

PISCIS: Platform for Interactive Search and Citizen Science

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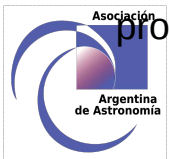
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abstract:

Many topics in modern astronomy are characterized by the identification of features on images. While this is an easy task for a trained eye, it is difficult to carry out through models or numerical methods. Here we present a tool that eases the process of generating value added catalogs from data comprising a set of images. This is made through a citizen science web platform (PISCIS, Platform for Interactive Search and Citizen Science), built on Django, a free python framework for web development. We present a report on the experience and early results of PISCIS implemented on an observational catalogue of galaxy pairs, aimed at classifying the type of interactions. With this dataset, we analyze several stability and reproducibility metrics of the platform and discuss its potential application to problems strongly based on image classification tasks.

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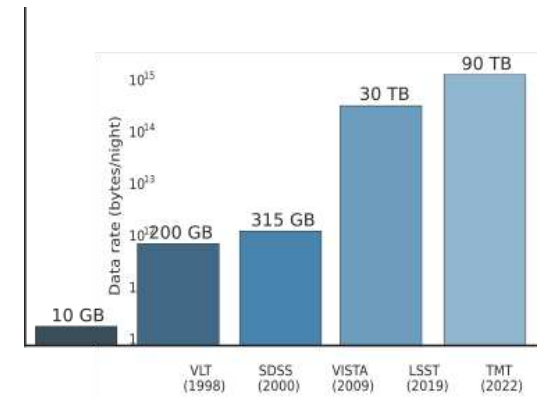
PISCIS

Platform for interactive search citizen science

Context:

Astronomy is being overcrowded by an exponential growth in the volume and complexity of observational and theoretical data (Szalay et al. 2002). This decreases considerably the efficiency of manual analysis, making it unworkable. To contribute to data science, we have generated a software application that uses citizen interest to facilitate data collection and analysis, which we call PISCIS: Platform for Interactive Search and Citizen Science.

<https://github.com/mkoraj/piscis>



PISCIS

Platform for interactive search citizen science

Project description:

PISCIS was developed on Django, a web framework that meets all the requirements necessary for the manufacture of our app and the pleasant distribution of it.

Django follows the MVT design pattern: Model - View - Template, and its main programming language is Python. A Model is a special type of object that defines the fields and their behaviour. Using software like DBBrowser for SQLite, we can visualize the model, which defines a database as a table. The View describes "what" data will be presented. While the Template describes "how" the data will look like and its format is an HTML (HyperText Markup Language) file.

In summary, in the MVT design, we first define the Models, choose which of their fields will be observable from the Views and, through the Templates, how they will be observed by the web users.

```
├── blog
│   ├── __init__.py
│   ├── admin.py
│   ├── apps.py
│   ├── migrations
│   │   └── __init__.py
│   ├── models.py
│   ├── tests.py
│   └── views.py
├── db.sqlite3
├── manage.py
├── mysite
│   ├── __init__.py
│   ├── settings.py
│   ├── urls.py
│   └── wsgi.py
└── requirements.txt
```

PISCIS

Platform for interactive search citizen science

Classification of galaxies:

PISCIS allows the creation of a web page where users can vote in a poll predetermined by the astronomers and accompanied by a set of images.

To measure its potential, we use it to classify pairs of galaxies according to if these present High, Medium and Low interaction.

The observational data used is a catalogue of pairs of galaxies from the SDSS. Are defined from the differences in velocity, distance and apparent magnitude of the galaxies that make up the pair and taking into account the criteria of isolations of this system with other galaxies. The images used in this application were generated with **SCORPIO**.

The screenshot shows the PISCIS web application interface. At the top, there is a navigation bar with links for 'Inicio', 'ENCUESTA', 'DESCRIPCIÓN', 'CONTACTOS', and 'INGRESAR'. The main content area displays a poll titled '¿Qué tipo de Interacción ves?' (What type of interaction do you see?). The poll options are 'Alta' (High), 'Media' (Medium), and 'Baja' (Low). The 'Baja' option is selected. Below the poll, there are two columns of galaxy images. The left column is labeled 'Alta Media Baja' and the right column is labeled '¿Qué tipo de Interacción ves?'. The interface also shows a database management tool with two tables: 'encuesta_imagenes' and 'encuesta_choice'.

id	picture
1	imagepar_...
2	imagepar_...
3	imagepar_...
4	imagepar_...
5	imagepar_...
6	imagepar_...
7	imagepar_...
8	imagepar_...
9	imagepar_...
10	imagepar_...
11	imagepar_...
12	imagepar_...

id	voto	imagen_id	usuario_id
1	Baja	237	1

Classification of galaxies:

Once the user has registered on the website and voted, the system generates a database, with the index of the image, the ID and the option that the user voted.

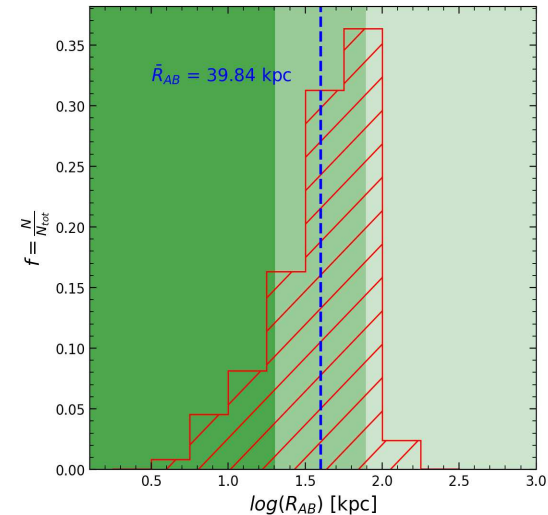
With this data generation modality, we are creating a sample of pairs of galaxies with information on their interaction based on a visual classification. Remember, this is only an example. **PISCIS can be used for any objects that can be classified by images.**

New Database Open Database Write

Database Structure Browse Data Edit Pragmas

Table: encuesta_choice

id	voto	imagen_id	usuario_id
		Filter	Filter
1	1 C	3	2
2	2 A	2	2
3	3 B	3	2
4	4 B	2	2
5	5 A	3	2
6	6 C	3	2
-	-	1	2
		3	2



Conclusiones y Perspectivas a futuro:

- ❖ We made a tool that can be used for any astronomical study where a classification needs to be made from visual analysis.
- ❖
- ❖ In addition, we are obtaining a new sample of galaxy pairs with a description based on a visual classify of their interaction type, to be analyzed.
- ❖ Como trabajo a futuro, agregaremos modificaciones a PISCIS para que la misma tenga un mayor alcance en cuanto a servidores web.



PROYECTO PISCIS

La aplicación informática PISCIS: Platform for Interactive Search and Citizen Science, construida sobre Django, un framework web de python de uso libre para el desarrollo de páginas web. El objetivo de este proyecto es brindar una herramienta a la comunidad científica que facilite el proceso de generación de datos a partir de un conjunto de imágenes computadas de una encuesta, a través de una plataforma web de ciencia ciudadana. En particular mostramos la implementación de PISCIS sobre un catálogo observacional de pares de galaxias destinado a clasificar el tipo de interacción entre las mismas. Mostramos también los principales resultados obtenidos tras su aplicación.

Puedes acceder a toda la documentación del proyecto PISCIS en nuestro [github aquí](#).