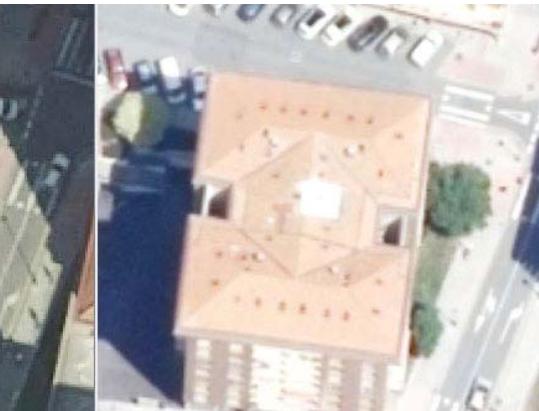




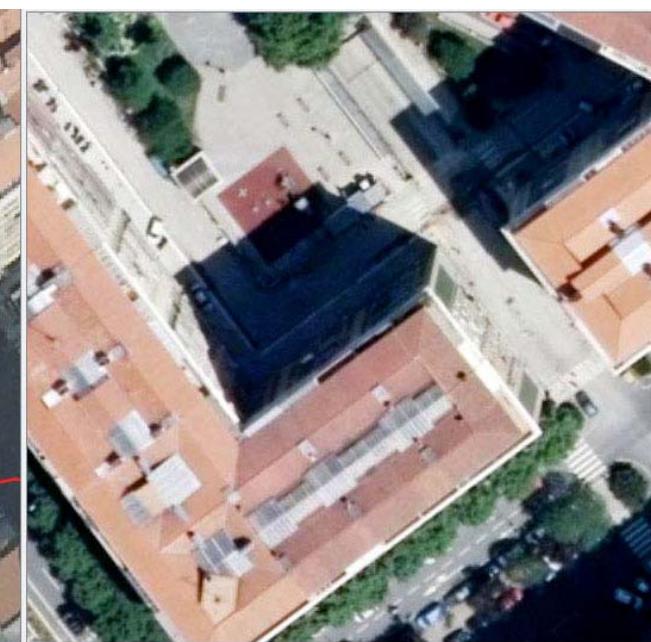
# Euskadi. Problemas: abatimientos ortos



Desplazamiento cubierta  
> 15m



Desplazamiento cubierta  
> 10m



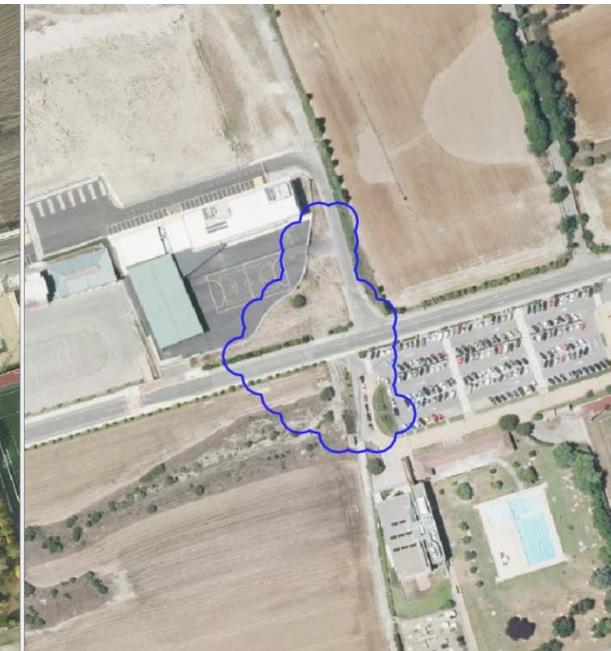
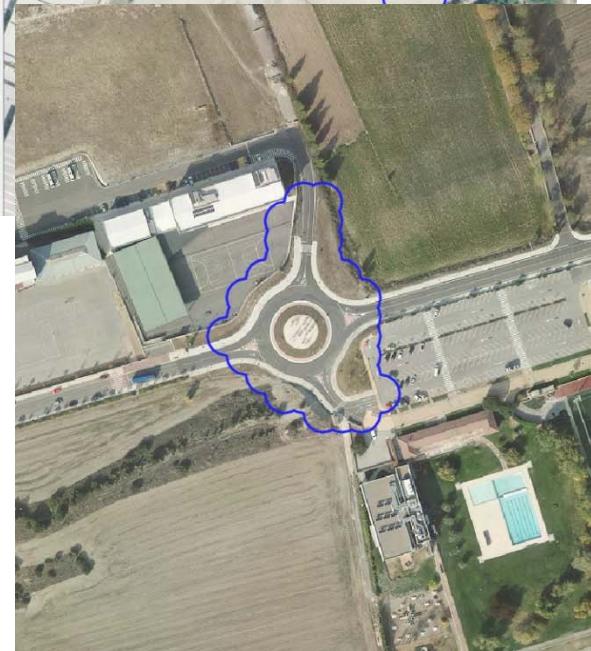
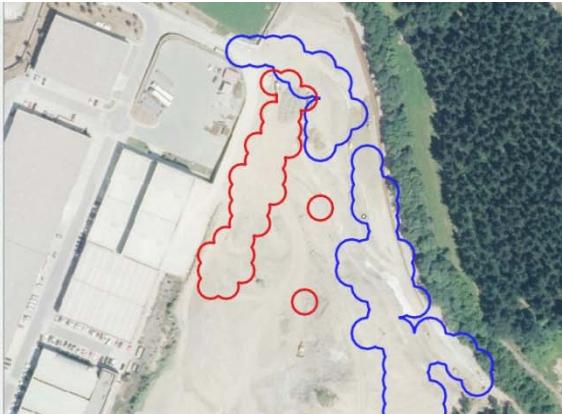
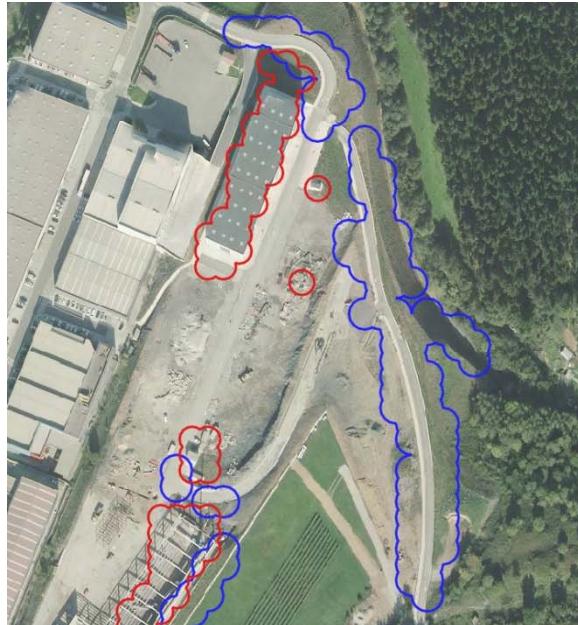


