

# What is my name?

Nirmal Kashyap (202011031)

Supervisor : Dr. Manish K. Gupta



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- When we meet a new face, we want to know their First name, Age, Location (i.e., Ethnicity in a more general way), Gender, Occupation, emotions etc.
- These are features we can extract from a facial image.
- The human brain can predict some of these attributes through a glance.
- For instance, gender, age group, ethnicity (based on some facial features), occupations (based on clothing in some cases), emotions (some of them), etc.
- From the features mentioned above, predicting the first name can be new. Also, nearly impossible.

- One of the potential applications of name prediction is name association.
- Suppose, for instance, we are given a group photograph, and we know the name of the people present there.
- So using this system, one can associate the name to the face.
- Like in various social media platforms like Facebook and Instagram, people post images and tag other users.
- So, the system can associate the name to the face.

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# Problem Statement

- Predict the first name of a person from the facial image of the person.
- The problem here is assumed to be a classification problem.
- In here, first 100 popular names of U.S. are taken. And the output will also be from the same set of these 100 names.

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- The achievements of face detection and recognition in computer vision approximately dates back to four decades.
- Is it possible to infer a person's name from through a single facial image? That too, without additional sample images of such face<sup>1</sup>.
- Expecting a high level of accuracy from this work is impractical.
- This flawed system could have a variety of usages, for instance, in terms of security and biometrics.

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<sup>1</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".

- Every individual has a faceprint. It's an electronically stored portrayal of a person's face that's as unique as a fingerprint<sup>2</sup>.
- So it may have applications for security purposes.
- Shakespeare states, "*What's in a name?*" and might proclaim it to be either insignificant or random<sup>3</sup>.
- The focus is on first names and not on the last names because the latter tends to be determined more by lineage or, in some cases, based on occupation.

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<sup>2</sup>Faceprint definition & meaning. URL: <https://www.dictionary.com/browse/faceprint>.

<sup>3</sup>Robin Kramer and Alex L. Jones. *Do people's first names match their faces?* 2015. URL: <https://www.jasnh.com/pdf/Vol12-No1-article15.pdf>.

- Rather than arbitrariness, clear patterns have been observed between the owner and the name<sup>4</sup>.
- In general names are mostly gender specific. Even though very few names are gender-neutral like Jamie.
- Even the education of the parents' and their race does influence the choices of names.
- Names do carry the information about the age because trends in naming keep on varying throughout decades.

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<sup>4</sup>Kramer and Jones, *Do people's first names match their faces?*

- A variety of aspects influences the name selection<sup>5</sup>.
- Gender, age, race, social culture, economic culture, the popularity of names, names of near and dear also influence name selection.
- Even within an ethnicity, the occurrence of particular first names varies.
- There is a significant age difference in easily distinguishable name pairs.
- The name pairs which exhibit the same popularity trends seem indistinguishable.

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<sup>5</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".

- They showed a face with ten alternative names because it seemed highly unreasonable to expect a person to choose one name from a list of the 100 names<sup>6</sup>.
- The names in this list here include nine arbitrary names of the same sex in a randomized fashion and one correct name.
- The correctness of human predictions is thirteen point seven per cent, which is much better than the chance of ten per cent.
- The researchers never claimed that this can be carried out by anyone anywhere without having any cultural familiarity.

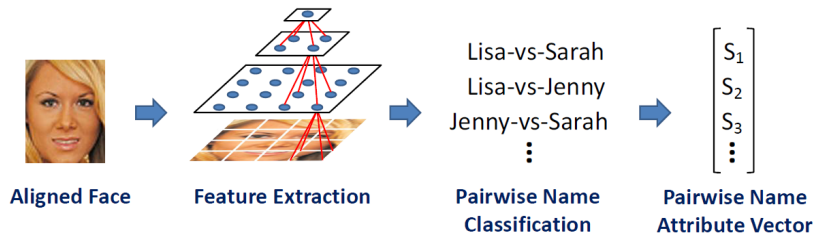
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<sup>6</sup>Chen, Gallagher, and Girod, *"What's in a Name? First Names as Facial Attributes"*.

- Individuals having the same name are prone to having almost identical expressions around the mouth and the eye area of the face<sup>7</sup>.
- These areas seem easily adjustable, as per a computer analysis.

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<sup>7</sup>Angus Chen. *Your Name Might Shape Your Face, Researchers Say*. 2017. URL: <https://www.npr.org/sections/health-shots/2017/02/27/517496915/your-name-might-shape-your-face-researchers-say>.



