

Python en la Antropología Biológica

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³ Laboratorio de Ciencias de las Imágenes (LCI)



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Objetivo

En el GIBEH estamos interesados en los orígenes genéticos y ambientales de la variación y evolución craneofacial en homínidos, empleando esta información para el estudio del poblamiento de América y las poblaciones mestizas Latinoamericanas. En este marco, investigamos patrones de integración morfológica en el cráneo de los homínidos y en la cara de los humanos modernos, aplicando conceptos de genética cuantitativa y Evo-Devo.



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Grupo de Trabajo



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Navarro, José Pablo
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Organizamos



2 años / 12 Encuentros



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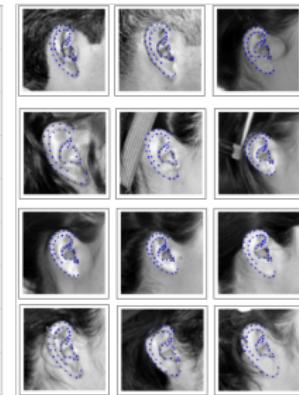
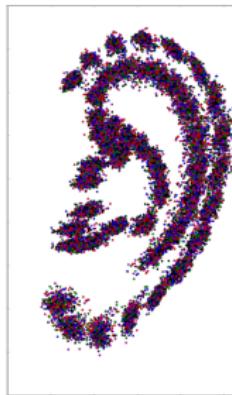
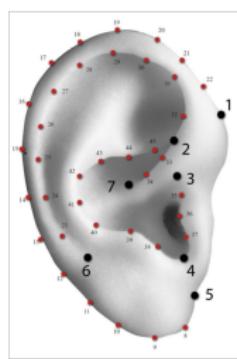
Patagonia Python Meetup



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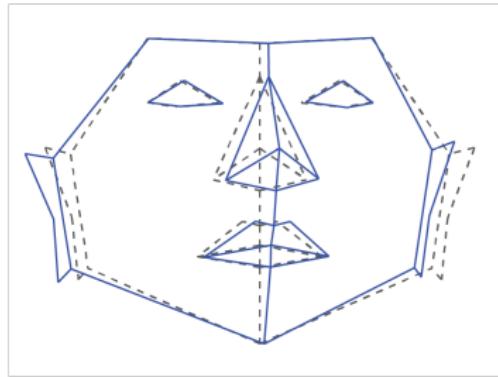
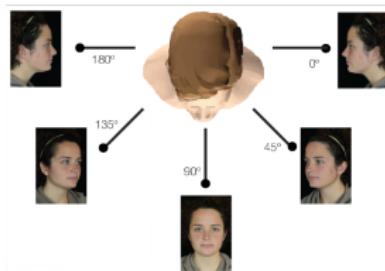
Fenotipado a gran escala

Deep Learning para fenotipado a gran escala sobre imágenes.



