Interactively Building a Discriminative Vocabulary of Nameable Attributes

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(Supplementary Material)

We show examples attribute visualizations from both datasets: Outdoor Scene Recognition (OSR) and Animals With Attributes (AWA); as well as both feature spaces: color and gist that we use in our experiments presented in the paper.

Along with the visualizations, we also provide the responses (attribute-names) elicited from 20 Amazon Mechanical Turk users for the visualizations, as well as whether they indicated that the attribute was increasing (present) or decreasing (absent) from left to right in the images shown in the visualization. For each attribute, we also indicate whether it was "NAMED" (i.e. average obviousness score across subjects >= 3) or "UNNAMED" (i.e. average obviousness score across subjects < 3).

We see that attribute-visualizations are quite intuitive. Moreover, the attribute-names are varied. Although there are some errors in the Amazon Mechanical Turk users' responses, a strong consistency in responses is observed, especially for the named attributes.

We provide a snapshot of the Amazon Mechanical Turk interface we used for the Animals dataset at the end of this document. A similar interface was used for the Outdoor Scene Recognition dataset.
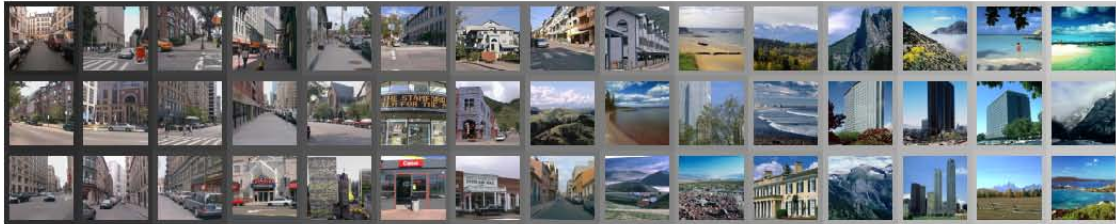
NAMED (Outdoor Scene Recognition, Color features)
Increasing: green.natural.green.green.green.colourful.green.green.trees.green.green.fresh.green.green.green.
Decreasing: cold.dull.blue.blue.blue.

NAMED (Outdoor Scene Recognition, Color features)
Increasing: horizon.open.blue.desolate.visions.blue.natural.open.open.nature.open.
Decreasing: close.congested.towers.pointy.manmade.close.manmade.congested.man made.

NAMED (Outdoor Scene Recognition, Color features)
Increasing: man made.far.blue.road.man mode.vibrant.freedom.horizon.bright.
Decreasing: manmade.open.gray.manmade.flat.man made.close.man made.manmade.clear-sides.manmade.

NAMED (Outdoor Scene Recognition, Color features)
Increasing: man made.congested.manmade.buildings.manmade.dark.man made.congestion.white.close.man made.congested.dark.
Decreasing: blue.natural.natural.green.horizon.blue.

NAMED (Outdoor Scene Recognition, Color features)
Increasing: brown.red.closed.manmade.
Decreasing: blue.man made.gloomy.blue.blue.height.blue.blue.blue.blue.flat.blue.blue.blue.blue.gloomy.

NAMED (Outdoor Scene Recognition, Color features)
Increasing: bright.blue.grey.
Decreasing: road.open.open.open.open.flat.perspective.open.flat.open.flat.far.gloomy.flat.open.gray.flat.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: natural.places.natural.natural.open.man made.natural.open.over-view.natural.natural.blue.busy.dull.blue.natural.
Decreasing: man made.summer.manmade.congested.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: man made.dull.gloomy.open.soft.open.depressing.open.natural.
Decreasing: blue.man made.blue.blue.blue.skylines.rocky.blue.dark blue.blue.blue.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: bright.height.shade.open.road.man made.congested.open.man made.
Decreasing: blue.open.flat.open.open.flat.open.open.open.open.high way.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: manmade.man made.hatred.close.congested.grey.man made.manmade.
Decreasing: natural.tone.natural.open.horizon.open.open.blue.plain.open.open.bright.blue.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: manmade.bright.manmade.manmade.green.building.
Decreasing: cold.natural.open.open.natural.open.blue.town planning.natural.deserted.natural.open.open.border.

