

A large sculpture of a robot head, constructed from hundreds of spheres of various colors including white, yellow, orange, red, brown, and teal. The spheres are arranged to form the facial features and the body of the robot. The sculpture is positioned against a red brick wall on the right and green foliage on the left.

ROBOT DREAM

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Agenda

- **Project Overview**

- Team
- Product vision
- Project goal
- Project duration

- **Data Collection and Labelling**

- Objective
- Definition of balloon in this project
- Definition of human face in this project
- Requirements
 - Dataset size
 - Image size
 - File extension
 - Classes of images
 - Other requirements

- Labelling
 - Label name
 - Bounding box
 - Tools to use
- Risk assessment (problems that we might encounter)
- Where to find our data
 - Public dataset vs building our own database vs hybrid method
 - Pros vs cons of each method

- **Balloon Dataset Statistical Analysis**

- **Happy Face Dataset**

Project Overview

Team: Robot Dream

Product Vision: a web application where user can upload a picture and receive the same image with bounding box(es) around the balloon(s) and happy face(s) as well as the number of balloon(s) presenting in the photo

Project Goal:

- Build a model to
 - detect balloon
 - detect happy face
 - count number of balloons
- Build a pipeline for real deployment

Data Collection and Labelling

- **Objective**

- detect balloons and happy faces in photos
- Count number of balloons

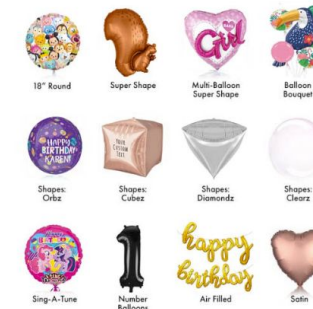
- **Definition of balloon in this project**

- **Balloon:** Normal party balloons (solid color or with prints) including out of focus balloons



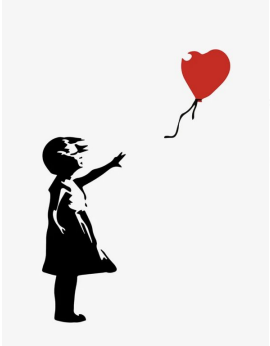
- Not balloon:

- Animal shaped balloons, alphabet-shaped balloons, etc



Data Collection and Labelling

- Not balloon:
 - hot air balloons, animated pictures of balloons, decorative strings, exercise ball, balls, reflection in mirror, etc



- **Definition of human face in this project**
 - faces of adult or children, of any gender and race



Data Collection and Labelling

- **Requirements**

- Dataset size: minimum of 500 photos
- Image size: at least 600 x 600 pixels
- File extension: .jpg
- Class of images:
 - Images with balloons (50%)
 - Images of party locations without balloons and Images of objects like balloons ex. Hot air balloons, balls, etc (50%)
- Other requirements:
 - images in RGB, not greyscale
 - avoid watermarked images
 - download from proper sources and not steal any intellectual property
 - a good mix of photos in variety of numbers, positions, distances, size, angles, etc
 - a good balance between different classes
 - labels each and every single balloons in the images

Data Collection and Labelling

- **Labelling**

- Label name:
 - **"balloon"**
 - not Balloon or balloons or BalloonS
- Bounding box:
 - data has to be annotated with a bounded box around balloons
 - bounding boxes should enclose the entirety of balloons
 - bounding boxes should be tight around each balloon
 - ignore balloons' reflection on other surfaces such as wall, mirror, etc
 - label occluded objects
 - occlusion is when an object is partially out of view in an image due to something blocking it in a photo.
 - label the occluded object as if it were fully visible, not just draw a bounding box for only the partially visible portion of the object. Boxes can overlap.
- Tools to use:
 - Roboflow
 - collaborate with other team members in checking, labelling and building our database
 - pulling already labelled photos from the public databases to our own dataset
 - export to variety of format that can be used to build the model in later phase

Data Collection and Labelling

- **Risk assessment (problems that we might encounter)**
 - balloons with colors closely match to the background such as white balloons in white background
 - balloons on the edge of the photo
 - reflection of balloons in other surface
 - balloon that are too blurry
 - groups of balloons where there are too many overlapped balloons

