

ANALYSIS OF RESIDENTIAL NEIGHBORHOODS IN MADRID, SPAIN

Author: Raúl Castellanos

DISCOVERING RESIDENTIAL NEIGHBORHOODS IS VALUABLE FOR FAMILIES

- ALL CITIES (ESPECIALLY THE BIGGEST ONES) HAVE DIFFERENT TYPE OF NEIGHBORHOODS. SOME OF THEM ARE MORE SUITABLE FOR TOURIST, OTHER ONES FOR SHOPPING AND SOME OF THEM FOR SETTING A FAMILY.
- FAMILIES NEED TO KNOW WHICH ARE THE MOST SUITABLE NEIGHBORHOODS FOR LIVING IN A NEW CITY
- MADRID IS THE CAPITAL CITY OF SPAIN. IT HAS MORE THAN 100 NEIGHBORHOODS WITH A TOTAL POPULATION OF 3.334.730. IT IS PRETTY DIFFICULT FOR A NEW FAMILY THAT ARRIVES TO THE CITY TO KNOW WHERE TO START LIVING.
- THE OBJECTIVE OF THIS PROJECT IS TO DIFFERENTIATE WHICH ARE THE RESIDENTIAL NEIGHBORHOODS IN THIS CITY.

DATA ACQUISITION AND CLEANING

- INFORMATION OF EVERY NEIGHBORHOOD IN MADRID, SUCH AS THE NAME AND THE PER INCOME CAPITA FROM:
[HTTPS://WWW.MADRID.ES/PORTALES/MUNIMADRID/ES/INICIO/EL-AYUNTAMIENTO/ESTADISTICA/?VGNEXTFMT=DEFAULT&VGNEXTCHANNEL=8156E39873674210VGNVCM1000000B205A0ARCRD](https://www.madrid.es/portales/munimadrid/es/Inicio/El-Ayuntamiento/Estadistica/?vgnextfmt=default&vgnextchannel=8156E39873674210VGNVCM1000000B205A0ARCRD).
- GEOGRAPHICAL COORDINATES OF EVERY NEIGHBORHOOD USING THE GEOPY LIBRARY.
- INFORMATION OF PUBLIC SCHOOLS IN THE CITY FROM : [HTTPS://DATOS.MADRID.ES/PORTAL/SITE/EGOB/](https://datos.madrid.es/portal/site/egob/)

METHODOLOGY

- COLLECT THE MADRID CITY DATA IN DATAFRAMES:

	Neighborhood	Renta	Latitude	Longitude	Colegios
0	Abrantes	10544.0	40.37980	-3.72636	4
1	Acacias	19323.0	40.40137	-3.70669	1
2	Adelfas	18991.0	40.40173	-3.67288	1
3	Aeropuerto	9814.0	40.48337	-3.55949	0
4	Alameda de Osuna	19871.0	40.45818	-3.58953	1
...
126	Ventas	12072.0	40.42238	-3.65020	3
127	Villaverde Alto, C.H. Villaverde	9354.0	40.34922	-3.71211	0
128	Vinateros	12695.0	40.40444	-3.64029	2
129	Vista Alegre	10775.0	40.38492	-3.74635	2
130	Zofio	9601.0	40.37987	-3.71495	2

131 rows x 5 columns

- USING FOUR SQUARE API WE WILL FIND ALL VENUES FOR EACH NEIGHBORHOOD.
- CLUSTER THE NEIGHBORHOODS ACCORDING TO ITS VENUES.
- VISUALIZE THE CLUSTER AND COMPARING TO PUBLIC SCHOOLS DISTRIBUTION

METHODOLOGY

- COLLECT THE MADRID CITY DATA IN DATAFRAMES:
- USING FOUR SQUARE API WE WILL FIND ALL VENUES FOR EACH NEIGHBORHOOD:

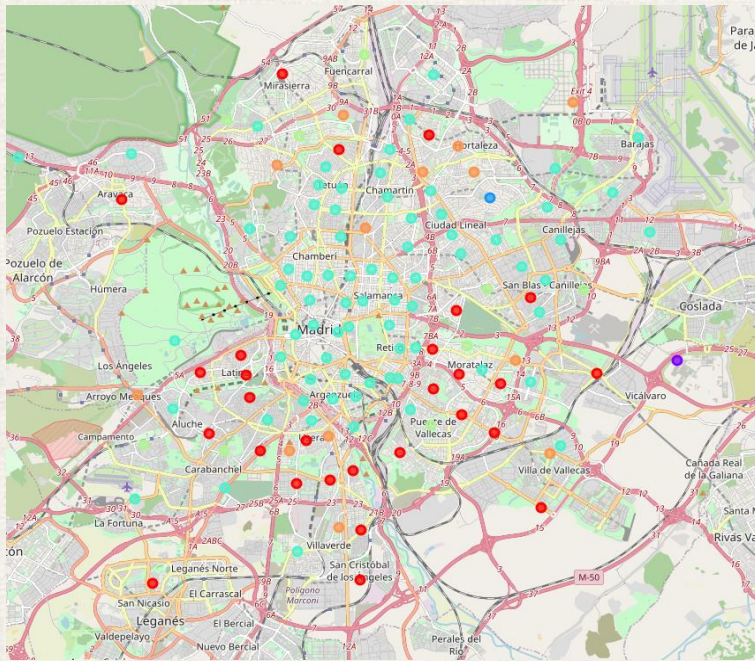
```
#create list with neighborhoods to exclude
neigh_to_exclude = Madrid_venues_count[Madrid_venues_count['Venue Category Count'] < 4]
#create filtered dataframe by excluding neighborhoods in above list
Madrid_venues_filt = Madrid_venues[~Madrid_venues['Neighborhood'].isin(neigh_to_exclude)]
#rename filtered dataframe back to toronto_venues
Madrid_venues = Madrid_venues_filt
#check counts after filtering
Madrid_venues.groupby('Neighborhood').count()
```

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude
Abrantes	7	7	7	7	7
Acacias	54	54	54	54	54
Adelfas	50	50	50	50	50
Alameda de Osuna	23	23	23	23	23
Almagro	100	100	100	100	100
...
Ventas	11	11	11	11	11
Villaverde Alto, C.H. Villaverde	4	4	4	4	4
Vinateros	8	8	8	8	8
Vista Alegre	17	17	17	17	17
Zofio	7	7	7	7	7

- CLUSTER THE NEIGHBORHOODS ACCORDING TO ITS VENUES.
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METHODOLOGY

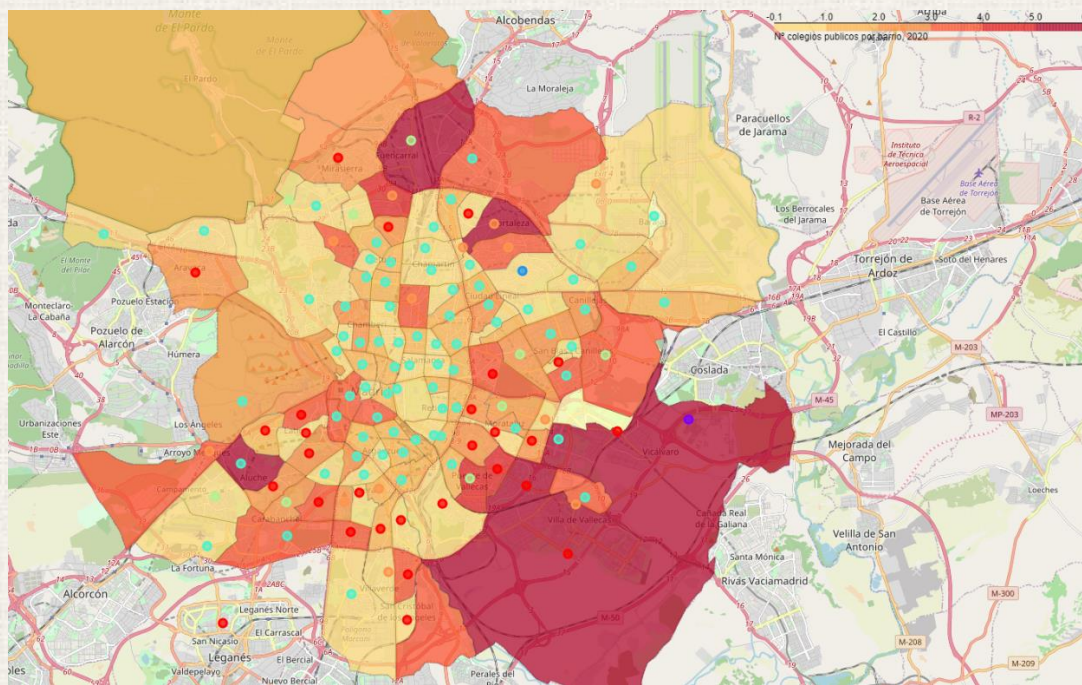
- COLLECT THE MADRID CITY DATA IN DATAFRAMES:
- USING FOUR SQUARE API WE WILL FIND ALL VENUES FOR EACH NEIGHBORHOOD.
- **CLUSTER THE NEIGHBORHOODS ACCORDING TO ITS VENUES:**



