The *Sesame Street* Archive: a labeled image repository of educational children's television, 1969-2018

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SSA web app:

This poster:

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1. INTRODUCTION

The *Sesame Street* Archive (SSA) is the first labeled image repository sourced from a children's educational television series.

- Projected to contain 35,000+ film frames from 4,397 episodes of *Sesame Street* aired between 1969–2018.
- Features 4 labeled object categories—`face`, `place`, `word`, and `number`—with striking intra-category variation (e.g., faces of humans, animals, puppets).
- Captures real-world, animated, and imaginative contexts through which children learn foundational literacy and numeracy.
- Spans 6 decades of sociocultural change and evolving broadcast formats (e.g., resolution, color, aspect ratio).
- Supports integrated tasks in face detection, OCR, and scene understanding.

2. RELATED WORKS

Existing datasets rarely foreground educational content, and none do so through children's programming.

- Datasets like ChildPlay [3, 9] and Toybox [10] offer limited annotation depth and only incidental educational content.
- The SSA fills gaps left by task-specific datasets like YLFW [6] (faces), SVHN [7] (numbers), and SUN [12] (places).

3. THE SESAME STREET ARCHIVE DATASET

Object Categories:

- Annotation schemas give object categories qualitative structure (Tab. 1).
- Schemas account for stylization, occlusion, non-canonical forms, and hybrid entities.

Data Collection:

- 343 *Sesame Street* episodes received from GBH [4].
- Frames extracted from episodes at 1fps yielded ~1.09M total frames.
- Frames featuring target categories curated to form a training dataset of 4,832 frames (Tab. 2).

Image Annotation:

- Trained coders annotated the training dataset using CVAT [1].
- New coders consensus-annotated individual object categories (Fig. 1).
- Edge cases resolved with iterative criteria and guiding principles.

Ethics and Copyright:

- Permission granted by Sesame Workshop and the Joan Ganz Cooney Center.
- Dataset to be shared for research under FAIR principles [10]; no commercial release.

Attribute	Values
`representation:`	`real-world; stylized; other`
`species:`	`human; puppet; animal; other`
`race-ethnicity:`	`white; black; asian; native-american; pacific-islander; other`
`age:`	`infant; child; teen; adult; elderly; other`
`orientation:`	`frontal; profile; other`
`camera-angle:`	`forward; downward; upward; other`
`visibility:`	`full; occluded; truncated; occluded-and-truncated; other`
`clarity:`	`clear; blurry; other`

Table 1. Annotation schema for identifying and labeling `face` instances. Annotation schema attributes and values reflect object label configurations made in CVAT.

	Instances		Frames	
Subset	Current	Projected	Current	Projected
`face`	7,214	52,251	3,433	24,865
`place`	1,486	10,763	1,000	7,243
`word`	4,672	33,839	1,359	9,843
`number`	2,333	16,898	1,182	8,561
Total	15,705	113,751	4,832*	35,000*

Table 2. Current and projected compositions of ssa_ subsets based on instance and frame counts. Asterisks indicate total frame counts are lower than the sums of their individual subsets, as object instances of different categories co-occur within frames.

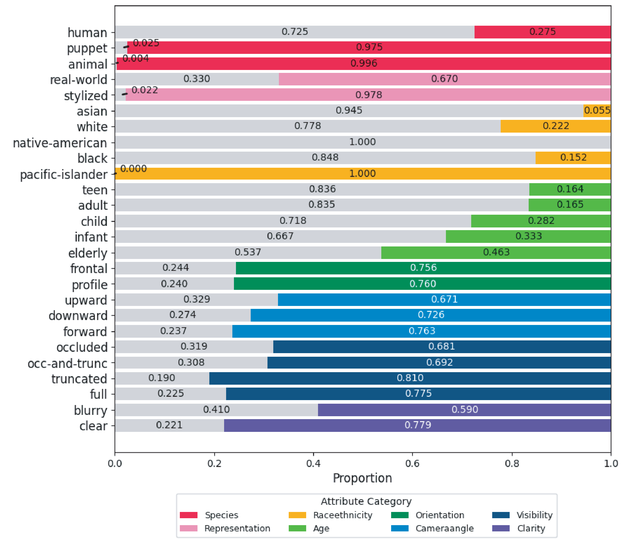
4. ANALYSIS AND RESULTS

Analysis of the `ssa_face` subset highlights remarkable facial diversity in child-centered scenes.

