Building a Taxonomy of Attributes for Fine-Grained Scene Understanding

Scenes Organized by Category

- Ice Cave
- Cavern
- Volcano
- Forest
- Dragon
- Savanna
- Village
- Beach
- Canyon
- Highway
- Railroad
- Canal
- River
- Subway
- Dentist’s Office
- Classroom

Scenes Organized by Attributes

- Indoor
- Outdoor

Natural Manmade

Transport

Water

Example of Using Attributes

- Spatial envelope: large, enclosed
- Affordances / functions: can fly, play, walk
- Materials: shiny, black, hard
- Object presence: has people, ships
- Simile: looks like Star Trek
- Emotion: scary, intimidating

Mechanical Turk Human Intelligence Tasks

Gathering Attributes:

Mechanical Turk Human Intelligence Task - workers are asked to compare the images on the left to those on the right. Workers must attribute tags for left or right images into the text boxes at the bottom of the page.

Labeling Attributes:

Attribute Labeling Interface for MTurk - workers are instructed to click on any of the 20 thumbnail-sized images that contain the given attribute displayed in blue at the top of the page. Workers are able to mouse over a thumbnail and see the full-sized image in the review window on the right.

Objects

- tree
- table
- people
- car
- chain
- net
- stones
- poles
- signs with text
- ship
- boat
- bathtub
- airplane
- waterfall
- refrigerator
- electrical wires
- ladder
- track
- food
- road markings

- chair
- stairs/steps
- computer monitor/television
- wheel
- fence
- shell (full/empty)
- speakers
- bottle
- uniforms
- umbrella
- cabinet/locker
- life jacket/life raft
- pots
- piano
- graffiti
- picture frame/art work
- pipes
- rope
- train
- birds
- statue
- road markings
- ladder
- hub
- lamp
- furniture
- statue
- pole
- ball
- clock (wall clock)
- black board/white board
door

Spatial Envelope

- warm
- cold
- natural
- man-made
- open area
- semi-enclosed area
- enclosed area
- far away horizon
- no horizon or near-by horizon
- rugged scene
- mostly-horizontal components
- mostly-vertical components
- symmetrical
- clustered space
- scary
- soothing
- stressful

Materials

- fencing
- railing
- wire
- railroad tracks
- grass
- vegetation
- shrubbery
- foliage
- leaves
- asphalt
- pavement
- shingles
- carpet
- brick
- tiles
- concrete
- metal
- paper
- wood
- not part of a tree
- vinyl
- linoleum
- rubber/plastic
- cloth

- sand
- rock/stone
- dirt/soil
- marble
- glass
- rocks
- waves/surf
- ocean
- running water
- still water
- ice
- snow
- clouds
- smoke
- fire
- natural light
- direct sun/sunny
- fluorescent lighting
- incandescent lighting
- harsh lighting

Functions

- sailing/boating
- diving
- transporting things or people
- sunbathing
- vacationing/traveling
- hiking
- climbing
- camping
- reading
- thinking
- studying/learning
- teaching/training
- research
- diving
- swimming
- bathing
- eating
- cooking
- socializing
- congregating
- waiting in line/queueing
- competing
- sports
- exercise

Surface Property

- aged
- worn
- glossy
- matte
- sterile
- moist/damp
- dry
- dirty
- rusty