UNNAMED (Outdoor Scene Recognition, Color features)
Increasing: manmade.gray.blue.light.gray.
Decreasing: red.natural.gloomy.yellow.open.green.beauty.fresh.open.horizon.sunny.natural.nature.red.natural.open.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: revelancy.red.manmade.manmade.close.manmade.green.close.manmade.
Decreasing: open.open.natural.clear-bottom.open.flat.open.nature.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: open.slopy.natural.open.open.far.natural.natural.blue.blue.
Decreasing: natural.close.sky.blue.near.close.natural.consumption.close.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: green.vegetation.green.green.close.green.green.closer.green.green.green.
Decreasing: green.flat.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: green.flat.representation.red.orthogonal.
Decreasing: natural.freshness.slope.open.blue.open.natural.natural.natural.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: capital.manmade.congested.manmade.green.judgments.top.close.congested.manmade.congested.
Decreasing: natural.open.open.natural.blue.

NAMED (Outdoor Scene Recognition, Gist features)
Increasing: yellow.dull.natural.art.open.nature.natural.open.natural.ash.blue.natural.
Decreasing: green.building.fluffy.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: green.flat.lower-bottom.man made.far.
Decreasing: corporate.lifestyle.congested.tall.blue.pointy.blue.blue.blue.building.pointy.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: yellow.altitude.rocky.natural.fresh.natural.slopy.landscapes.pointy.sloppy.
Decreasing: flat.horizon.green.sky blue.flat.man made.encounters.far.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: green.natural.manmade.man made.blue.flat.manmade.road.perspective.black.black.citations.
Decreasing: grey.natural.green.natural.natural.freshness.close.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: scary.close.red.close.travel.close.red.congested.close.
Decreasing: bright.far.natural.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: bright.family.water.ash.building.blue.
Decreasing: rocky.blue.slopy.bright.pointy.natural.natural.glacier.fresh.green.green.

UNNAMED (Outdoor Scene Recognition, Gist features)
Increasing: open.open.clear-bottom.flat.warm.flat.liquid.open.blue.very bright.coastal.open.dull.religion.
Decreasing: green.green.natural.top.natural.natural.

NAMED (Animals, Color features)
Increasing: black.furry.black.primatial.black.black.black.black.black.black.black.black.tough skin.gorillas.
Decreasing: brown.furry.brown.black.

NAMED (Animals, Color features)
Increasing: brown.brown.hard.brown.pointy.brown.brown.brown.brown.brown.brown.large.spotted.brown.
Decreasing: hairless.green.arctic.lighter.white.

NAMED (Animals, Color features)
Increasing: brown.spotted.brown.brown.brown.neutral.spotted.white.brown.hard.spotted.brown.large.brown.brown.brown.brown.
Decreasing: furry.black and white.black and white.

NAMED (Animals, Color features)
Increasing: white.green.green.black.green.brown.green.green.spotted.near.fresh.
Decreasing: spotted.green.close.furry.dark.spotted.spotted.contrast.furry.

NAMED (Animals, Color features)
Increasing: white.white.white.furry.
Decreasing: large.brown.brown.brown.brown.tough-skin.black nad white.brown.brown.brown.brown.brown.spotted.brown.brown.brown.

NAMED (Animals, Color features)
Increasing: close.black.large.black.tough skin.black.large.gray.gray.black.large.
Decreasing: brown.green.green.far.green.green.hard hair.green.long neck.

UNNAMED (Animals, Color features)
Increasing: spotted.gray.lighter.large.wild animals.furry.far.gloomy.
Decreasing: heavy.ugly.patches.black.freshness.large.large.large.tough-skin.black.black.black.

UNNAMED (Animals, Color features)
Increasing: dark.black.photogenic.black.patches.spotted.black.close.blank and furry.big.brown.
Decreasing: furry.brown.gray.distance.sealed.long-foot.furry.gray.furry.

UNNAMED (Animals, Color features)
Increasing: furry.patches.spotted.green.furry.green.furry.furry.spotted.spotted.
Decreasing: dull.long-neck.gray.patches.contasting.long-necked.long-neck.tall.furry.large.
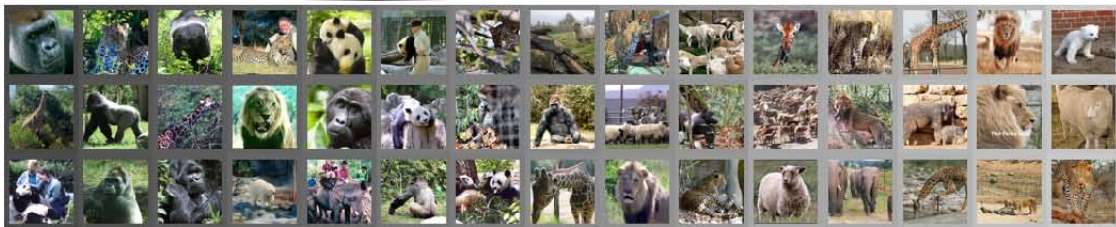

UNNAMED (Animals, Color features)
Increasing: black.black.black.black.rough.furry.
Decreasing: brown.brown.brown.brown.brown.brown.brown.hair.brown.brown.furry.spotted.brown.brown.

