30Cappa - The "Christmas" decree in kilometres

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Following the COVID-19 pandemic emergency, in mid-December 2020 the Italian government introduced travel restrictions during the Christmas holidays. In the implemented policies there was an exception: citizens of a municipality of up to 5,000 citizens can move within an area of 30 kilometers from their respective borders. This policy was used again in the following months to manage travel during the pandemic.
30Cappa is a data visualization created by three civic hackers to give citizens the opportunity to understand this policy ("cappa" is the pronunciation of the letter "k" in Italian and means "km"). The project consists of a website where it is possible to receive information on the matter and the cartographic representation of the municipalities that correspond to the exception. The site has reached 350,000 unique visitors in two months and there has been a lot of talk about it in the media. This work highlights how the transformation of a policy into a tangible product such as a map created with the open data available, becomes an effective tool to guide citizens and also to review the policies themselves.

data visualisation, open data, policy making, citizens communication, open knowledge

1. INTRODUCTION

This work presents an interesting use case of reuse of open data for the communication of a policy implemented by the Italian Government during the pandemic emergency of COVID-19

In mid-December 2020, the Italian Government introduced restrictions on movements during the Christmas holidays. In the list of the policies implemented there was an exception:

"the movements from municipalities with a population not exceeding 5000 inhabitants are allowed for a distance not exceeding 30 kilometers from the relative borders, with the exclusion in any case of movements to the provincial capitals" - Italian Decree of Christmas (2020)

This rule was then used in the subsequent period in relation to the classification of the risk of contagion of each Italian region and autonomous province. The classification took place through a series of indicators that led the regions and autonomous provinces into a specific category (associated with a color). In relation to these there were then restrictions on movements with the exception

described above. The formula described by the rule clearly shows the need to access data in order to identify: the municipalities concerned and the area where it is permissible to move.

A team of three civic hackers (Andrea Borruso, Salvatore Fiandaca and Maurizio Napolitano) moved more by the curiosity of representing this rule on a map, has exploited the open data offered by Istat and created the website "30Cappa" [1] (*"cappa"* is the pronunciation of the letter *"k"* in Italian and, in this case, it means *"km"*).

This work describes which data were used, the problems identified in the reuse of these data, a brief description of social consequences that arose from this representation and the interesting case of the Autonomous Province of Trento which revised (provincial ordinance 69 (2021)) the rule specifying that the distance must be measured on the kilometers traveled, however, obtaining further curious consequences.

[1] https://ondata.github.io/30cappa/

2. THE 30CAPPA PROJECT

30Cappa
footnotehttps://ondata.githubi.io/30cappa was therefore born as a response to have a cartographic representation of the 2020 Christmas decree. It arises from the need to help give meaning to the words of a law in order to be able to interpret it or to help improve it. (from a blog post of Andrea Borruso (2020)).

The project is present on the GitHub repository[2] of the OnData Association.[3].

In the github repository you will find:

- sources codes of the scripts used

- data processed by scripts

- html and javascript code for the information site and for the maps[4]

- documentation

The datasets used are:

- administrative boundaries

- resident population census

- list of the provincial capitals

and they are all distributed by ISTAT[5] - the Italian national statistical institute - as open data[6]

The algorithm for creating the areas to move within follows very simple steps:

1. creation of a dataset of union between the resident population and administrative boundaries

2. extraction from the created dataset of the municipalities up to 5000 inhabitants

3. creation of areas 30km from the border

4. subtraction, from the areas created, of those that correspond to the boundaries of the provincial capital cities

The authors have thus decided to proceed in parallel, each with the tools they prefer, with the creation of these areas in order to validate the process and allow reproducibility according to four pillars of open science (see Masuzzo, P., and L. Martens (2017)).

On the repository are therefore available codes and instructions to process data with python[7], a set of command line tools[8] and QGIS[9] - the most famous geospatial open source software for desktop.

2.1. Limits of the datasets

The data processing starts from a law decree, therefore the chosen source was to reuse the open data offered by Istat, the official source of data for statistics in Italy. In particular, administrative boundaries[10] and demographic data[11] were used. The information about the provincial capitals is stored in a column of the first dataset.