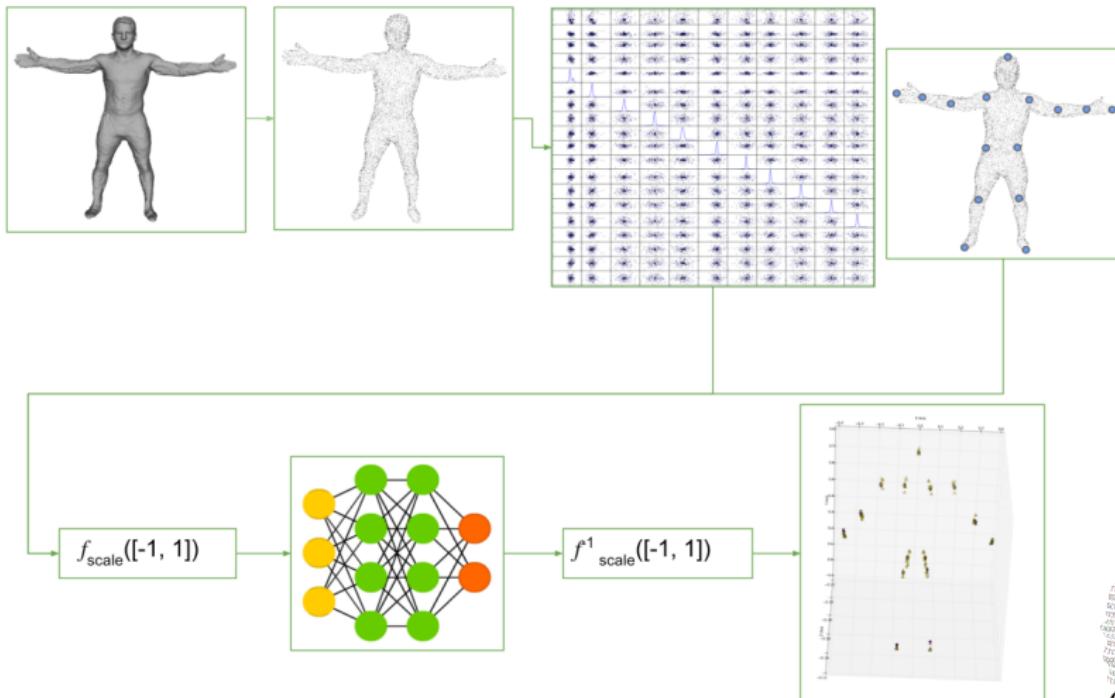
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Fenotipado a gran escala



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Landmarking 3D



Publicación

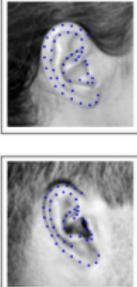
jupyter testing_output_ears Autosave Failed! https://github.com/celiacintas/tests_landmarks Logout

File Edit View Insert Cell Kernel Help Python 2

Predict landmarks over unseen images (test)

```
In [11]: def plot_sample(img, y, axis, move=48):
    axis.imshow(img, cmap='gray')
    axis.scatter(y[0::2] * move + move, y[1::2] * move + move, marker='x', s=5)

In [12]: y_pred = nets[0].predict(X_test)
for i in range(X_test.shape[0]):
    fig = plt.figure(figsize=(6, 3))
    ax = fig.add_subplot(1, 2, 1, xticks=[], yticks[])
    img = X_test[i].reshape(96, 96)
    plot_sample(img, y_pred[i], ax)
    plt.savefig('/tmp/out_lateral_{}.png'.format(str(i)))
    plt.show()
```



IET Biometrics
Research Article

Automatic ear detection and feature extraction using Geometric Morphometrics and convolutional neural networks

IET Journals
The Institution of Engineering and Technology

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www.ietdl.org



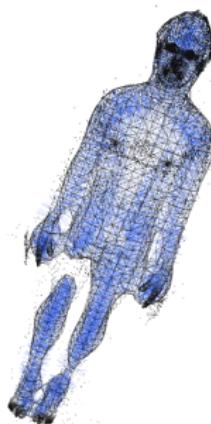
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Fenotipado a gran escala



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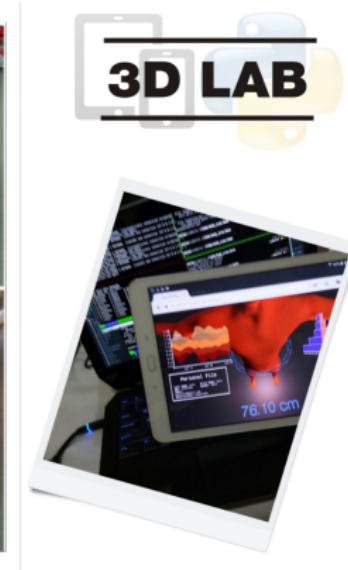
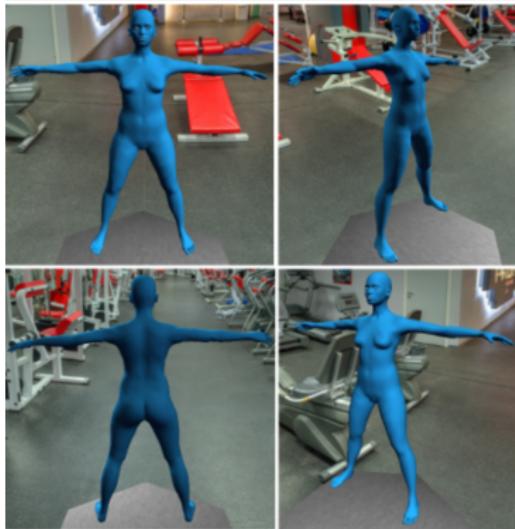
SFM - Structure from motion