Data Collection and Labelling

- **Where to find our data**

	Public Dataset	Create our own dataset	Hybrid (collect data from both public dataset and labelling ourselves)
Pros	<ul style="list-style-type: none">- large dataset with already labelled images- fast, easy download & check- large variety of size and shape photos => good mix of different positions for the model to learn	<ul style="list-style-type: none">- have a good control of our dataset that meet exact our requirements- maintain a good balance between different classes	<ul style="list-style-type: none">- mitigate the cons of each previous method by taking photos from the public dataset that meets our requirement and add more photos of our own and label them ourselves.- medium speed because we don't label everything from scratch
Cons	<ul style="list-style-type: none">- unsure what baseline the database is built on => maynot meet the requirements for our dataset- large dataset but mostly not meet our requirement (like hot air balloon or other shaped balloons), especially the resolution 600 x 600 pixels- even if we download them from the internet, still have to manually go through each and every photo to check if the label name is correct, bounding box is right, any missing object that hasn't been labelled yet, etc.	<ul style="list-style-type: none">- slow & time consuming in collecting data and done labelling on each and every photos- smaller dataset than public one- might be biased in choosing to include and exclude photos and end up not having many variety of photos in different shape and size and position	<ul style="list-style-type: none">- time intensive

Balloon Dataset Statistic Analytics

- **Our current dataset**

- total image: 1879 photos
- each class:
 - 920 photos with balloons
 - 959 negative photos

Balloon Dataset Statistic Analytics Week 1

Images

1,000

1 missing annotations

514 null examples

Annotations

3,103

3.1 per image (average)

across 1 classes

Average Image Size

0.79 mp

from 0.17 mp

to 58.98 mp

Median Image Ratio

1024×1024

square

Class Balance

balloon

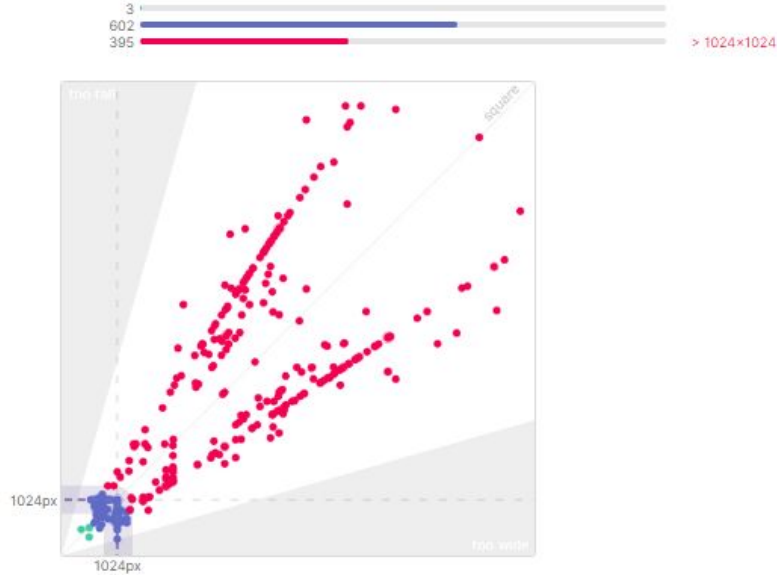
3,103

Dimension Insights

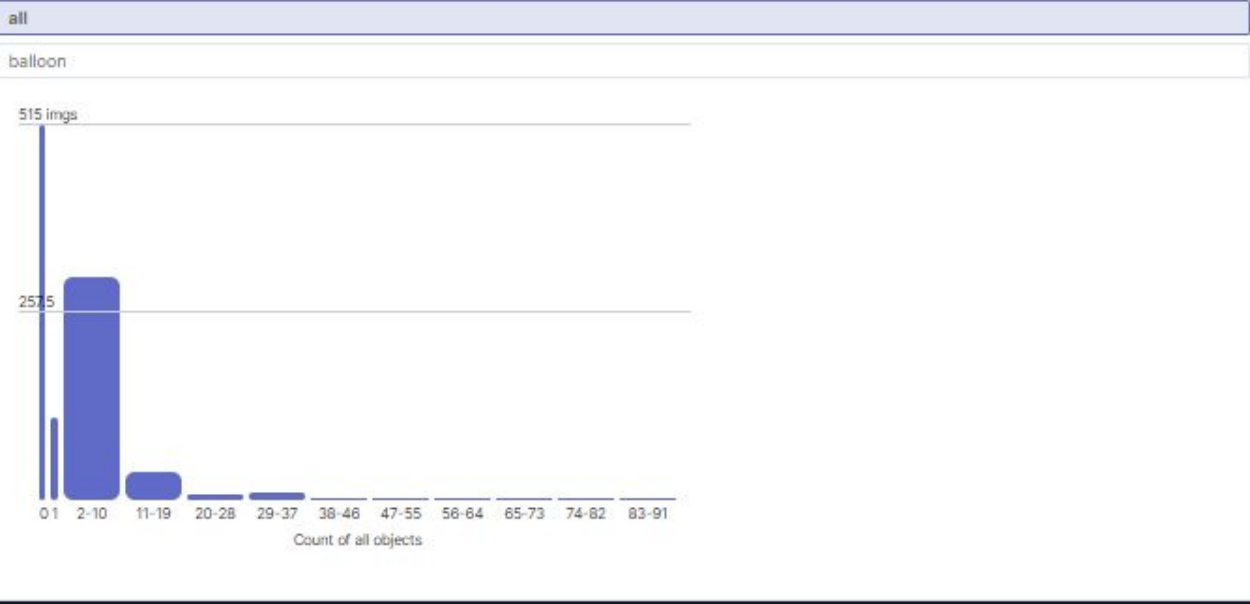
Size Distribution

The **purple box** indicates the median width by median height image (1024×1024).

