Counting Males and Females from Internet for Sociology. Damegender and GNU/Linux as Use Case

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ABSTRACT

To achieve gender equality, first we need to measure gender in a population to detect if gender gap exists. Damegender is a gender detection tool that takes names as input returning the gender Menéndez et al. (2020).
The gender detection tools from the names are being used usually with commercial APIs. But in recent years, many countries have released data on the frequency and gender of names of their population with Open Data Licenses. So, Damegender uses these datasets in an industrial way and gives a new, original solution to classify gender using names as input – although we are using Machine Learning algorithms to predict the gender for names that do not appear in the datasets, such as nicknames or new names.
Damegender uses Perceval Dueñas et al. (2018) to count males and females in a lot of Internet Communities (mailing lists, software repositories, ...) In this paper we present how to use this tool in sociology.

Keywords: Gender gap, Gender detection tools, Software repositories

1. INTRODUCTION

Any gender study takes into account previous studies with different objectives and to collect data towards the objective proposed. The gender detection tools from the names can be used when the objective has been defined.

A gender detection tool from the name has a string as input, for instance, Alicia and returns a gender (male or female, generally) with a probability.

These tools has been used in global problems as to measure the gender gap in science Holman et al. (2018) using sources as PubMed and arXiv and counting males and females from author names. You can use Damegender with global objectives or in Internet communities with specific objectives.

In this paper, we are going to explain how to use Damegender (the gender detection tool from common names developed by us) applied to sociology with an use case: to measure males and females in a GNU/Linux operating system.

2. MATERIAL AND METHODS

Gender Inequality in the World

Gender gap or gender inequality is the idea that men and women are not equal and that gender affects an individual's living experience. These differences arise from distinctions in biology, psychology, and cultural norms. Some of these types of distinctions are empirically grounded while others appear to be socially constructed. Studies show the different lived experience of genders across many domains including education, life expectancy, personality, interests, family life, careers, and political affiliations. Gender inequality is experienced differently across different cultures. (Source: wikipedia, 2020)

The women is underrepresented in the labour world (among adults aged from 25 to 54 has stagmated over the past 20 years, standing at 31 percentage points. The gender pay gap exists, too, so the women are paid 16% less than men. Share of women and men with an account at a financial institution is 65% of the total in women and 72% of the total in men. 31% of young women aged 15 to 24 are not in education, employment or training in 2020, more than double rate for young men (14%). Violence against women is 18% of ever-partnered women aged 15 to 49 experienced sexual and/or physical violence by an intimate partner in the previous 12 months.[1].

First, we can determine gender gap in several continents. From the best score to the worst score. We can find: North America with the best score, Europe and Central Asia, Latin America and the Caribbean, Sub-Saharan Africa, Asia and the Pacific, and the worst score Middle East and South Africa. (Source: Global Gender Gap Index 2012):

Gender Gap in STEM

In Holman et al. (2018), explains that the gap publishing in STEM is especially large in authorship positions associated with seniority, and prestigious journals have fewer women authors. Additionally, they estimate that men are invited by journals to submit papers at approximately double the rate of women. Wealthy countries, notably Japan, Germany, and Switzerland, had fewer women authors than poorer ones.

The Gender Shares of Total and STEM Jobs is 76% men and 24% women compared with 52% men and 48% women in all jobs Beede et al. (2011)

We can find summarize six explanations Wang and Degol (2017) for US women's underrepresentation in math-intensive STEM fields: (a) cognitive ability, (b) relative cognitive strengths, (c) occupational interests or preferences, (d) lifestyle values or work-family balance preferences, (e) field-specific ability beliefs, and (f) gender-related stereotypes and biases.

Philosophies about software, market, freedom and gender

There are different philosophies developing software and we are counting males and females in Internet, so the floor is the software in this world. If we must analyze gender in a country the ideology is changing in the place where you are. In the software world is the same problem. So, we are giving the vocabulary and the philosophy for speak about software and ideologies.