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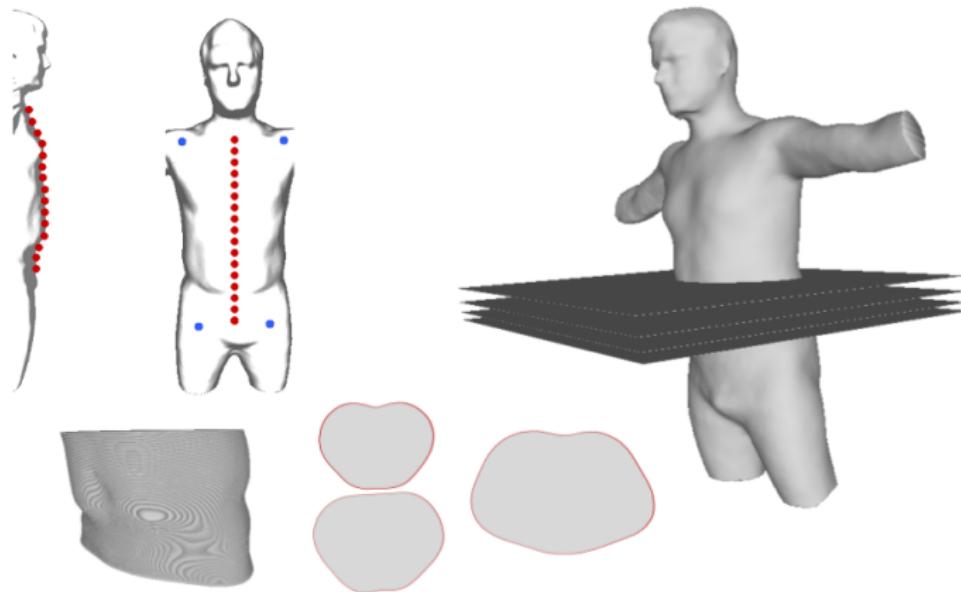
Estudio de formas del cuerpo sobre 3D

Machine Learning para el estudio de formas del cuerpo sobre 3D, y su ulterior implicancia en el estudio de la obesidad sobre la población Patagónica.



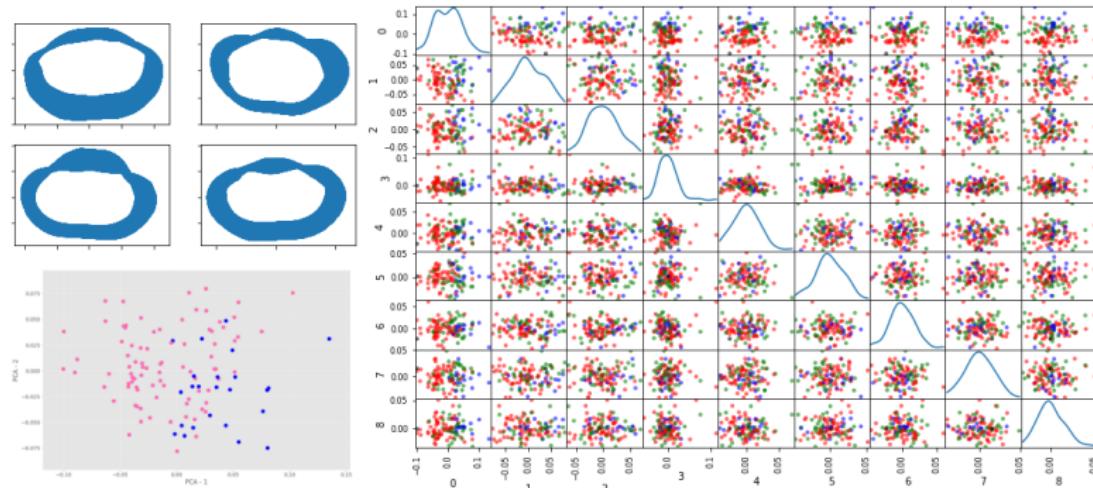
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Estudio de formas del cuerpo sobre 3D



