Orsolya Putz
Eötvös Loránd University, Budapest

Prototypes of Women
in American Advertisements
A Machine Aided Image Analysis

How were women visually represented in American advertisements in the last century? Are they sexy, sporty, housewives and/or stay-at-home moms? My current research intends to identify the prototypes of women in American ads.[1] The study is driven by the following research questions:

- What are the prototypes of women in American advertisements?
- What features do they have?
- How are the prototypes connected?
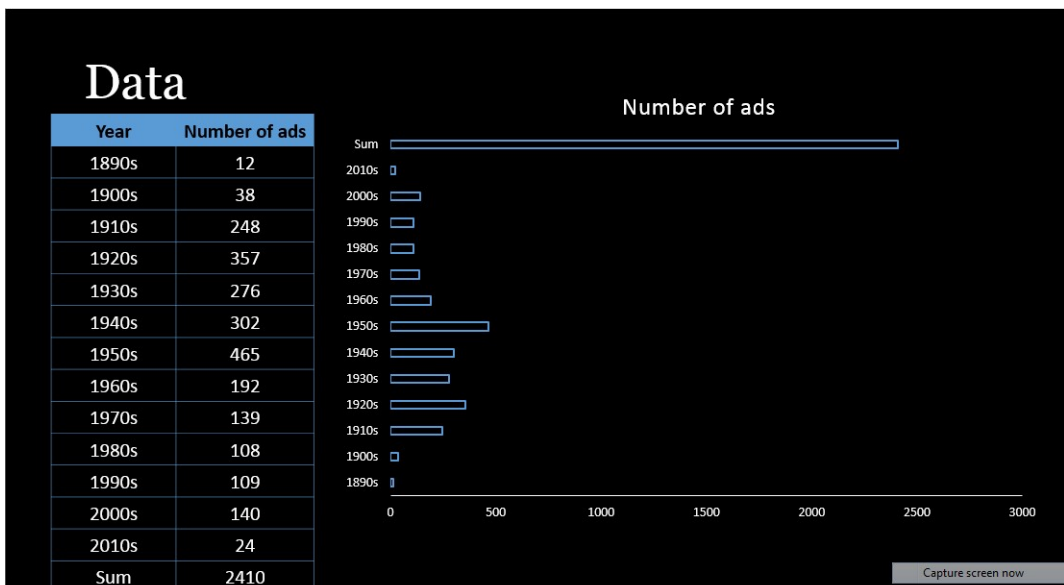- How do they change over time?

To be able to answer to these questions, data was collected from the Advertising Archives database, which contains over 100,000 well captioned and catalogued pictures. Images that are available online stem from American press adverts, American Magazine Covers and Artwork including story Illustrations, Mail Order Catalogues, Vintage Magazines, Posters, Postcards, Menus and Theatre Programmes.

---

[1] Special thanks go to my husband, Zoltán Varjú without whom I couldn't have carried out this research.

The corpus was compiled on the basis of the following protocol:

1. First a search was run with the keyword "womens". This keyword seemed to fit the research aim the best, since in the database there is no such category label as "woman" or "women". But there are category labels containing the term "womens" (for example women's fashion or women's humour").

2. As a second step the hits were narrowed down to American ads.

3. With this filtering, 2425 records were found ranging from the 1860s to the 2010s. Since manually downloading thousands of images one by one would have taken for ages, data was automatically scraped. Not only the images but their metadata (year and source of publication, name of the image) were also saved.

4. As a final step, I took a closer look at the images and found that there are decades in the early period (for instance the 1870s) that contain no or just very few images. Hence the time frame of the corpus was modified. The final corpus contains 2410 images and covers the period between the 1890s and the 2010s.

Data

Year	Number of ads
1890s	12
1900s	38
1910s	248
1920s	357
1930s	276
1940s	302
1950s	465
1960s	192
1970s	139
1980s	108
1990s	109
2000s	140
2010s	24
Sum	2410

Number of ads

As the chart above shows, the distribution of the images is quite balanced in the 20th century. There are only some outlier categories. The earliest decades (namely the 1890s and the 1900s) and the latest (namely the 2010s) seem to be underrepresented, while the 1950s is a bit overrepresented.