- Of all human `ssa_face` instances, 49% depict children and 31% depict nonhuman entities.
- Educational scenes also offer diverse task semantics, unlike the cluttered scenes commonly used for adult benchmarks.

Current models performing on `ssa_face` underscore a domain bias for adult-centered scenes.

- RetinaFace [2] misses nearly all nonhuman and stylized `ssa_face` instances (e.g., puppets, children's drawings) (Fig. 2).
- RetinaFace & S^{3}FD [12] both exhibit marked precision-recall disparities, suggesting sparse yet precise predictions within child-centered scenes (Tab. 3).



	IoU@0.5			IoU@0.5:0.95
Model	Precision	Recall	AP	mAP
RetinaFace	0.80	0.24	0.94	0.57
S^{3}FD	0.79	0.22	0.95	0.51

Table 3 (left). Performance of RetinaFace and S^{3}FD on the `ssa_face` subset, evaluated at IoU thresholds 0.5 and 0.5:0.95.

Figure 2 (above). Normalized proportions of `ssa_face` instances missed by RetinaFace, evaluated at IoU threshold 0.5. Color-coded segments show proportions missed, while gray segments show proportions detected. Left-side attribute value names that share a common attribute are grouped by color.

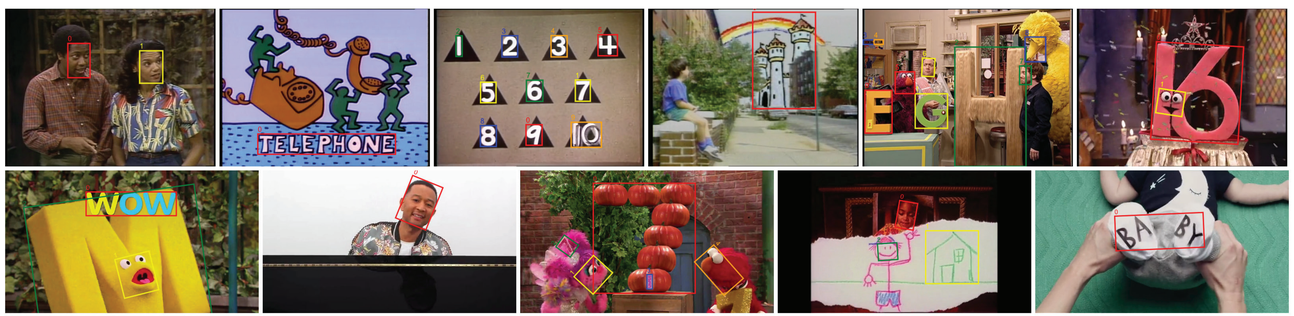


Figure 1. Example Sesame Street film frames in the SSA dataset, each with bounding boxes around faces, words, numbers, and buildings (places). Bottom-row frames have slightly wider aspect ratios, reflecting a historical shift in film production and broadcasting technology.

5. ONGOING AND FUTURE WORK

- Refine annotation schemas, switch to instance segmentation, and enable image captioning.
- Scale to 35,000+ labeled images, prioritizing visually abstract instances and scenes invoking sense of wonder.
- Integrate multimodal data (e.g., eye, cursor tracking) and international *Sesame Street* adaptations.
- Explore the SSA's uses in supporting model domain generalization, grounded in childhood cognition.
- Launch an independent SSA governance consortium and open-source research platform.

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