These types of data are officially released by ISTAT on an annual basis at the beginning of each year. Therefore, even if the decree law was published at the end of December 2020, the processing uses the data as of January 1, 2020. This has also created some perplexity in the municipalities where the number of inhabitants was just over 5,000. One possible solution was to use the web service of the National Resident Population Registry[12], but the data stored in this service have the same updating frequency as ISTAT[13]. Another possible way was to contact each of the 7904 municipalities of Italy or the 5511 of those with up to 5000 inhabitants, but given the numbers it was considered a useless waste of time.

The real problem, however, was in unifying the two datasets. This is because, the data with the administrative borders of Italy had been released from 1 January 2020, while that of the resident population on 1 January 2020. A one-day difference that, in reality, appeared very significant since as of January 1, 2020, as many as 13 Italian municipalities had "disappeared" to give life to new municipalities through mergers or aggregations. Some of these had exceeded the quota of 5000 inhabitants, others were still below. Therefore it was necessary to read up to be able to reconstruct the new dataset.

Further minor problems were then identified by how the ISTAT site distributes demographic data[14]. Although the choice was to transmit the data in CSV format and therefore machine-readable, some information present in the same file did not allow an automated reading. In each CSV file, before the declaration of the header with the values of the fields and following by the data, there was a text in

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[2]https://github.com/ondata/30cappa
[3]the association OnData at that time was carrying out the "Dati Bene Comune" campaign - a request for more transparent access to the data of the diffusion of covid-19 in Italy
[4]the website is accessible as GitHub Page
[5]https://www.istat.it/en/
[6]license CC-BY

[7]https://github.com/ondata/30cappa/tree/main/script/conpython
[8]https://github.com/ondata/30cappa/tree/main/script/arigadicomando
[9]https://github.com/ondata/30cappa/tree/main/script/QGIS
[10]https://www.istat.it/it/archivio/222527
[11]https://demo.istat.it
[12]https://www.anagrafenazionale.interno.it/
[13]https://github.com/italia/anpr/issues/2503
[14]https://demo.istat.it

Italian with descriptive information. Information that, on the other hand, it would be more appropriate to present as metadata and explanatory text on the download page. The table also presented a column containing the value of the age associated with the number of inhabitants for that specific age. Among the possible age values there was also 999, which actually indicated the total number of inhabitants (= the value that 30Cappa then needed). Therefore this required further processing of the data, not complex, but still to be known to avoid creating errors.

2.2. The geospatial analysis

Once the dataset with the municipalities up to 5000 inhabitants and their administrative boundary was created, we moved on to the creation of the areas within which the decree law declares that one can move.

At the start of the project, the question arose whether the 30 kilometers from the border should be interpreted as a distance traveled or as a perimeter of distance from the border through which to move. The text of the decree law was therefore read and reread, which states *"a distance not exceeding 30 kilometers from the relative borders"*[Italian Decree of Christmas (2020)] and which therefore leaves no doubt that the calculation had to be made by creating a perimeter of 30km from the municipal border. In geospatial analysis this function is defined as a "buffer" and is based on the creation of circles with a radius equal to the distance value in the points that make up the geometry. This means that, the higher the distance value, the more the perimeter area that will be created will resemble a circumference.

This first result immediately gave the idea that the decree-law draws an area much larger than one can imagine, moreover, while taking into account the number of inhabitants, it has completely forgotten the territorial extensions. Territorial extensions which, in some cases, while covering uninhabited areas, their perimeter at 30 kilometers exceeds 5,000 square kilometers.

Furthermore, a further completely forgotten consideration is linked to the fact that many Italian municipalities are distributed over several non-continuous areas between them (enclaves) or even outside the borders of Italy (exclave) - such as the case of Campione d'Italia which has no territorial continuity with Italy and lies within the Swiss borders.

Therefore, in creating the area in which the law decree allows you to move, the algorithm added the areas of the perimeters 30 kilometers from each enclave (if present) of each single municipality concerned and only if contiguous to each other.

And from these it then subtracted the areas of the municipal boundaries of the capitals (as required by the law decree) and - naturally - those of the Italian border. This then highlighted once again how the decree law would need more details in its definition.