This dataset is still considered suitable for the identification of the prototypes of women in American ads. But how can one make this corpus informative? These questions bring us to the issue of methodology. Due to the size of the corpus, data can be processed most effectively with machine learning, deep learning and AI methods. Each research question was approached with the most fitting machine-based method:[2]

- Prototypes were identified with clustering, which I will explain later on.
- The features of each prototype were studied at a deeper level on the basis of similarity metrics. It means that the most similar 5 images were enquired in case of certain selected images.
- It's hypothesized that the prototypes exist not in isolation in our mind, but they are connected. What we can easily investigate is the relation of the pictures of the corpus, based on graph theory and its computer-based application.
- Our intuition suggests that the image of the ideal woman changed since the 19th century, which must have affected the prototype of the woman as well. This issue was tackled by generating the mean image of each decade and then comparing them.

Among the four research sub-topics (namely the identification of prototypes, their features, their relations and their evolution), I focus on the first and most basic one in the next section. Let us see how women are represented in American ads.

Our algorithm suggested that the most ideal case is to divide the corpus into 8 groups. We could have written a model that creates 1, 2, 3, 50, or 100 clusters out of the corpus, but it was calculated that

---

[2] Code: https://github.com/crow-intelligence/womens.

the ideal number in this case was 8, so the model was set to form 8 clusters. After getting 8 bunches of pictures, we studied them carefully and tried to identify features that they share or common features that connect them. This way, we came up with the following categories:

1. Face
2. Part of the body
3. Naked body
4. Artistic portrait
5. Artistic figure
6. With other persons and things
7. Clothes
8. Women as illustration

Before we see them one by one we must note that our method is based on the tense co-operation of human and machine intelligence. In this case, the machine investigated the 2400 images one by one, and sorted them into 8 categories. But it's a human task to provide this categorization with meaning, since only humans bare the sense of meaning-making. Now let's see the result of this joint venture!

1) Face

The first category contains images that solely represent the face of women. This phenomenon can be interpreted as a metonymy, since the face, a salient body part of humans, stands for the whole person. As the images suggest the face is in the center of the picture, and hence get to the center of attention. The plain background of the images makes the face even more emphatic. This cluster is mostly made up of illustrations.

cc624997799d9b161a07c751
4e4f2593.jpg

ce77556d23bde43f1cfbb23c
cc19e390.jpg
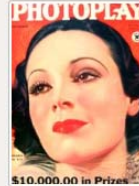
d0c8011c357c1d943dd0e02
236c3906f.jpg

d3f7168ad165702c94948ae2
afc89b66.jpg

d42e53512e91309d2bf5caa
d760af986.jpg

d578a09a21956d387fdf9142
ed54420d.jpg

d3650ded5216cf3244ef3536
03c927ec.jpg

d8940bb0c910551085de520
fc9318892.jpg

e142d210585ed6e411ed96b
7d00410ad.jpg

faf9ee84fde8a28585e44efc8
3c8d53f.jpg

fe15ded1bb7715f1743f466c
43d101f7.jpg

fec6fd8073ca8b0ded8975dd
8f7aaaff.jpg

2) Part of the Body

The images of the next category let the viewer see more from the woman than her face. Images belonging to this category show mostly the upper part of the body. These women are captured while they are engaged in some kind of activity, like sitting, lying, hugging, kissing or phoning. The person or persons they are with and the object they manipulate get also to the focus of attention. Mostly illustrations belong to this category.

9008a33dce7b8b38ddb4b06 28edccceb.jpg
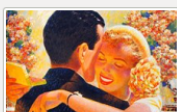
9803e70158cc8722af924fa2 5224e933.jpg

12325eeb27534158213494d 5fd3b61e5.jpg

14143ee2caeaa92030ae58d5 0a2ea391.jpg

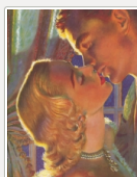020389b3d7c9143ba03b192 2a6694b4c.jpg

27580f903cd9d21f4a9dd127 7b6555e0.jpg

40250c75f43944a923296200 8e404b3b.jpg

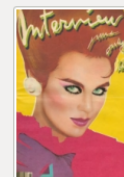45086b95841daa4e3871c02 918916eeb.jpg

59661cb7447129c23d8e03f4 f0d57d69.jpg

061712d4604ac2b27e77c2b a9d8711dc.jpg

90473bc80a4db4d8e31e672 9956d5a09.jpg

92171f74f9882c34c6293b67 54e300f8.jpg

3) Naked Body

The next prototype is the naked body. Our algorithm found those images similar that depict naked or partly naked women posing for the camera. Drawing one's attention on the woman's naked body, highlights such aspect of the body as the skin, the figure etc. One could easily argue that these illustrations and photos objectify the woman and are sexist.

