

# Google Research A Step Toward More Inclusive People Annotations for Fairness

Candice Schumann, Susanna Ricco, Utsav Prabhu, Vittorio Ferrari, Caroline Pantofaru  
 {cschumann, ricco, utsavprabhu, vittoferrari, cpantofaru}@google.com

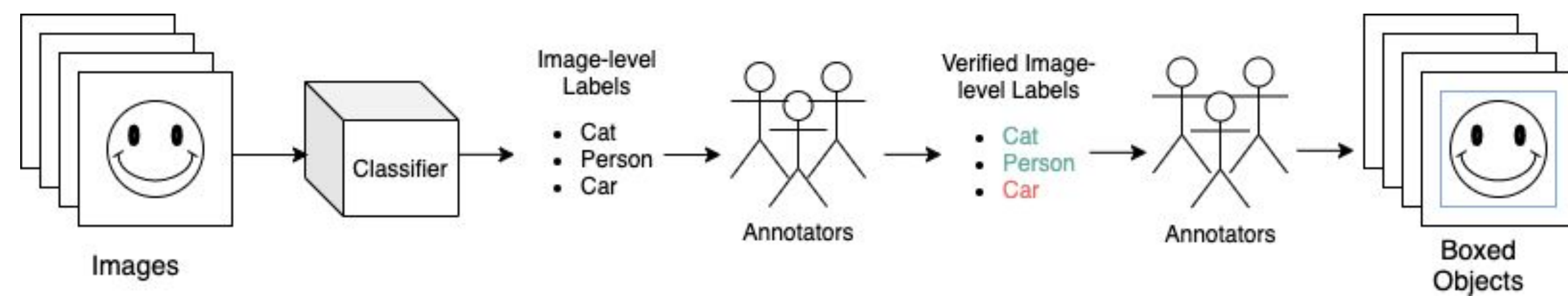
## Introduction

### More Inclusive Annotations for People (MIAP)

The Open Images Dataset<sup>1</sup> contains approximately 9 million images and is a widely accepted dataset for computer vision research. As is common practice for large datasets, the annotations are not exhaustive, with bounding boxes and attribute labels for only a subset of the classes in each image. In this research, we present a new set of annotations on a subset of the Open Images dataset called the "MIAP (More Inclusive Annotations for People)" dataset<sup>2</sup>, containing bounding boxes and attributes for all of the people visible in those images.

In summary, the main contributions of this research are:

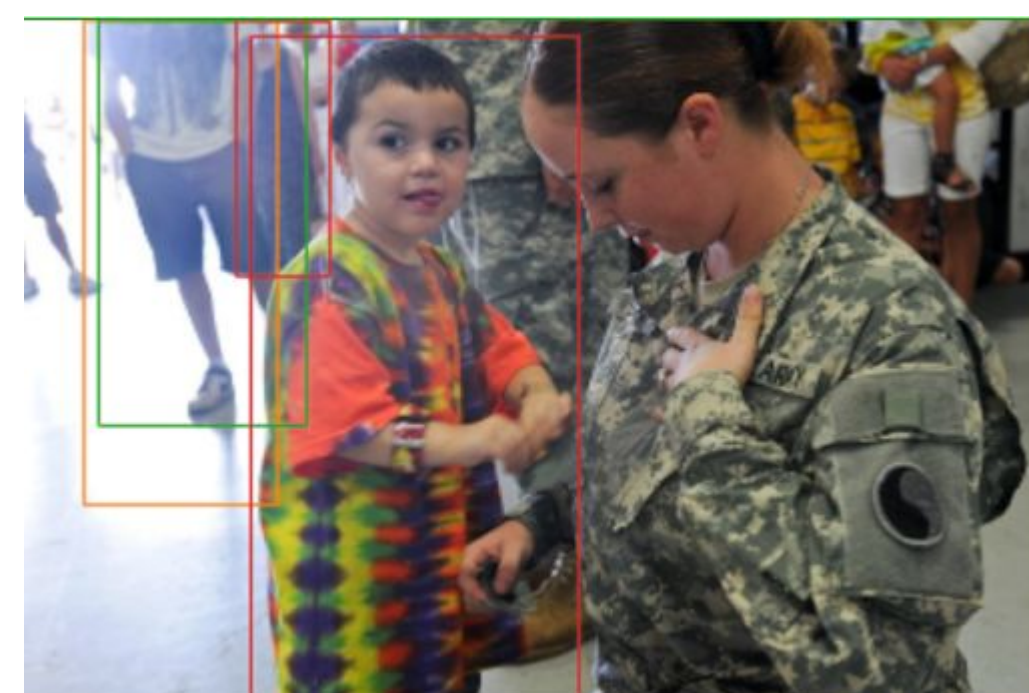
- An analysis of the original Open Images Dataset.
- An updated annotation procedure to produce more complete annotations for the *person* class.
- The resulting annotations on a subset of images and a comparative analysis of the differences between the two annotation types. We publicly release our new annotations as MIAP (More Inclusive Annotations for People).



The Open Images annotation pipeline from raw images to labeled object bounding boxes.

In the original dataset, each image contains image-level annotations (present or absent) for the most relevant classes and bounding boxes for the subset of localizable classes marked as present. There is one exception: to avoid drawing multiple boxes around the same object, less specific classes were temporarily pruned from the candidate set. We refer to this as hierarchical de-duplication (See the process above).