The results therefore appear curious. For example, the municipality of Fardella has a population of 581 inhabitants, on a total area of 29 square kilometers spread over five enclaves and thus has an area in which to move of 4593 square kilometers.[15] Much more curious, however, is the case of Campione d'Italia who, having no territorial continuity with the Italian borders, is represented isolated within its border but with the possibility of moving into Italian territories without being able to stop in Swiss territory.[16]

3. THE SOCIAL IMPACT

The policies proposed by the Christmas decree [Italian Decree of Christmas (2020)] were then reused in the following months[Italian Decree 1 (2021)] depending on the level of risk of contagion of COVID-19 in each Italian region and autonomous province, therefore 30Cappa has become one of the reference tools for many Italian citizens. The statistics to the site show over 350,000 unique visitors in the two months following the launch of the project (December 2020 - February 2021) with peaks of up to 71,000 visits in one day. Much space was given by the Italian media[17] particularly at the local level. Many provincial newspapers have dedicated articles to the project highlighting stories of their own territory[18] A report by a regional editorial board of RAI (the national italian television), also released on the online platform[19], brought 7 percentage of visits. The developer Salvatore Larosa also created a Telegram bot by reusing the data generated by 30Cappa.

The discussions on social networks - in particular the comments on the news that came out of the online newspapers - then led to the creation of a FAQ section on the 30Cappa website where one can better explain some curiosities. There was no lack of criticisms and often offensive observations, a phenomenon that, in these cases, must be considered and that in any case showed how the contribution of 30Cappa led to reasoning on issues

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[15]https://ondata.github.io/30cappa/mappa.html?id=076031
[16]https://ondata.github.io/30cappa/mappa.html?id=013040
[17]Example the website Mashable - https://it.mashable.com/4984/natale-2020-spostamenti-comuni
[18]editorial groups like citynews or GEDI
[19]https://www.rainews.it/tgr/trento/articoli/2020/12/tnt-decreto-natale-zona-arancio-30-chilometri-napolitano-8d089a00-2e27-496b-90e6-f69f2e7fcd2e.html

that were often ignored (e.g. the extensions of municipal territories)

3.1. The case of the ordinance of the Autonomous Province of Trento

The 30Cappa team never received any contact from anyone in the government who dealt with the issue. However, the website continued to be a reference even if the authors themselves pointed out that it had no legal value and suggested to confront the police and to minimize travel for the sake of public health.

The subsequent decree law that reused the rules of travel allowed the regions and autonomous provinces to develop any compatible policies that were valid only within their own territory. From here, the Autonomous Province of Trento, with the provincial ordinance 69 (2021), proposed two small revisions: extension of the rule for municipalities up to 6000 inhabitants and the distance of 30km not on the perimeter of the municipal border, but on a maximum distance that can be traveled. This has therefore given rise to a new version of 30Cappa for the territory of the Autonomous Province of Trento only called pat30cappa[20] ("pat" means "province autonomous of trento"). In pat30cappa the distance calculation has been revised using the isodistance functions of the open source software OpenRouteService[21] based on the power of the open data created from the crowdsource project OpenStreetMap [Haklay, Mordechai, and Patrick Weber (2008)]. The isodistance is a line drawn on a map that connects the reachable points on a road graph to the distance that starts from the same starting point. Using isodistance instead of perimeter creates smaller displacement areas, but continues to ignore the issue of land size and enclaves.

4. CONCLUSIONS

Even if the 30Cappa project was born for fun, its contribution to the verification of policies through data highlights the increased need for tools - based on data, verifiable and reinterpretable by third parties - through which to help citizens understand them. Open Government also has this as an objective, however it often stops at the publication of data and documents, without providing additional useful tools such as data storytelling. And even if there are several success stories (see Moretti, Matteo, Francesca De Chiara, and Maurizio Napolitano (2018)), the case of 30Cappa came at a historical moment in which knowing, understanding and interpreting data has become a crucial issue for health, safety and freedom of people. 30Cappa

has brought to the center the problems of data integration, of interpreting the territory in what is the perception of an administrative boundary and paying attention to terms that then need more in-depth analysis to be understood. This is also one of the advantages of making data available for total reuse.

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[20]https://napo.github.io/pat30cappa/
[21]https://openrouteservice.org