The propietary software is the most common idea for the common people, operating systems such as Microsoft Windows or Mac OS. If you are using software with propietary licenses, the source files will be containing copyright notes such as:

```
# Copyright (C) 2020  David Arroyo Menéndez

# Author: David Arroyo Menéndez <davidam@@gmail.com>
# Maintainer: David Arroyo Menéndez <davidam@@gmail.com>

# All rights reserved}
```

This idea is associated to big companies leading the market but any people can use this philosophy. The criticism appears with Richard Stallman about privacy and the lack of freedom to the academic people, or hackers (people who knows read and write software and they do it for his objectives or global objectives). I could to say the monopoly is too strong with this license and the current social inertia and now nobody can change the market, we need another licenses to preserve the free market with an ethical strategy for startups and students.

Richard Stallman defines the Free Software with four freedoms: (0) to run the program, (1) to study and change the program in source code form, (2) to redistribute exact copies, and (3) to distribute modified versions. [2]

This idea to build software as a social good and motivated by ethical values. The solution is to apply the GPL license and to request to GNU to include the software.

The copyright note in GNU would be similar to:

```
;; This software is free software: you can redistribute it and/or modify
;; it under the terms of the GNU General Public License as published by
;; the Free Software Foundation, either version 3 of the License, or
```

[1] https://www.unwomen.org

[2] https://www.gnu.org/philosophy/free-sw.html

```
;; (at your option) any later version.

;; This software is distributed in the hope that it will be useful,
;; but WITHOUT ANY WARRANTY; without even the implied warranty of
;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
;; GNU General Public License for more details.

;; You should have received a copy of the GNU General Public License
;; along with GNU Emacs.  If not, see <https://www.gnu.org/licenses/>.
```

On opposition the Open Source movement believes in free licenses, but they thinks that the software is business and they want to develop Free Software by economy, so they prefer change the word Free Software by Open Source claiming their philosophy.

They redefines the Free Software Definition by the Open Source Definition[3]:

1. Free Redistribution

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

2. Source Code

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost, preferably downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

3. Derived Works

The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

4. Integrity of The Author's Source Code

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of ”patch files” with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

5. No Discrimination Against Persons or Groups

The license must not discriminate against any person or group of persons.

6. No Discrimination Against Fields of Endeavor

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

7. Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

8. License Must Not Be Specific to a Product

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

9. License Must Not Restrict Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

10. License Must Be Technology-Neutral

No provision of the license may be predicated on any individual technology or style of interface.

[3] https://opensource.org/osd

In the point six, we find the conflict with the feminist theories due to the possitive discrimination is a good idea to reach gender equity.

The GNU philosophy has the same problem explained on a different way. Only the Free Software is a good idea, if the software is not Free Software, then it's Propietary Software (the bad idea to avoid).

Generally, a worker in a company can extract ideas from GNU and Open Source movements from the economical interest in a equlibrium with the ideology.

Multiculturalism, Interculturalism

The term multiculturalism has a range of meanings within the contexts of sociology, of political philosophy, and of colloquial use. In sociology and in everyday usage, it is a synonym for "ethnic pluralism", with the two terms often used interchangeably, for example, a cultural pluralism in which various ethnic groups collaborate and enter into a dialogue with one another without having to sacrifice their particular identities. It can describe a mixed ethnic community area where multiple cultural traditions exist (such as New York City or Trieste) or a single country within which they do (such as Switzerland, Belgium or Russia). Groups associated with an indigenous, aboriginal or autochthonous ethnic group and settler-descended ethnic groups are often the focus.

In reference to sociology, multiculturalism is the end-state of either a natural or artificial process (for example: legally-controlled immigration) and occurs on either a large national scale or on a smaller scale within a nation's communities. On a smaller scale this can occur artificially when a jurisdiction is established or expanded by amalgamating areas with two or more different cultures (e.g. French Canada and English Canada). On a large scale, it can occur as a result of either legal or illegal migration to and from different jurisdictions around the world (for example, Anglo-Saxon settlement of Britain by Angles, Saxons and Jutes in the 5th century or the colonization of the Americas by Europeans, Africans and Asians since the 16th century).