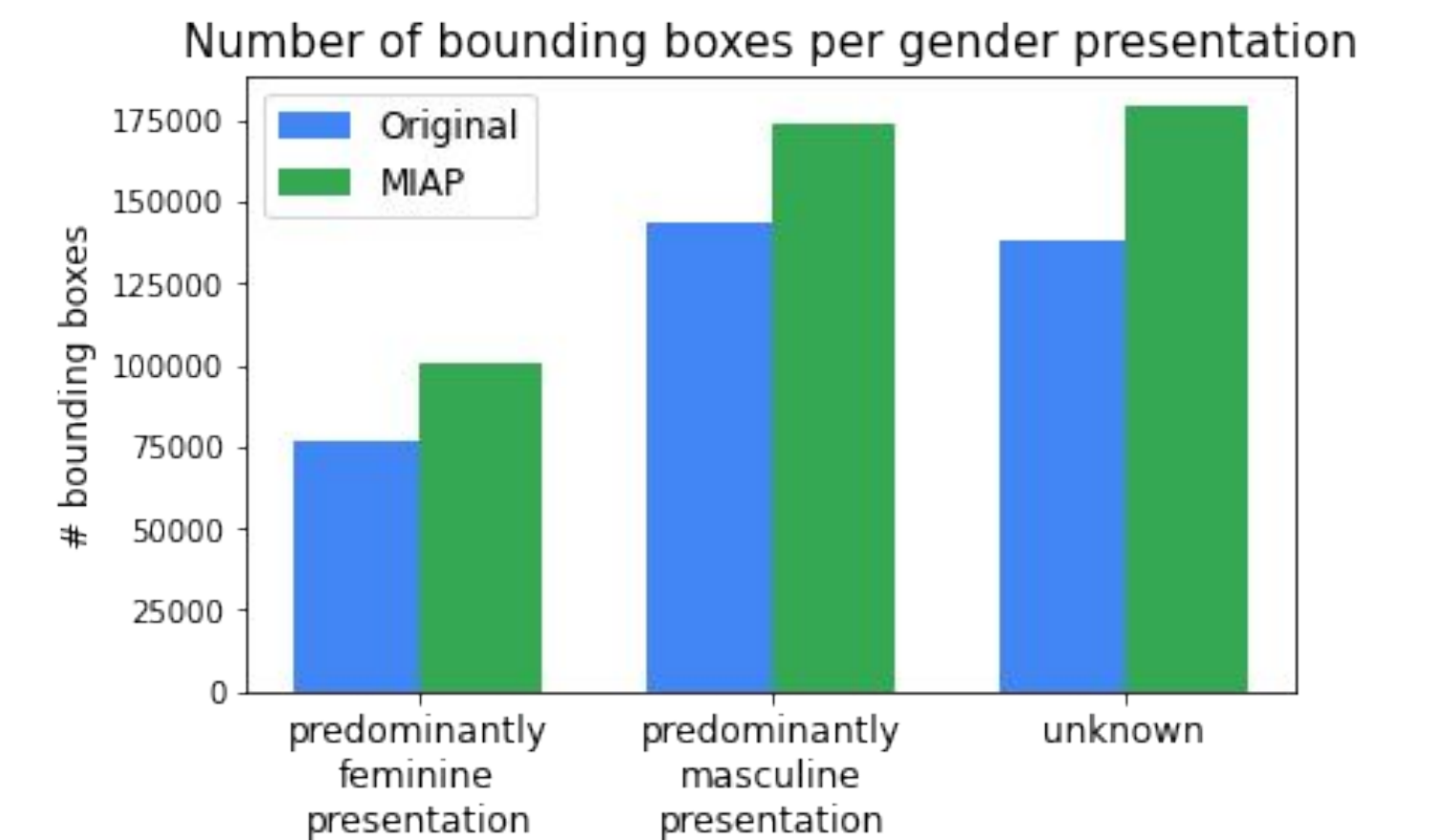
However, we found that the combination of hierarchical de-duplication and societally imposed distinctions between woman/girl and man/boy introduced limitations in the original annotations. For example, if annotators were asked to draw boxes for the class *girl*, they would not draw a box around a boy in the image. Some examples can be seen in images on the right.



## More Inclusive Annotations

For MIAP, rather than asking annotators to draw boxes for the most specific class from the hierarchy (e.g., *girl*), we invert the procedure, always requesting bounding boxes for the gender- and age-agnostic person class. All person boxes are then independently associated with labels for perceived gender presentation (predominantly feminine, predominantly masculine, or unknown) and age range presentation (young, middle, older, or unknown).

This procedure adds a significant number of boxes that were previously missing. Over the 100K images, the number of person bounding boxes have increased from 357,870 to 454,331. Our new annotations give more complete ground truth for training a person detector as well as more accurate subgroup labels for incorporating fairness into computer vision research.



Examples of new boxes in MIAP. In each subfigure the magenta boxes are from the original Open Images dataset, while the yellow boxes are additional boxes added by the MIAP dataset.

## Open Images Analysis

### Discussion and Future Work

- We encourage the use of MIAP for tasks such as disaggregating/stratifying metrics along age range and gender presentation slices, in the hope that such analysis will eventually lead to less biased models, classifiers, and workflows.
- It is important to note that the gender presentation and age range presentation, while useful for evaluation, do *not* represent gender identity or actual age of the people.
- This data should *not* be used to create gender and/or age classifiers.
- We acknowledge that there are trade-offs between providing the capability to do fairness analysis based on societal concepts of perceived gender, and perpetuating binary definitions of gender.
- Several parts of the annotation pipeline for the Open Images dataset were not addressed in this research - including image selection, object class hierarchy, determination of classes that are boxed, and annotation of relationship triplets.
- This research is a step toward inclusive annotations but more work should be done to address biases in computer vision datasets.

## Conclusion

### References

1. Kuznetsova, Alina, et al. "The open images dataset v4." International Journal of Computer Vision (2020): 1-26.
2. Schumann, Candice, et al. "A Step Toward More Inclusive People Annotations for Fairness.", AIES (2021)