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Estudio de formas del cuerpo sobre 3D

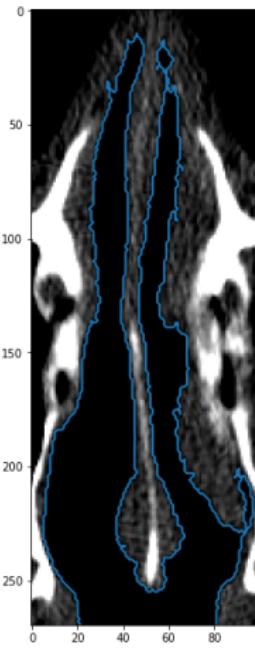
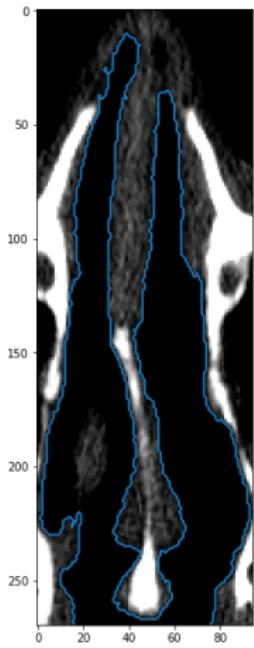
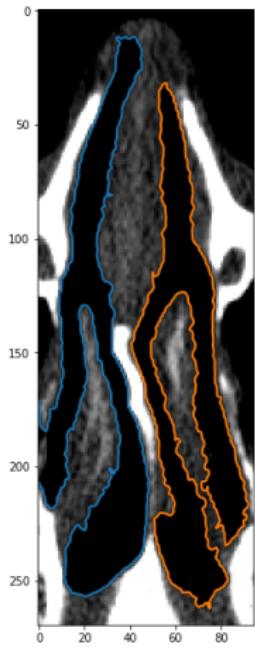
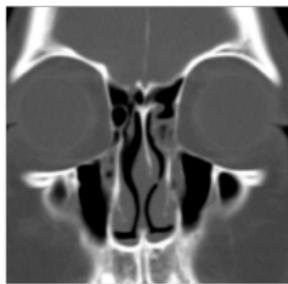


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Estudio de formas del cuerpo sobre 3D

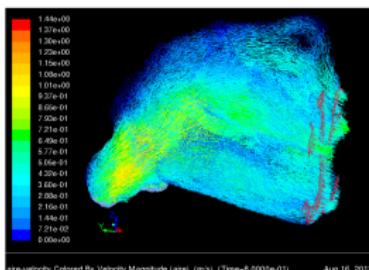
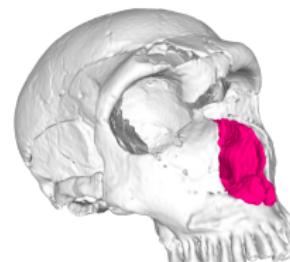
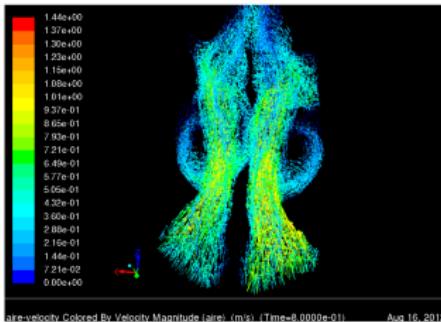


