

Searching for aliens

Basado en el post

<http://www.machinalis.com/blog/searching-for-aliens/>

¿Qué son esos círculos?



It's ALIENS

I'M NOT SAYING IT'S ALIENS...

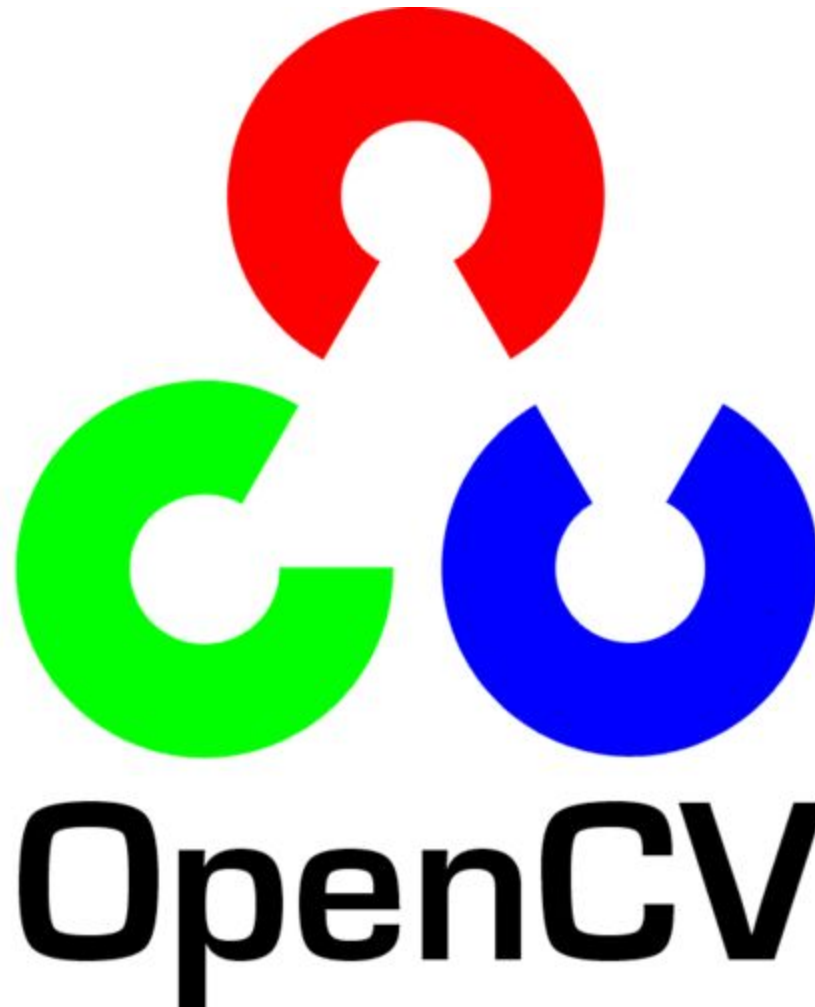
BUT IT'S ALIENS.

ML vs CV



OpenCV

(<http://opencv.org/>)



OpenCV

(<http://docs.opencv.org/4.1.1/>)

- Main modules:
 - core. **Core functionality**
 - imgproc. **Image Processing**
 - imgcodecs. **Image file reading and writing**
 - videoio. **Video I/O**
 - highgui. **High-level GUI**
 - video. **Video Analysis**
 - calib3d. **Camera Calibration and 3D Reconstruction**
 - features2d. **2D Features Framework**
 - objdetect. **Object Detection**
 - dnn. **Deep Neural Network module**
 - ml. **Machine Learning**
 - ...
- Extra modules:
 - cnn_3dobj. **3D object recognition and pose estimation API**
 - face. **Face Analysis**
 - fuzzy. **Image processing based on fuzzy mathematics**
 - hdf. **Hierarchical Data Format I/O routines**
 - hfs. **Hierarchical Feature Selection for Efficient Image Segmentation**
 - superres. **Super Resolution**
 - surface_matching. **Surface Matching**
 - text. **Scene Text Detection and Recognition**
 - tracking. **Tracking API**
 - videostab. **Video Stabilization**
 - viz. **3D Visualizer**
 - xfeatures2d. **Extra 2D Features Framework**
 - ximgproc. **Extended Image Processing**
 - xobjdetect. **Extended object detection**
 - xphoto. **Additional photo processing algorithms**
 - ...

Detección de Círculos (<http://docs.opencv.org/4.1.1/>)

HoughCircles

The function finds circles in a grayscale image using a modification of the Hough transform.