# Ejemplos cambios detectados



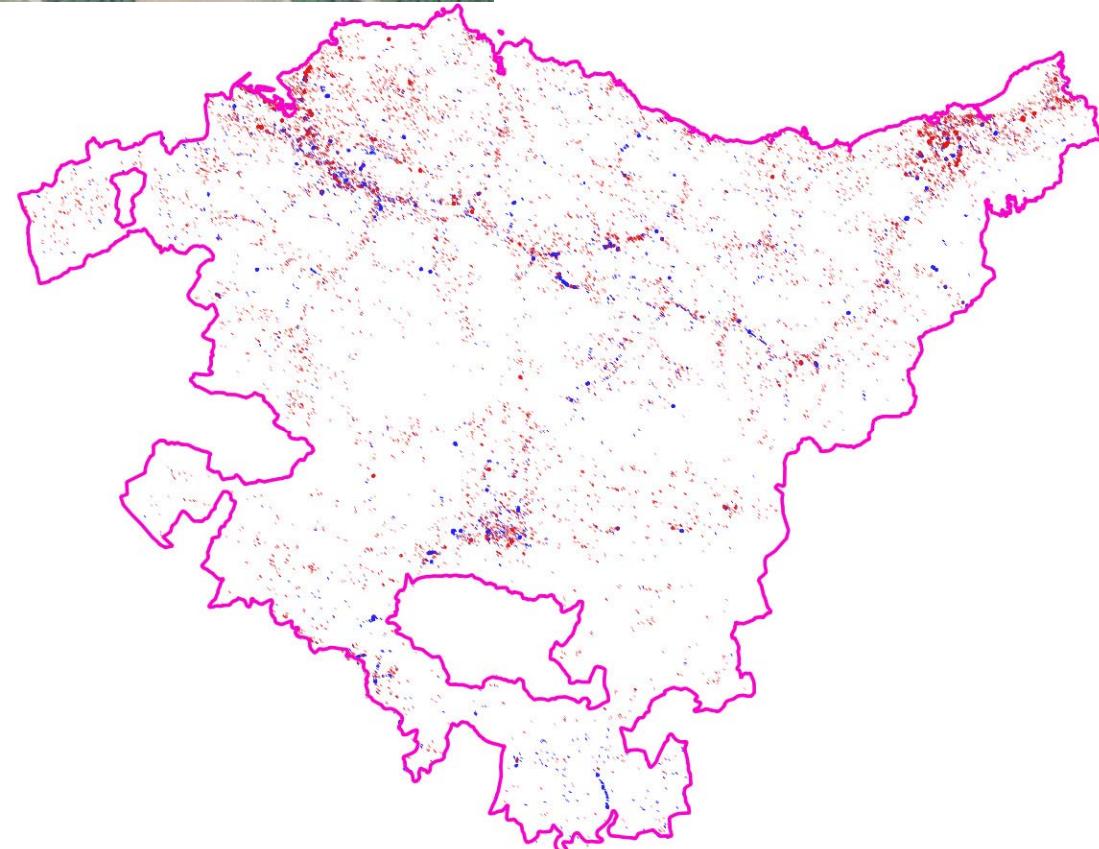


# Ejemplos cambios detectados





# Ejemplos cambios detectados





# Lineas de trabajo...

- Incrementar número de patrones
- Valoración multiagente (ensemble)

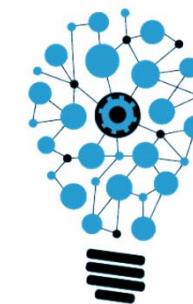
– Varias opiniones



- Mejora en las zonas de abatimientos

– Segmentación de zonas

– Nuevo entrenamiento específico



# Gracias por su atención

Jose Julio Rodrigo - [jrodrigo@grafcan.com](mailto:jrodrigo@grafcan.com)



Web: [www.grafcan.es](http://www.grafcan.es)  
IDECanarias: [www.idecanarias.es](http://www.idecanarias.es)  
Blog: [www.grafcan.es/blog](http://www.grafcan.es/blog)  
Twitter: <http://twitter.com/grafcan>  
Facebook: <http://facebook.com/grafcan>  
Youtube: <http://www.youtube.com/idecanarias>  
Flickr: <http://www.flickr.com/photos/idecanarias>