Segmentación y reconstrucción automática



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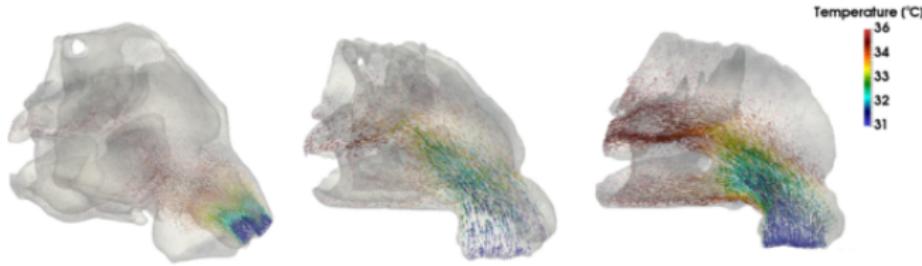
Segmentación y reconstrucción automática



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Nasal airflow simulations suggest convergent adaptation in Neanderthals and modern humans

S. de Azevedo^{a,1}, M. F. González^{a,1}, C. Cintas^{a,1}, V. Ramallo^a, M. Quinto-Sánchez^b, F. Márquez^c, T. Hünemeier^d, C. Paschetta^a, A. Ruderman^a, P. Navarro^a, B. A. Pazos^a, C. C. Silva de Cerqueira^e, O. Velan^f, F. Ramírez-Rozzi^g, N. Calvo^h, H. G. Castro^{i,j}, R. R. Paz^{i,k,2}, and R. González-José^{a,2}

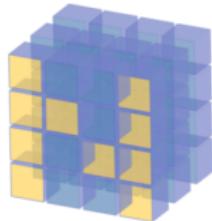


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Segmentación y reconstrucción automática



scikit-image
image processing in python



NumPy

OpenCV

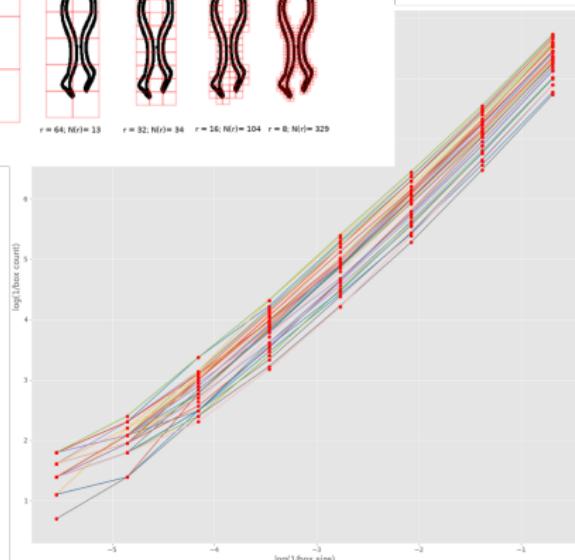
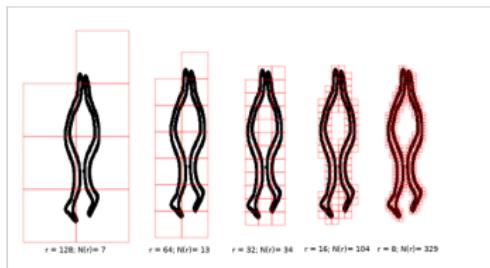
P Y T O R C H