Output: Found circles. Each vect

Parameters:

- **image** – 8-bit, **single-channel**
- **method** – Detection method
- **dp** – Inverse ratio of the accumulator has the same width and height.
- **minDist** – Minimum distance between centers of the detected circles. If the parameter is too small, multiple neighbor circles may be missed.
- **param1** – The higher threshold for the non-maximum suppression.
- **param2** – The accumulator threshold for the circle centers. The smaller it is, the more false circles may be detected.
- **minRadius** – Minimum circle radius.
- **maxRadius** – Maximum circle radius.



imple, if $dp=1$, the accumulator has half as big width

parameter is too small, too large, some circles

one is twice smaller).
e. The smaller it is, the accumulator values, will be

Directo al tutorial

(https://docs.opencv.org/4.1.1/da/d53/tutorial_py_houghcircles.html)

```
import numpy as np
import cv2 as cv
img = cv.imread('c
img = cv.medianBlu
cimg = cv.cvtColor
circles = cv.Hough
    Img, cv.HOUGH_
    param1=50, par
)
circles = np.uint1
for i in circles[0
    # draw the oute
    cv.circle(cimg,
    # draw the cent
    cv.circle(cimg,
cv.imshow('detecte
cv.waitKey(0)
cv.destroyAllWindows()
```



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Aplicación real (<https://github.com/machinalis/satimg/>)

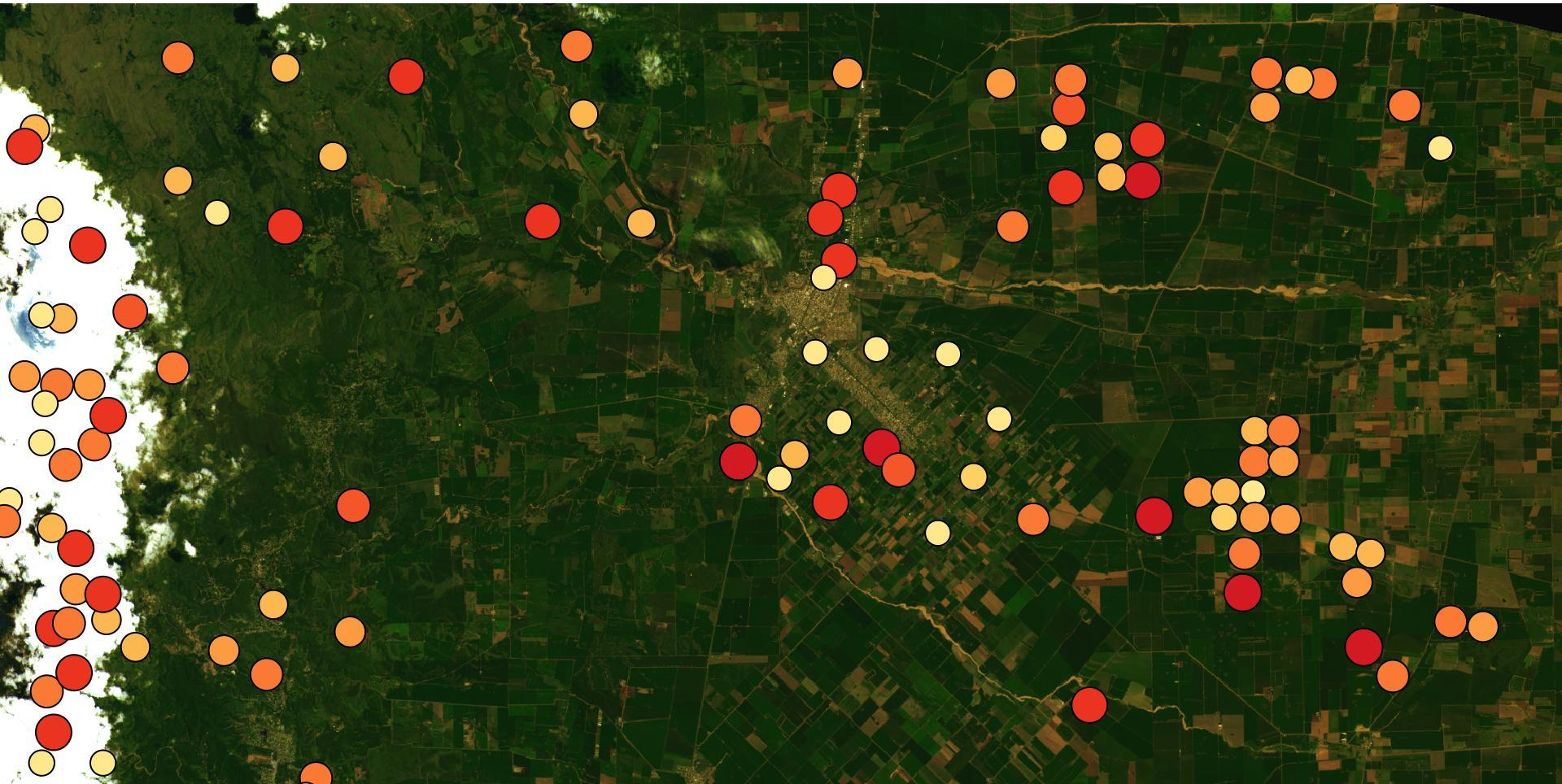
- Imágenes satelitales Landsat 8
 - Múltiples bandas != *single-channel*
 - Resolución radiométrica > 8-bit
 - Mucho “ruido”