In reference to political science, multiculturalism can be defined as a state's capacity to effectively and efficiently deal with cultural plurality within its sovereign borders. Multiculturalism as a political philosophy involves ideologies and policies which vary widely. It has been described as a "salad bowl" and as a "cultural mosaic", in contrast to a "melting pot". (Source: wikipedia, 2020)

Interculturalism refers to support for cross-cultural dialogue and challenging self-segregation tendencies within cultures. Interculturalism involves moving beyond mere passive acceptance of a multicultural fact of multiple cultures effectively existing in a society and instead promotes dialogue and interaction between cultures.

Interculturalism has arisen in response to criticisms of existing policies of multiculturalism, such as criticisms that such policies had failed to create inclusion of different cultures within society, but instead have divided society by legitimizing segregated separate communities that have isolated themselves and accentuated their specificity. It is based on the recognition of both differences and similarities between cultures. It has addressed the risk of the creation of absolute relativism within postmodernity and in multiculturalism. (Source: wikipedia, 2020)

Aguado in Odina and María (1991) propose these principles:

1. Promote the respect by all cultures together and condemn the politics to change the culture of the people towards the culture dominant. (Borrelli y Essinger, 1989)

2. The intercultural education is relevant for any student, not only for the foreigners and minorities (Borrelli and Essinger, 1989)

3. The troubles created by the ethnic and cultural diversity of the society has many solutions, there not an only magic solution. The politics in education there are partials because we are in a global society (Galino, 1990).

4. It's based in the perception about to accept cultures in contact, it's near to the form of life of societies with a poor cultural context instead of societies with more rich, more structure and high social control.

5. We need develop a scheme of concepts with many cultures demonstrating in the education that the knowledge is the common property of all people (Walking, 1990).

So, interculturalism and multiculturalism are the same concept in many uses, both recognize the cultural diversity in the contexts where there are the diversity, but interculturalism is doing an emphasis in the enrichment of all cultures respecting the diversity.

Damegender understands has an international and intercultural perspective about guess the gender about the name in the sense that in many countries are existing many different cultures determining names, surnames with a gender. For example, in Spain are living 4 so important cultures (no foreigners): Castillian (culture dominant), Catalan, Basque and Galician.

These cultures has correlations with names and surnames.

3. RESULTS

An operating system based on UNIX such as Ubuntu GNU/Linux or MacOS is based on several parts we can divide Debian GNU/Linux in:

- Debian is a distribution: the packaging to be downloaded from Internet or released on a CD or DVD. There are several distributions: Debian, Ubuntu, Suse, RedHat, ... We have chosen Debian as a case. These distributions mentioned are using GNU and Linux.
- Linux is the kernel: the part that is communicating with the hardware
- GNU is a project to create free operating system, many software such as editors, desktop, commands console, compilers, ... has been developed by this project.
- There are more software created by another projects in an operating system such as X Window System. But GNU/Linux is a good verbal agreement recognizying efforts.

This section is divided counting males and females in Debian, GNU and Linux.

We have reached the csv files from different ways to know the names about the people in these communities.

When this article was being wrote in the Debian community all members must be collaborating with a gpg key, so we can count males and females from the keyring. The keyring was imported with gpg commands and later was dumped the keyring in a csv file.

In the moment to write this paper GNU[4] and Linux[5] has websites with the people collaborating in these projects. So, making webscraping scripts we have downloaded the people and processed the people to csv files

Damengender is set of datasets and software related developed in Python Van Rossum and Drake (2011). We have developed csv2gender, a software with a csv file as input and returns the result of males, females and unknows and/or deploying a statistics graph.