- VISUALIZE THE CLUSTER AND COMPARING TO PUBLIC SCHOOLS DISTRIBUTION

METHODOLOGY

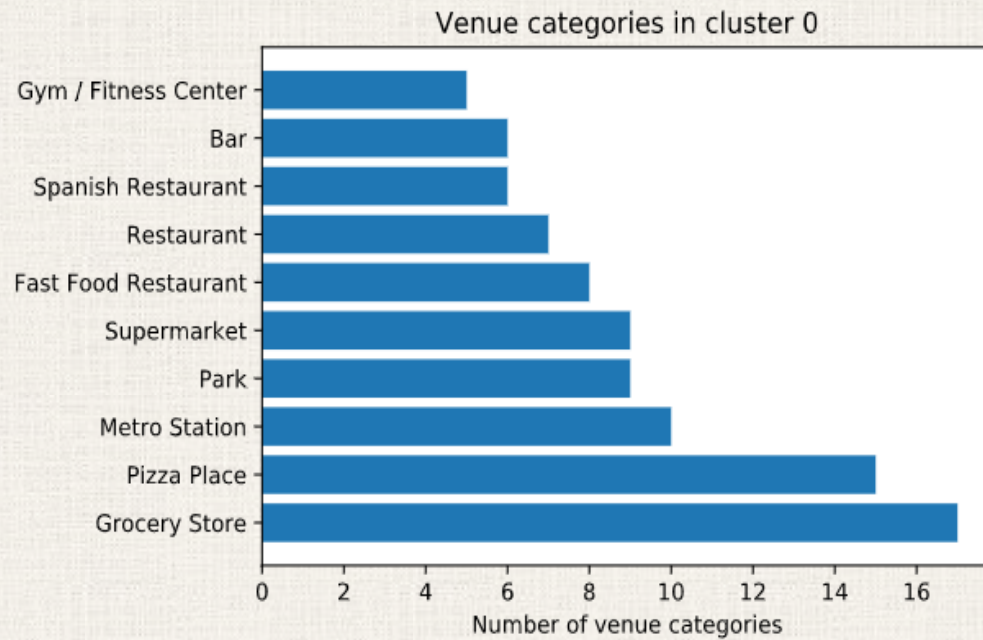
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- USING FOUR SQUARE API WE WILL FIND ALL VENUES FOR EACH NEIGHBORHOOD:
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- **VISUALIZE THE CLUSTER AND COMPARING TO PUBLIC SCHOOLS DISTRIBUTION:**



RESULTS

- MOST SUITABLE RESIDENTIAL NEIGHBORHOODS:

Cluster 0: Residential



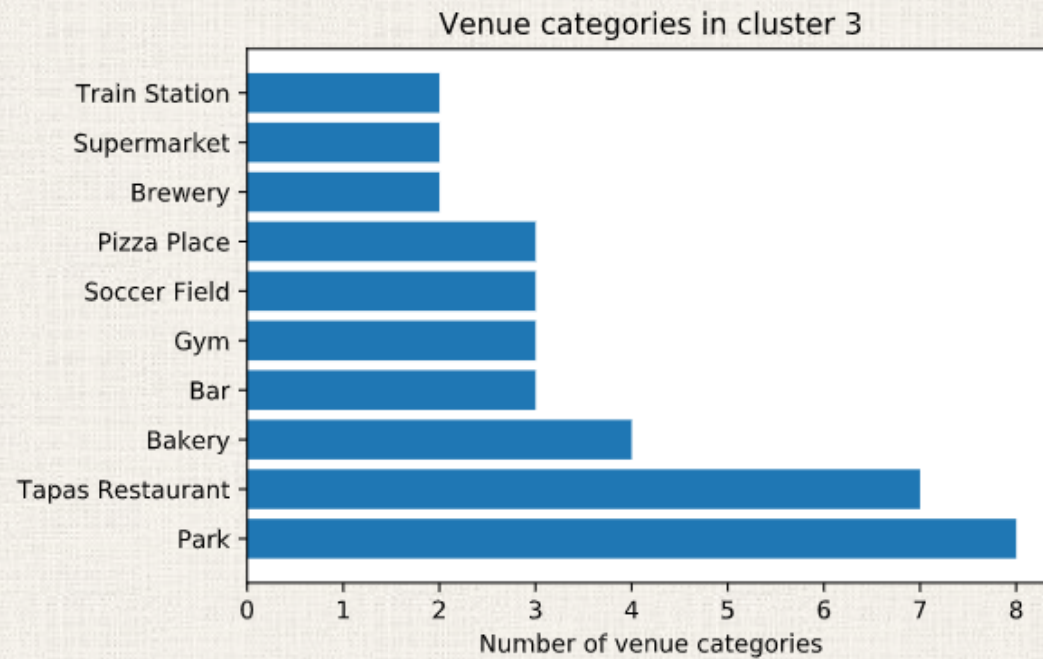
Plenty of useful services for a family like:

- *Grocery stores*
- *Metro stations*
- *Parks*
- *Supermarkets*
- *Gyms*

RESULTS

- MOST SUITABLE RESIDENTIAL NEIGHBORHOODS:

Cluster 3: Sport lovers residential area



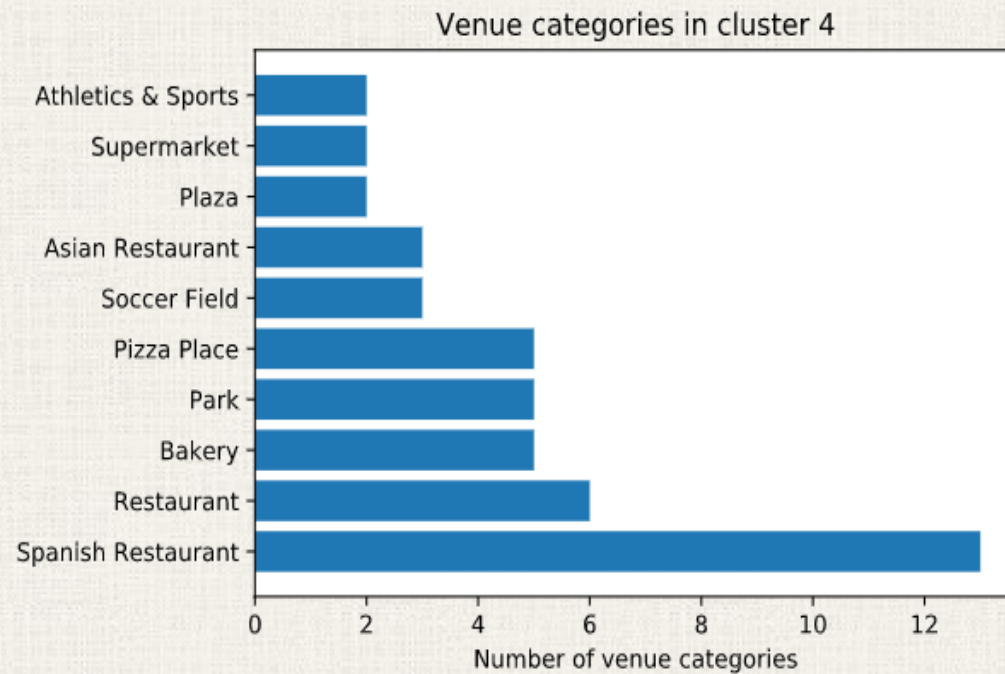
Interesting services for a sport lover family like:

- *Soccer fields*
- *Gyms*
- *Parks*
- *Supermarkets*
- *Train stations*

RESULTS

- MOST SUITABLE RESIDENTIAL NEIGHBORHOODS:

Cluster 4: Food lovers residential area



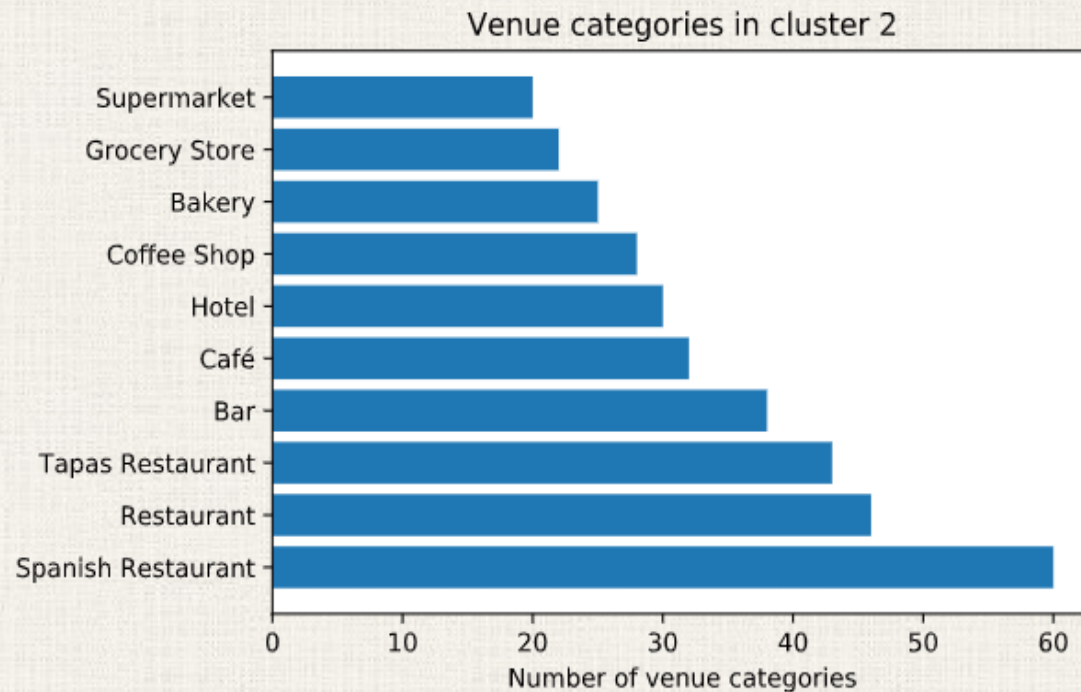
Plenty of useful services for a family like:

- *Restaurants*
- *Spanish restaurants*
- *Parks*
- *Supermarkets*
- *Plaza*

RESULTS

- LESS SUITABLE RESIDENTIAL NEIGHBORHOODS:

● *Cluster 2: Downtown*

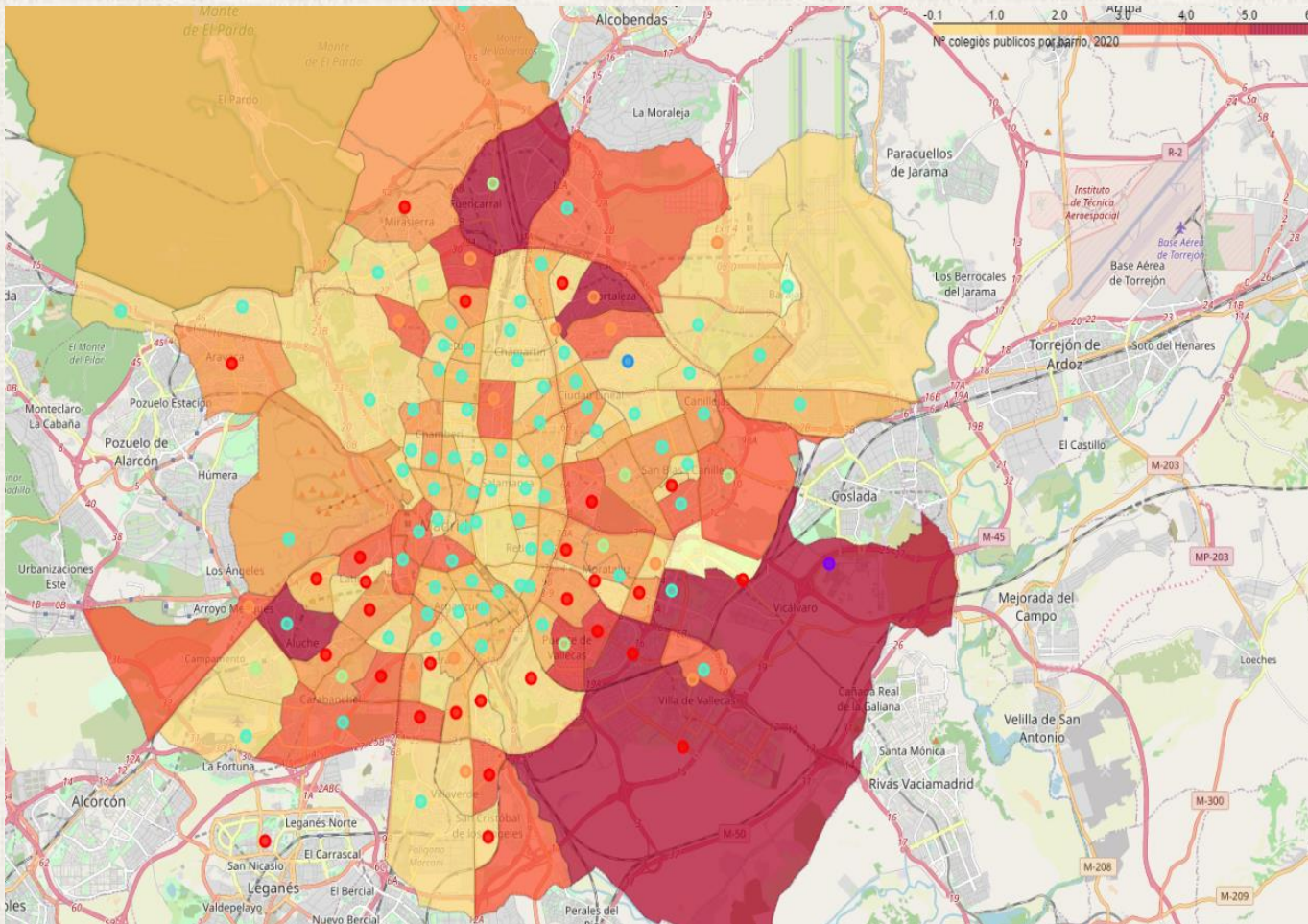





Plenty of useful services for a tourist like:

- *High end Restaurants*
- *Hotels*
- *Coffee shops*
- *Bar*

CONCLUSION

- COMPARING TO PUBLIC SCHOOLS DISTRIBUTION:



We can see that the previous clusters ( ,  and ) are in those neighborhoods with a huge amount of public schools.

That is according to what is expected
so its seems to be a pretty realiable
Project.

As we have shown before, we can even decide among different type of residential neighborhoods.

3. CLONAR PROYECTO DE GITLAB

- CLONAR PROYECTO DESDE LA PAGINA [HTTPS://GITLAB.COM/RCASTELL/OSIRIS](https://gitlab.com/rcastell/osiris)

CREAR LA CARPETA DONDE QUEREMOS INSTALAR PROYECTO. EN MI CASO: /HOME/DOCUMENTOS/IAC/OSIRIS.

PARA ELLO DEBERÍA HACER EL COMANDO “*GIT CLONE*” DENTRO DE LA CARPETA “IAC”

Reproducible source for XXXXXXXXXXXXXXXXXXXX

Copyright (C) 2018-2020 Mohammad Akhlaghi mohammad@akhlaghi.org
See the end of the file for license conditions.

This is the reproducible project source for the paper titled “**XXX XXXXX XXXXXXX**”, by XXXXX XXXXXX, YYYYYY YYYYY and ZZZZZZ ZZZZZ that is published in XXXXX XXXXX.

To reproduce the results and final paper, the only dependency is a minimal Unix-based building environment including a C compiler (already available on your system if you have ever built and installed a software from source) and a downloader (Wget or cURL). Note that **Git is not mandatory**: if you don't have Git to run the first command below, go to the URL given in the command on your browser, and download the project's source (there is a button to download a compressed tarball of the project). If you have received this source from arXiv, please see the respective section below.

```
$ git clone XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
$ cd XXXXXXXXXXXXXXXXXXXX
$ ./project configure
$ ./project make
```

master osiris / +

History Find file Web IDE Clone

Descriptions added
Raul Castellanos Sanchez authored 6 months ago

README GNU GPLv3 Add CHANGELOG Add CONTRIBUTING Add

Clone with SSH
git@gitlab.com:rcastell/osiris.