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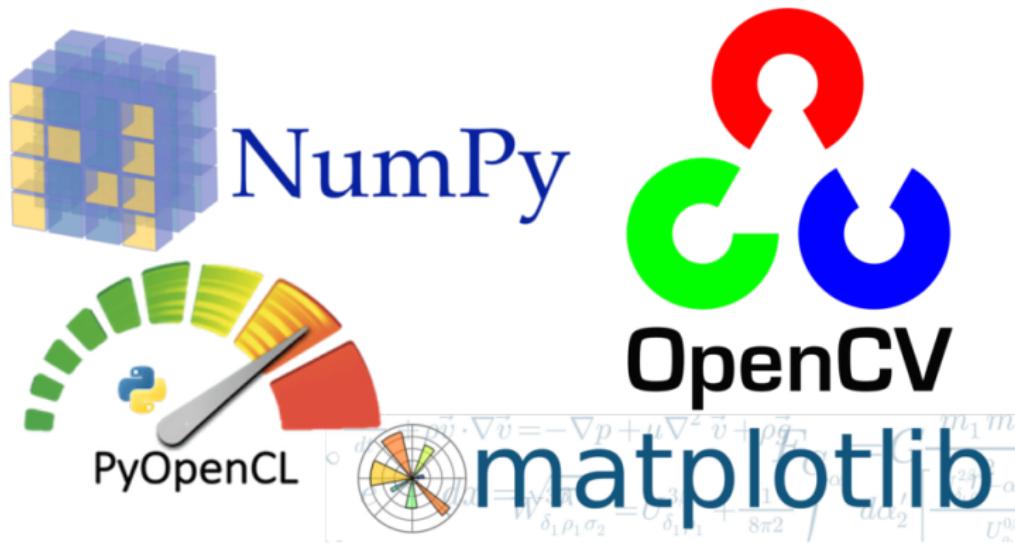
Análisis Fractal 2D

Análisis fractal de estructuras anatómicas en 2D.



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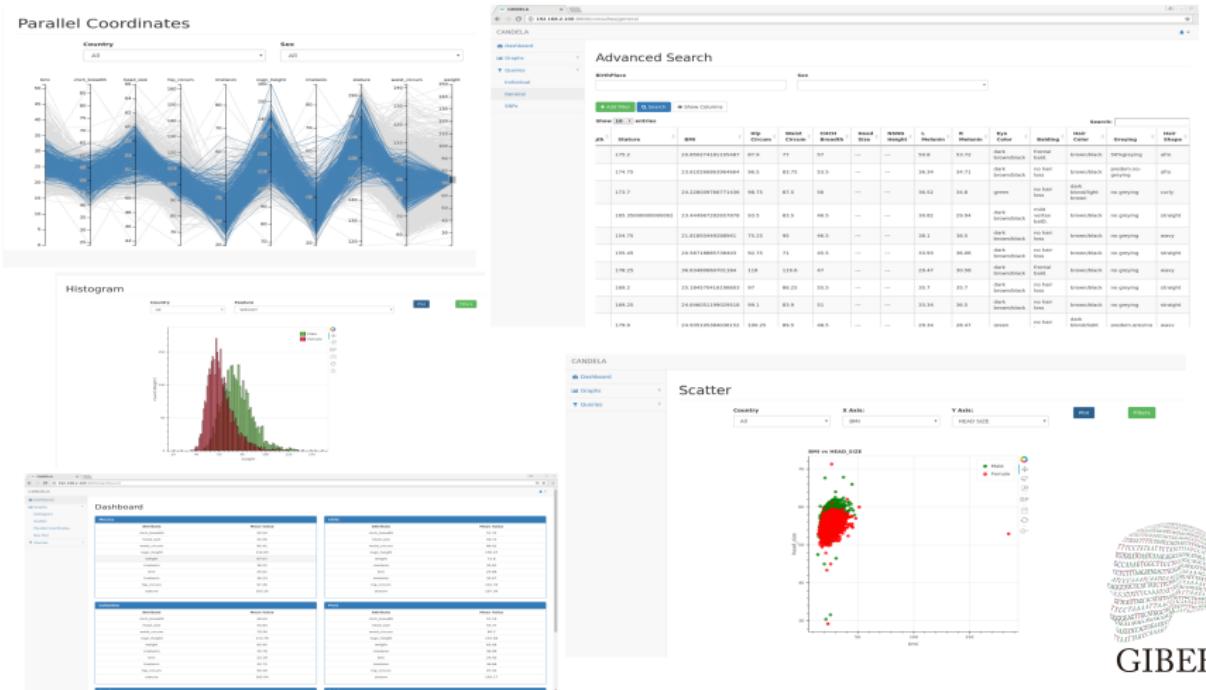
Análisis Fractal 2D