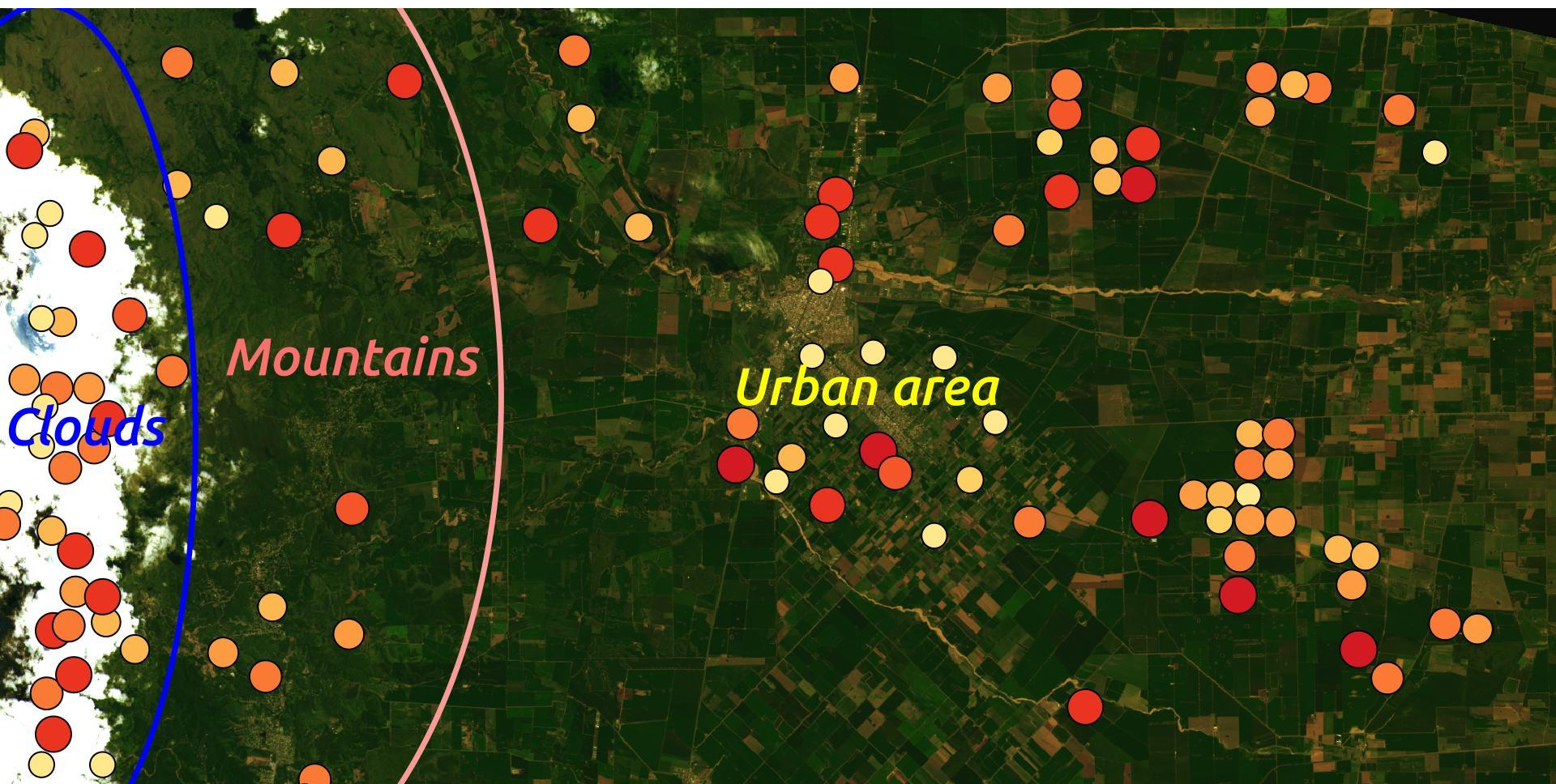
A ver qué sale...



A ver qué sale...



A ver qué sale...



¿Cómo sigue?

- Conocimiento del dominio
 - Índices de vegetación (min, max, promedio)
- Otras fuentes de datos
 - Datos vectoriales (para ríos, caminos, ciudades, etc)
 - DEM (para montañas)
 - Metadatos de calidad propios de la imagen (detección de nubes)
- Características *texturales*
 - Homogeneidad, correlación, dissimilarity





Cooperación



Una marca de  **mercado
libre**



www.kilimo.com.ar



4G R 17:55



eventos.python.org.ar/events/py

3



PyAr



11va conferencia
Argentina de Python

2019
CABA



PYCONAR

4, 5 y 6 de
Diciembre de

Gracias ¿Preguntas?

Carlos Matías de la Torre

cmdelatorre@gmail.com
@py_litox