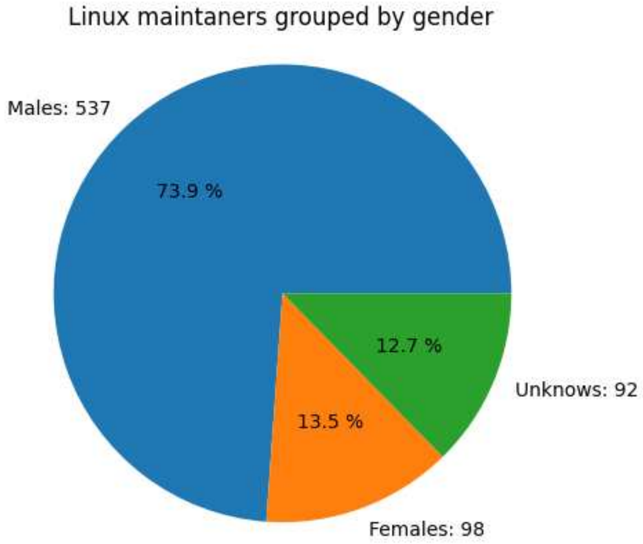
To make easy to reproduce the experiment we are pasting the commands used with the version 0.3.4 of damegender.

```
python3 csv2gender.py files/gnu-maintainers.csv
 --first_name_position=0 --title="GNU maintainers grouped by gender"
 --dataset="inter" --outcsv="files/gnu-maintainers.gender.csv"
 --outimg="files/gnu-maintainers.gender.png" --noshow
 --delete_duplicated

python3 csv2gender.py files/linux-maintainers.csv
 --first_name_position=0 --title="Linux maintaners grouped by gender"
 --dataset="inter" --outcsv="files/linux-maintainers.gender.csv"
 --outimg="files/linux-maintainers.gender.png" --noshow
 --delete_duplicated

python3 csv2gender.py files/debian-maintainers-gpg-2020-04-01.csv
 --first_name_position=0 --title="Debian maintaners grouped by gender"
 --dataset="inter" --outcsv="files/debian-maintainers.gender.csv"
 --outimg="files/debian-maintainers.gender.png" --noshow
 --delete_duplicated
```

[4] https://www.gnu.org/people/

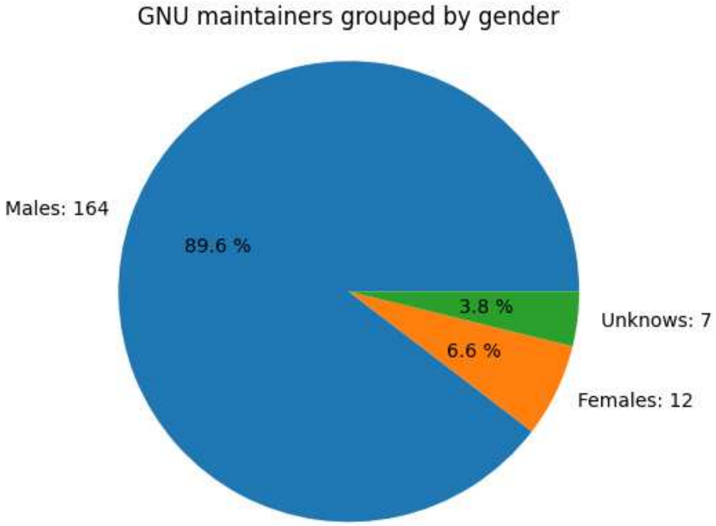
[5] https://www.kernel.org/doc/html/latest/process/maintainers.html

The inter dataset was created merging several open datasets downloaded from official statistics sites from different nations: Austria, Australia, Belgium, Canada, Germany, Denmark, Spain, Finland, Ireland, Iceland, Mexico, New Zealand, Portugal, Slovenia, United States of America, Uruguay and France. That's a good representation of the Western World and the Free Software world is populating this world's area Gonzalez-Barahona et al. (2008).