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Data Warehouse de datos poblacionales

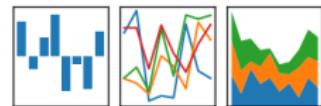
Data Warehouse de datos heterogéneos poblacionales. Desarrollado por : Leandro Luque (Pasante de UNPSJB).



Data Warehouse de datos poblacionales



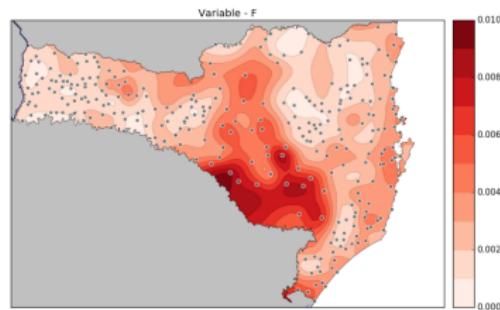
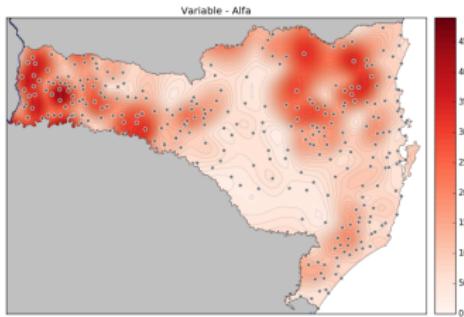
pandas
 $y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$



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Análisis de Apellidos

Análisis de apellidos, su distribución, origen, abundancia en una región, estimaciones de consanguinidad e isonimia en la población.



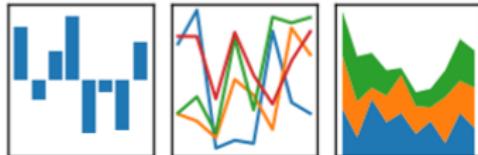
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Análisis de Apellidos



pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



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Otras Publicaciones



RESEARCH ARTICLE

Socioeconomic Status Is Not Related with Facial Fluctuating Asymmetry: Evidence from Latin-American Populations

IET Biometrics

Research Article



Automatic ear detection and feature extraction using Geometric Morphometrics and convolutional neural networks



Journal of Forensic Research

Review Article

Predicting Physical Features and Diseases by DNA Analysis: Current Advances and Future Challenges



Received 4 Nov 2014 | Accepted 14 May 2015 | Published 24 Jun 2015

DOI: 10.1038/ncomms8500

OPEN

A genome-wide association study identifies multiple loci for variation in human ear morphology



Received 3 Jul 2015 | Accepted 14 Apr 2016 | Published 19 May 2016

DOI: 10.1038/ncomms11616

OPEN

A genome-wide association scan implicates *DCHS2*, *RUNX2*, *GLI3*, *PAX1* and *EDAR* in human facial variation

AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 00:00-00

Facial Asymmetry and Genetic Ancestry in Latin American Admixed Populations

Original Research Article

Shifts in Subsistence Type and Its Impact on the Human Skull's Morphological Integration

AMERICAN JOURNAL OF HUMAN BIOLOGY 28:118-128 (2016)



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Gracias !

¿Preguntas?



LABORATORIO DE
CIENCIAS DE LAS
IMAGENES

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