0e0475e3acc6ac55db0181df2975fa52.jpg

3f1ffb005aad0f86d983efef5f0b1358.jpg
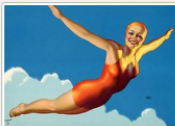
4db1c5b3b61b56520784589eb80d8953.jpg

7f3e5a79f5827be7887f7f6271f13529.jpg

7f7c445ada35c74f4883d00c9eddec32.jpg

8d1b6fbe19c172c9b1586a4589bb67a6.jpg

8f2a2879c82c1d0b46c0d7b850a15a1b.jpg

68a20688efe9ba12ec9f3d10d971d5f4.jpg

89b0fac37a4c5cf0429bc08d0a30ee88.jpg

164f5c4198f2a0123036b23c85077459.jpg

176f8f29a0c7be8580368dafd5c46252.jpg

0302e09bee76eb7cf013be7fba503918.jpg

4) Artistic Portrait

The body can be the subject of art. This category contains set photos, which were taken in a photo studio. Models are typically staring into the camera in artistic postures in an artistic background. One would consider these women sexy and attractive, but others would regard these photos as sexist. What we can be sure about is that these wo-men advertise products (mostly cosmetics) of certain brands. They are often contacted to be the face of a brand.

3f2a65e02ab5e62ce33e5478
7392a21c.jpg

3fc712f872306b5c33175bf9
b7dbefac.jpg

3ff7c4e9b4beb2a43d947d12
74207118.jpg

4aac9c474c7be6656deea9b8
1e013226.jpg

4b2549f0fb3bcd6183969967
23f3530f.jpg

4d525a94ba85ba7b9b08495
c34a0828d.jpg

04d2090db2aff572a22e8624
817f2c81.jpg

4d8447dfc3d6a3c8d534a644
d7302090.jpg

4e4a04107cd884e0581e22d
d3e0e1b49.jpg

4ea49b183e51b62f6fd4cf14
cf518883.jpg

4ecebec88bcada2231541ad
7b9bc2fc9.jpg

5a50436b1051751204a9212
79c16fc2a.jpg

5) Artistic Figure

The prototypical artistic figure of a woman is similar to the previous category, since these photos are also set and artistic. However in this case the background and the objects (e.g. bags) are more emphasized. The viewer has the impression that these women are depicted in a more natural environment, not necessarily in a photo studio.