medium
large
jumbo



Histogram of Object Count by Image



Aspect Ratio Distribution



Balloon Dataset Statistic Analytics Week 2

Images

879

0 missing annotations
445 null examples

Annotations

3,157

3.6 per image (average)
across 1 classes

Average Image Size

0.74 mp

from 0.17 mp
to 42.18 mp

Median Image Ratio

1024×768

wide

Class Balance

balloon

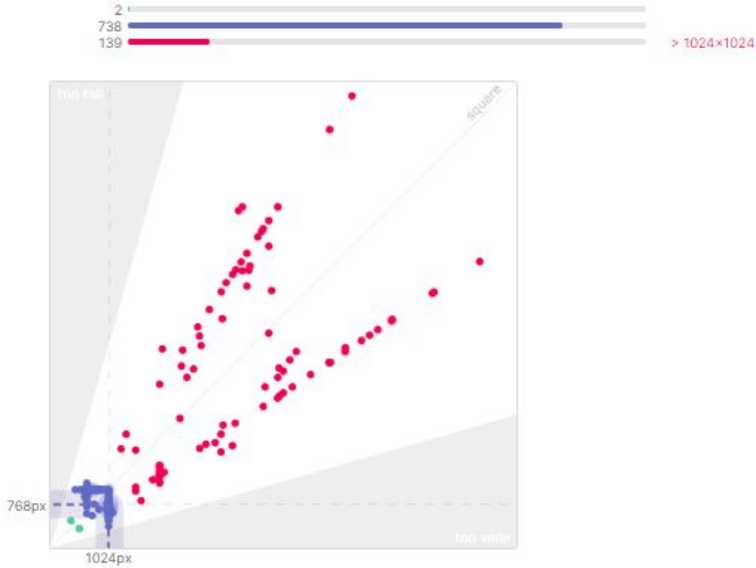
3,157

Dimension Insights

Size Distribution

The **purple box** indicates the median width by median height image (1024×768).

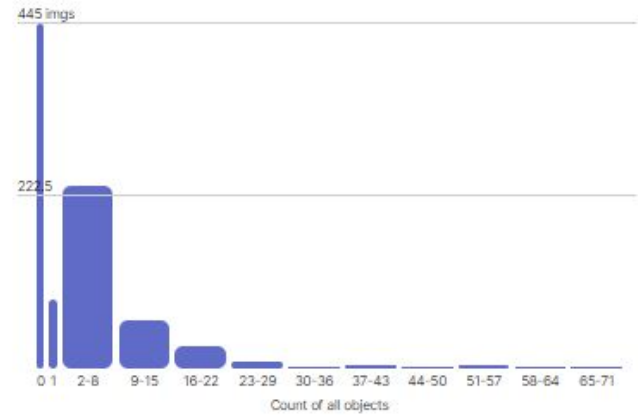
medium
large
jumbo



Histogram of Object Count by Image

all

balloon



Aspect Ratio Distribution

tall
square
wide
very wide

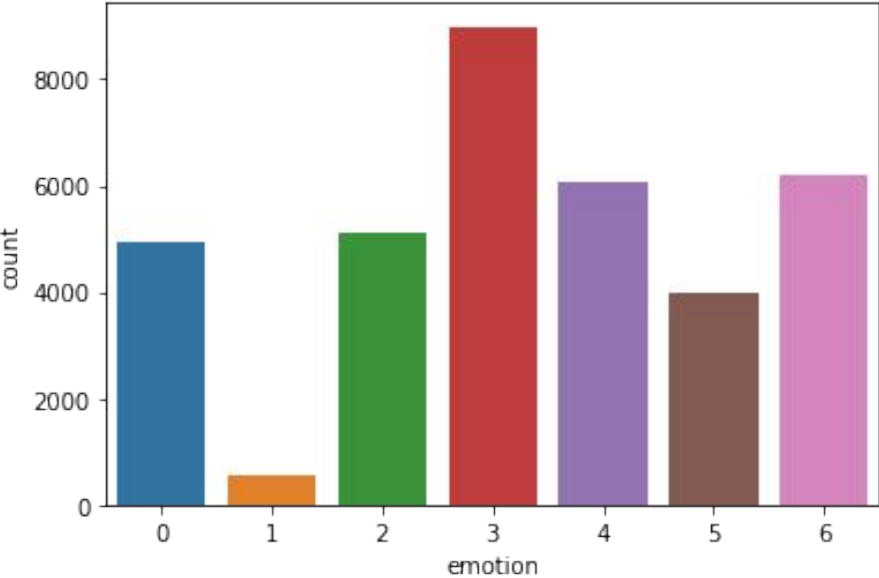


> 1.5:1

Happy Face Dataset

(35887, 3)