UNNAMED (Animals, Color features)
Increasing: brown.congested.brown.brown.congested.brown.brown.furry.brown.brown.brown.patched.brown.brown.
Decreasing: rough.black.gray.pointy.rude.black.

UNNAMED (Animals, Color features)
Increasing: furry.furry.brown.brown.brown.bright.brown.brown.brown.brown.white.
Decreasing: black.black.fresh.tough-skin.green.rough.black.black.black.

NAMED (Animals, Gist features)
Increasing: long neck.long-neck.long.long-neck.long-neck.long-leg.long neck.long-neck.long neck.long long neck.long-neck.large.long neck.long-necked.long-neck.long-neck.patches.long-neck.
Decreasing: trees.

NAMED (Animals, Gist features)
Increasing: black.furry.black and white.furry.friendly.black and white.bulbous.black and white.fat.congested.black and white.patches.climbers.black and white.black and white.black and white.
Decreasing: solid.far.open.brown.

NAMED (Animals, Gist features)
Increasing: clarity.spotted.white.
Decreasing: spotty.yellow.spotted.spotted.large.spotted.spotted.spotted.spotted.stripes.spotted.dotted.spotted.spotted.spotted.spotted.

NAMED (Animals, Gist features)
Increasing: white.white.arctic.furry.white.fresh.white.arctic.white.polar.white.white.clear - sides.lighter.arctic.white.
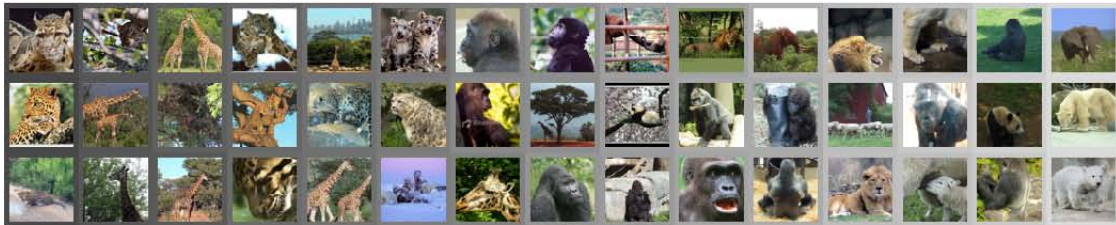Decreasing: rude.open.tough skin.brown.

NAMED (Animals, Gist features)
Increasing: brown.colorful.red.rough.pointy.lions.brown.cruel.rough.brown.
Decreasing: black.darker.black.black.dirty.brown.black and white.black.black.black.black.

NAMED (Animals, Gist features)
Increasing: black.long neck.furry.
Decreasing: patches.dotted.long neck.spotted.long neck.spotted.spotted.stripes.spotted.long neck.brown.spotted.large.spotted.long neck.spotted.patched.

UNNAMED (Animals, Gist features)
Increasing: complicated.green.brown.
Decreasing: white.open.white.barren land.open.green.white.white.furry.white.solid.white.white.white.green.white.distance.

UNNAMED (Animals, Gist features)
Increasing: patches.black and white.furry.arctic.black and white.white.black and white.furry.black and white.black and white.
Decreasing: brown.brown.tall.green.spotted.far.green.far.green.brown.

UNNAMED (Animals, Gist features)
Increasing: open.long neck.long-neck.far.long neck.large.skyline.hair-less.free.
Decreasing: spotted.porous.black.stripes.brown.spotted.black.patches.spotted.rocky.black.
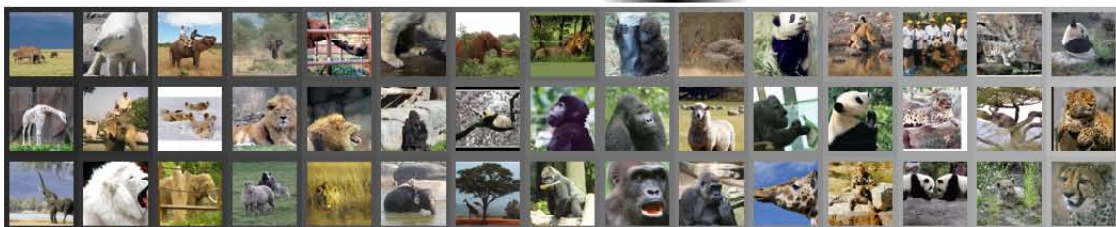

UNNAMED (Animals, Gist features)
Increasing: spotted.spotted.fluffy.yellow.scary.brown.black.monkey.
Decreasing: black.black.black.white.black.furry.black.black.black.dark.black.black.