1f1b903140b0f7d18c9173b7
1a90a9b2.jpg

2cfc4e70cc61920f534914d6
14495a35.jpg

2e10bf4e1ae3c11a9cef612b
53489891.jpg

3ae5941115adaa106eb5a4c
4244a1c31.jpg

3b046050fbdce719a22aa047
ceccbcc8.jpg

04d5b9000ce9d88a92cd03e
be80da15f.jpg

4f4c3a0797ffd9b63939a722
d5cd4b64.jpg

5afbdb6b0012015af6edc976
f0d40c8c.jpg

5f1b4850e8005f8408725092
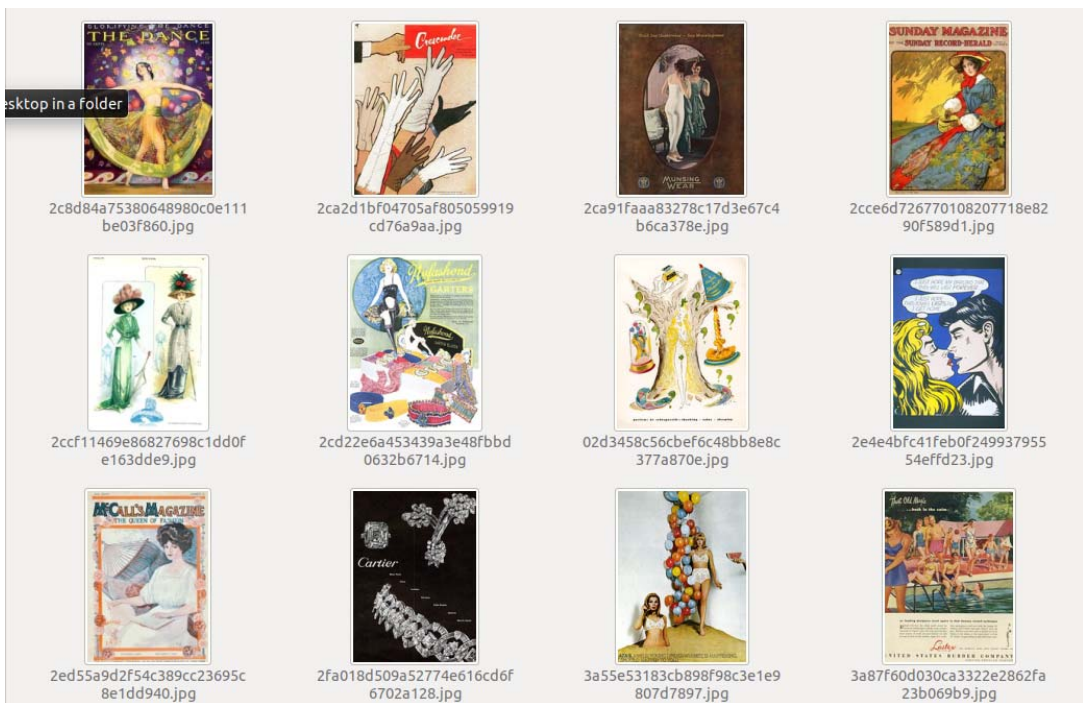4811b683.jpg

6cb711a74948d7e99036964
09583c23c.jpg

6f5e7ac319bb827e8d5a12d
91875ca63.jpg

07f3431a5c5744c7514588dc
189a26a7.jpg

6) With Other Persons or Things

Women are also portrayed in big companies with other persons or things. The images of this category are typically crowded, detailed and colorful. The figure of the woman tends to be much smaller than in the previous categories, hence the woman is not (alone) in the center of attention.

2c8d84a75380648980c0e111be03f860.jpg

2ca2d1bf04705af805059919cd76a9aa.jpg

2ca91faaa83278c17d3e67c4b6ca378e.jpg

2cce6d726770108207718e8290f589d1.jpg

2ccf11469e86827698c1dd0fe163dde9.jpg

2cd22e6a453439a3e48fbbd0632b6714.jpg

02d3458c56cbef6c48bb8e8c377a870e.jpg

2e4e4bfc41feb0f24993795554effd23.jpg

2ed55a9d2f54c389cc23695c8e1dd940.jpg

2fa018d509a52774e616cd6f6702a128.jpg

3a55e53183cb898f98c3e1e9807d7897.jpg

3a87f60d030ca3322e2862fa23b069b9.jpg

7) Clothes

The prototypical woman wears fashionable clothes – according to the next category. Illustrations of this category draw the viewers' attention not on the women's body, but on their clothes.

80ec63188df23a78711e6e26c7a11396.jpg

81aa607472e8624bb170f8e6545f6c3a.jpg

85be7d0fb322fb2e864c19fd887703dd.jpg

85ca61588b3df20b598d759e3739e5c4.jpg

85f04f7e76c283c4036a51067d359e81.jpg

86c055c5cc40707145ce789ff2911639.jpg

88e4db2a4485651d68a77b924197a546.jpg

90ab8bb96bc9160bfc6126a3ac382f9d.jpg

91a474d95e7f1928827febea

91d99b17903a642a1987e6a

091f70b20b6746f5aa243d51

93d1111b1c0f1f2c39d0d185

8) Women as Illustration

Finally the drawing of a woman can be a pure illustrational element that goes with the textual element. In this case, the textual element dominates the image. The woman, who is either alone or with others, is much less emphasized.

30eacf38cbcafe6f8f4e9b0bc
1de8ef1.jpg

32e97d4ae37fdfa4633e6905
549f3d74.jpg

32e325f03c1363de81ee9e95
ac1528dc.jpg

33f495b092967c4fd3095856
2d4d2569.jpg

34a20bbfe0796370f4d43432
798680db.jpg

36d18a103edf2cdfde3a85bc
6e6e3e27.jpg

38ed3264917f315588ec5795
cadf6121.jpg

41c016380471797426dabad
7e5ab36fa.jpg