Clone with HTTPS
https://gitlab.com/rcastell/osi

Name	Last commit	Last update
reproduce	Descriptions added	6 months ago
tex/src	Verification of output values and data added within template	9 months ago
.dir-locals.el	Configure step: compiler checks done before basic settings	8 months ago
.file-metadata	Moving basic configuration of Git section in README-hacking.md	8 months ago
.gitignore	Some new Makefiles and gitignore modification	8 months ago
COPYING	Added generic copying/license file to top	1 year ago
README-hacking.md	Imported Raul's additions to README-hacking.md, no conflicts	8 months ago

4. INICIAR CONFIGURACIÓN

- DENTRO DE LA CARPETA OSIRIS INTRODUCIR COMANDO:
`./PROJECT CONFIGURE`
- LA CONFIGURACIÓN TOMA EN TORNO A 1-2H (SEGÚN EL ORDENADOR). EN CASO DE DAR CUALQUIER PROBLEMA PODEMOS COMPROBAR QUE HA PASADO CON EL COMANDO (PUEDE PEDIR ALGUNA INSTALACIÓN EXTRA):
`./PROJECT CONFIGURE -E`

4. INICIAR CONFIGURACIÓN

PARA INICIAR LA CONFIGURACIÓN NOS PEDIRÁ UNA SERIE DE CARPETAS:

- **TOP BUILD DIRECTORY**: EN ESTA CARPETA CONSTRUIRÁ LAS DEPENDENCIAS Y SACARA TODOS LOS RESULTADOS DE CADA UNO DE LOS PASOS DE LA REDUCCIÓN. LO RECOMENDABLE ES QUE SE TRATE DE UNA CARPETA AL MISMO NIVEL DE OSIRIS, ES DECIR, SIGUIENDO EL EJEMPLO SEGUIDO HASTA AHORA USAR LA RUTA:

/HOME/DOCUMENTOS/IAC/OUTPUT

- **INPUT DIRECTORY**: EN ESTA CARPETA SE INTRODUCIRÁN TODAS LAS IMÁGENES NECESARIAS DURANTE LA RUTINA, LA RUTA A INTRODUCIR EN ESTE CASO ES:

/HOME/DOCUMENTOS/IAC/INPUT

- **DEPENDENCY DIRECTORY**: ESTA CARPETA SE PUEDE DEJAR EN BLANCO AL SER OPCIONAL Y NO ES NECESARIO PROPORCIONARLE NINGUNA RUTA:

5. ESTADO DEL PROYECTO

TRAS ESTOS PASOS DEBERIAMOS TENER ESTAS CARPETAS:

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5. ESTADO DEL PROYECTO

PARA INICIAR LA CONFIGURACIÓN NOS PEDIRÁ UNA SERIE DE CARPETAS:

- **CARPETA INPUT**: AQUÍ SE TIENEN QUE INCLUIR TODOS LOS ARCHIVOS NECESARIOS PARA LA REDUCCIÓN. TAL Y COMO SE ENCUENTRA AHORA MISMO CONFIGURADO INCLUIMOS TODOS LOS BIAS EN EN UNA CARPETA LLAMADA “BIAS”, LAS DE CIENCIA EN UNA CARPETA LLAMADA “OBJECT” Y EL CATALOGO DE ASTROMETRÍA EN UNA CARPETA LLAMADA “CATALOGUES”.

EL CATALOGO DEBE DE SER DESCARGADOR DE VIZIER COMO UNA TABLA DE FITS (BINARY) E INCLUIRÁ CON EL NOMBRE DE “ASTR-OBJECT”.FITS (“ASTR-OBJECT” ES EL NOMBRE DEL OBJETO QUE ESTEMOS ESTUDIANDO Y QUE SE CONFIGURARÁ EN OTRO ARCHIVO)

- **CARPETA OSIRIS**: EN ESTA CARPETA SE ENCUENTRAN LOS SCRIPTS DE TODOS LOS PASOS
- **CARPETA OUTPUT**: ESTA CARPETA SE ENCUENTRAN LOS ARCHIVOS GENERADOS DURANTE LA RUTINA. IMPORTANTE: SIEMPRE QUE HAGAMOS UNA NUEVA REDUCCIÓN PODEMOS BORRAR TODO SALVO LAS CARPETAS “LOCKS”, “SOFTWARE” Y “TEX”