UNNAMED (Animals, Gist features)
Increasing: large.rough-skin.vibrant.spotted.
Decreasing: longneck.long-necked.spot.spotted.long-neck.tall.agile.green.black.long-neck.long-neck.long neck.long neck.spotted.long neck.

UNNAMED (Animals, Gist features)
Increasing: white.spotted.hard.spotted.spotted.spotted.spotted.pattern.black and white.
Decreasing: furry.open.large.border.white.big.huge.white.large.white.white.

Name the property and tell us how obvious it is

How are the images on the left different from the images on the right? What property of the scenes generally seems to be changing from left to right in the series of images shown below? The property may be increasing, or decreasing. And **how obvious is this change?**

Example 1

Property name (one word or phrase):

| Brown |

Is the property you indicated increasing or decreasing from left (darker borders) to right (lighter borders)?

○ Increasing   ◉ Decreasing

Example 2

Property name (one word or phrase):

| Spotted |

Is the property you indicated increasing or decreasing from left (darker borders) to right (lighter borders)?

◉ Increasing   ○ Decreasing

The properties:

- May be any **characteristic of the scenes or of the animals** such as the color or layout or view or general feel **(examples: patches, stripes, hairless, tough-skin, bulbous, long-neck, spotted, orange, yellow, large, small, fat, furry, far, green, white, brown, black, gray, agile, arctic, coastal, dessert, rough, close, rocky, congested, fluffy, porous, hard, soft, pointy, clear-sides, clear-bottom, scary, gloomy, fresh, etc.)**
- May be decreasing i.e. present in the images on the left and absent in the images on the right, or increasing i.e. absent in the images on the left but present in the images on the right.
- May slowly vary from left to right, or may suddenly transition.
- May transition from one property in the images on the left to another property in the images on the right. In this case, please name any ONE of the two properties.
- May transition from the presence of a property to it's absence. In this case, please name that property.

The Borders & Fading Black Horizontal Bar:

- The border around each image approximately indicates how the property is varying. The property is strong for images with dark/black borders or light/white borders. The property is weak/vague for images with gray borders.
- The fading black horizontal bar (if shown) loosely indicates a split to show two groups on either side: images that have the property, and images that don't.
- The images, the border colors, and the fading black horizontal bar (if shown) are approximate and may contain mistakes. Please use your best judgement to find a general change in property of images going from left to right.

DO:

- The property name/tag should be a single phrase.
- The property name/tag should be a general characteristic of the scenes / images
- Please respond to ALL questions asked
- Thr property may not be obvious. Please take some time to observe the images and think about them before responding.

DON'T

- Please **DO NOT name objects** in the images (such as mountain, trees, sky, water, building, road, etc.)
- Please **DO NOT name the animal** depicted in the images (such as elephant, tiger, lion, giraffe, panda, bear, monkey, chimpanzee, etc.)
- The property name CANNOT be longer than 25 characters

Rejection Policy:

If ANY one of the above are violated, or any of the questions below are left empty, your work will be rejected.

Your Task Begins Here:

How are the images on the left different from the images on the right? What property of the scenes generally seems to be changing from left to right in the series of images shown below? The property may be increasing, or decreasing.

REQUIRED: How are the images on the left different from the images on the right? Property name (one word or phrase):

| |

REQUIRED: Is the property you indicated above increasing or decreasing from left (darker borders) to right (lighter borders)?

○ Increasing   ○ Decreasing

REQUIRED: Please provide an **accurate assessment** of how obvious this change is in the images from left to right? Please DONOT provide the same level of obviousness to all HITs. Please **think about this carefully** before responding.

○ Subtle   ○ Little Obvious   ○ Obvious   ○ Very Obvious

REQUIRED: Please **describe** how the images on the left are different from the images on the right. **What changes did you see** in the images that made you select this property-name? Please explain in clear and well-written English. Your work will **DEFINITELY be REJECTED** if a meaningful well-written explanation describing the changes you see in the images from left to right is not provided.

| |

| You must ACCEPT the HIT before you can submit the results. |