**Figure 1:** A summary of the system. The confidence scores produced by the pairwise name classifiers are referred to as the pairwise name attribute vector<sup>9</sup>.

<sup>9</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".

- The test faces are first scaled with observed eye locations and then resampled to  $150 \times 120$  pixels<sup>10</sup>.
- The algorithm is based on the AdaBoost framework, where the classifiers being SVMs that work on multiple feature channels.
- For instance, they have  $T$  feature channels and  $N$  training images.

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<sup>10</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".



# Literature Survey

- Data: Training data  $x_{t,i}$ , training labels  $y_i \in \{-1, +1\}$ , testing data  $z_t$ , where  $t = 1, \dots, T$  and  $i = 1, \dots, N$
- Result: SVM classifiers  $f_t(z_t)$ , classifier weights  $\alpha_t$
- Initialization: weights  $D_i = 1$
- for  $t = 1 : T$  do
  - (i) Do SVM 5-fold cross validation with weights  $D$  for obtaining confidence  $f_t^{cv}(x_{t,i}) \in R$  and prediction  $\hat{y}_{t,i}^{cv} = \text{sign}(f_t^{cv}(x_{t,i}))$ , calculate error  $err_t = \frac{\sum_{i=1}^N |\{\hat{y}_{t,i}^{cv} \neq y_i\}|}{N}$
  - (ii) Train SVM  $f_t$  with  $D$ ;
  - (iii) Calculate  $\alpha_t = \frac{1}{2} \log \left( \frac{1 - err_t}{err_t} \right)$ ;
  - (iv) Set  $D_i = D_i \exp(-\alpha_t y_i f_t^{cv}(x_{t,i}))$ , and renormalize so that  $\sum_{i=1}^N D_i = N$ ;
- end
- Output the final classifier  $f_{\text{all}}(z) = \sum_{t=1}^N \alpha_t f_t(z_t)$

Algorithm: Multi-Feature SVM<sup>2</sup>

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- Name100: A First Name Face dataset<sup>11</sup>.
- They create an extensive dataset by choosing images and tags from Flickr.
- The dataset comprises 800 faces of each 100 most famous first names, based on information from the U.S. Social Security Administration (SSA)<sup>12</sup>.
- After completion, the dataset contains 48 men's names, 48 women's names, and 4 gender-neutral names.
- The names listed represent 20.35 per cent of all the Americans birthed from 1940 to 2010.

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<sup>11</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".

<sup>12</sup>U.S. Social Security Administration baby name database. URL : <http://www.ssa.gov/oact/babynames>.



Figure 2: Sample of Alejandra's facial images from Name100 dataset<sup>13</sup>.

<sup>13</sup>Chen, Gallagher, and Girod, "What's in a Name? First Names as Facial Attributes".

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- The objective of the work is to predict the first name of a person using the given facial test image. To do this, I plan on using Attention.
- In layman terms, Attention is focusing on the essential areas and fading out the rest, and devoting more computational power to the more minor but essential part.

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# Conclusion

- In the discipline of computer vision, name prediction can be a tough and inspiring problem to solve.
- This work did not receive that much consideration and had very restricted efforts in terms of research.
- The name prediction system is not that ideal to function well in all real-world situations.
- The current works have high prediction accuracy than random chance. Plenty of work needs to be carried out to achieve higher efficiency and accuracy goals.



- [1] Angus Chen. *Your Name Might Shape Your Face, Researchers Say*. 2017. URL: <https://www.npr.org/sections/health-shots/2017/02/27/517496915/your-name-might-shape-your-face-researchers-say>.
- [2] Huizhong Chen, Andrew Gallagher, and Bernd Girod. “What’s in a Name? First Names as Facial Attributes”. In: *Proceedings / CVPR, IEEE Computer Society Conference on Computer Vision and Pattern Recognition*. (June 2013), pp. 3366–3373. DOI: 10.1109/CVPR.2013.432.
- [3] *Faceprint definition & meaning*. URL: <https://www.dictionary.com/browse/faceprint>.
- [4] Robin Kramer and Alex L. Jones. *Do people’s first names match their faces?* 2015. URL: <https://www.jasnh.com/pdf/Vol12-No1-article1.pdf>.

- [5] *U.S. Social Security Administration baby name database.* URL: <http://www.ssa.gov/oact/babynames>.

# Thank You