	emotion	pixels	Usage
0	0	70 80 82 72 58 58 60 63 54 58 60 48 89 115 121...	Training
1	0	151 150 147 155 148 133 111 140 170 174 182 15...	Training
2	2	231 212 156 164 174 138 161 173 182 200 106 38...	Training
3	4	24 32 36 30 32 23 19 20 30 41 21 22 32 34 21 1...	Training
4	6	4 0 0 0 0 0 0 0 0 0 0 3 15 23 28 48 50 58 84...	Training



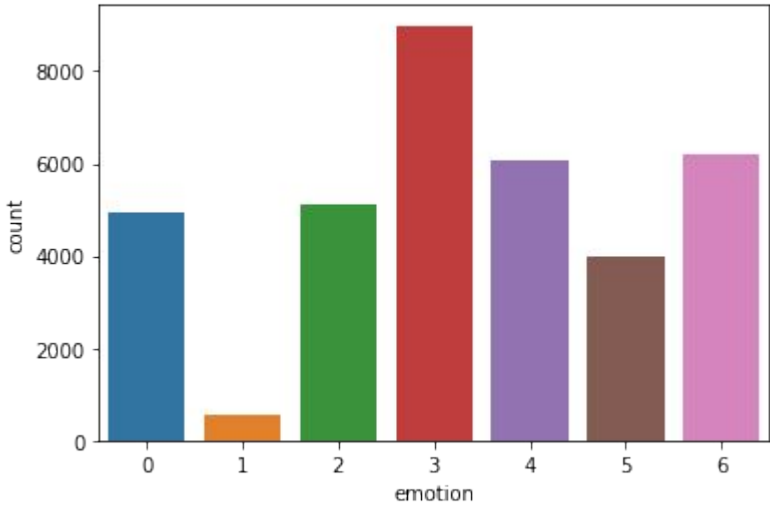
- 0 - anger
- 1 - disgust
- 2 - fear
- 3 - happiness**
- 4 - sadness
- 5 - surprise
- 6 - neutral

Happy Face Dataset



Happy Face Dataset (Downsized)

Labels to keep	Labels to remove
0 - anger	<i>1 - disgust</i>
3 - happiness	<i>2 - fear</i>
4 - sadness	<i>5 - surprise</i>
	<i>6 - neutral</i>

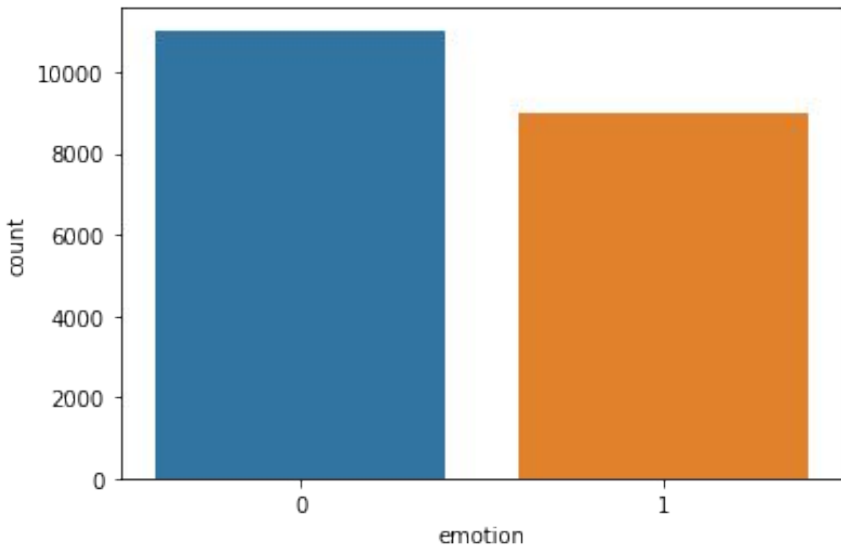


After Balancing:

0 - Not Happy: Anger + Sadness

1 - Happy: Happiness

11030 vs. 8989



(35887, 3) --> (20019, 3)

Q & A