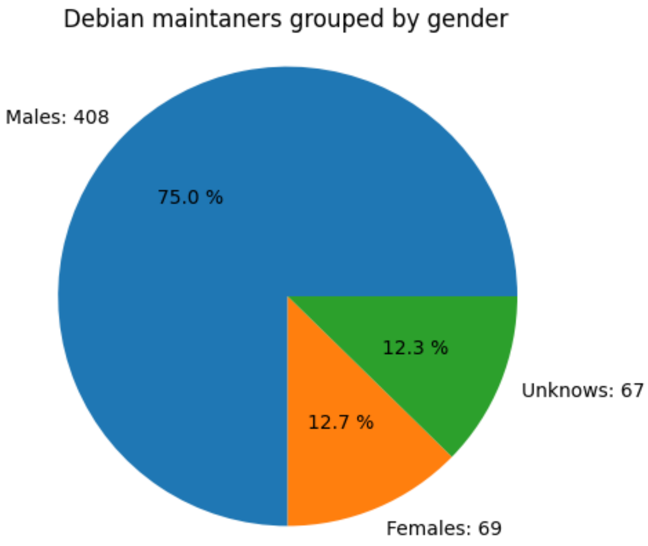


Linux divides the developers in 537 males (73.9%), 98 females (13.5%) and 92 unknows (12.7%). The number of unknows is due to different reasons, but it's so common in Linux that the developer is a company and not a name of a person.

GNU divides the developers in 164 males (89.6%), 12 females (6.6%) and 7 unknows (3.8%)



The GNU people has a number lowest in females, they are the founder of the Free Software philosophy, the Debian principles and the Open Source philosophy was invented later influenced by GNU with very similar practical decisions (for example: deciding licenses for the software). Richard Stallman returned to be president recently apologizing by his personal behaviour with the females.[6]



Debian is a distribution, the project who makes the CD/DVD and the software ready to be downloaded from Internet with the dependencies. There are many distributions, such as, Ubuntu or RedHat so it is not representative, but it's interesting to understand that the numbers are similar in Debian dividing the developers in 408 males (75%), 69 females (12.7%) and 67 unknows (12.3%).

4. DISCUSSION

The context of the operating systems is not feminist by different reasons. In the Free Software world there are many males developing the software. But in another Operating Systems there are another problems about the male domination, for example, Microsoft created the richest man in the world for many years.[7]

Apple was classified as the most valuable company in the world in 2020.[8]

By intersectionality, to create companies more powerful than some states is bad for the democracy and the social change towards the gender equity many times only funded by democracy values.

The Free Operating Systems is pressuring to the propietary operating systems such as Windows or MacOS to change the philosophy about licensing. So the gender gap dicussion in operating systems is a world dominated by economical pressures of several companies where the scientific population is closed to free software values due to they implement the Free Software freedoms every day in their positions and business in some way. On another hand, the powerful companies is dominating the market about domestic users as monopolies against the free software solutions funded by academical interests in the begining and now by another companies such as Oracle or Google who is investing on these markets with clever solutions such as Android or MySQL with ideas for dominate these markets, too.

So, the ethical discussion about the free market is real in the context of operating systems, although a software community can be dominated by a strong company with investments.

The gender equity is the objective five in United Nations about sustainable development.[9]

A good business must be living in harmony with the values of the society, although earning money from many points. So, the current situation in GNU/Linux must be fixed until the average in STEM or TIC because many times are being compared with it, improving the marketing about values that's using yet.

[6] https://www.fsf.org/news/rms-addresses-the-free-software-community

[7] https://www.forbes.com/profile/bill-gates/

[8] https://www.forbes.com.mx/mercados-apple-empresa-mas-valiosa-del-mundo/

[9] https://www.un.org/sustainabledevelopment/gender-equality/

5. CONCLUSIONS

The violence against the women sometimes is the structure of the society and the software industry is a piece of the society. GNU/Linux is a good option for desktops, servers and supercomputers. Linux is used in Android, too.

The gender gap exists in STEM, but it's bigger in GNU/Linux with a rate about women varying from 6% until 13%. We can to count the gender gap in different contexts with Open Datasets and to measure and to evaluate evolution by years if there are people with this objective, skills and time to invest on it.

So, the marketing about ethical values in GNU/Linux could be improved deleting the gender gap due to it's bigger than the average in STEM.

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