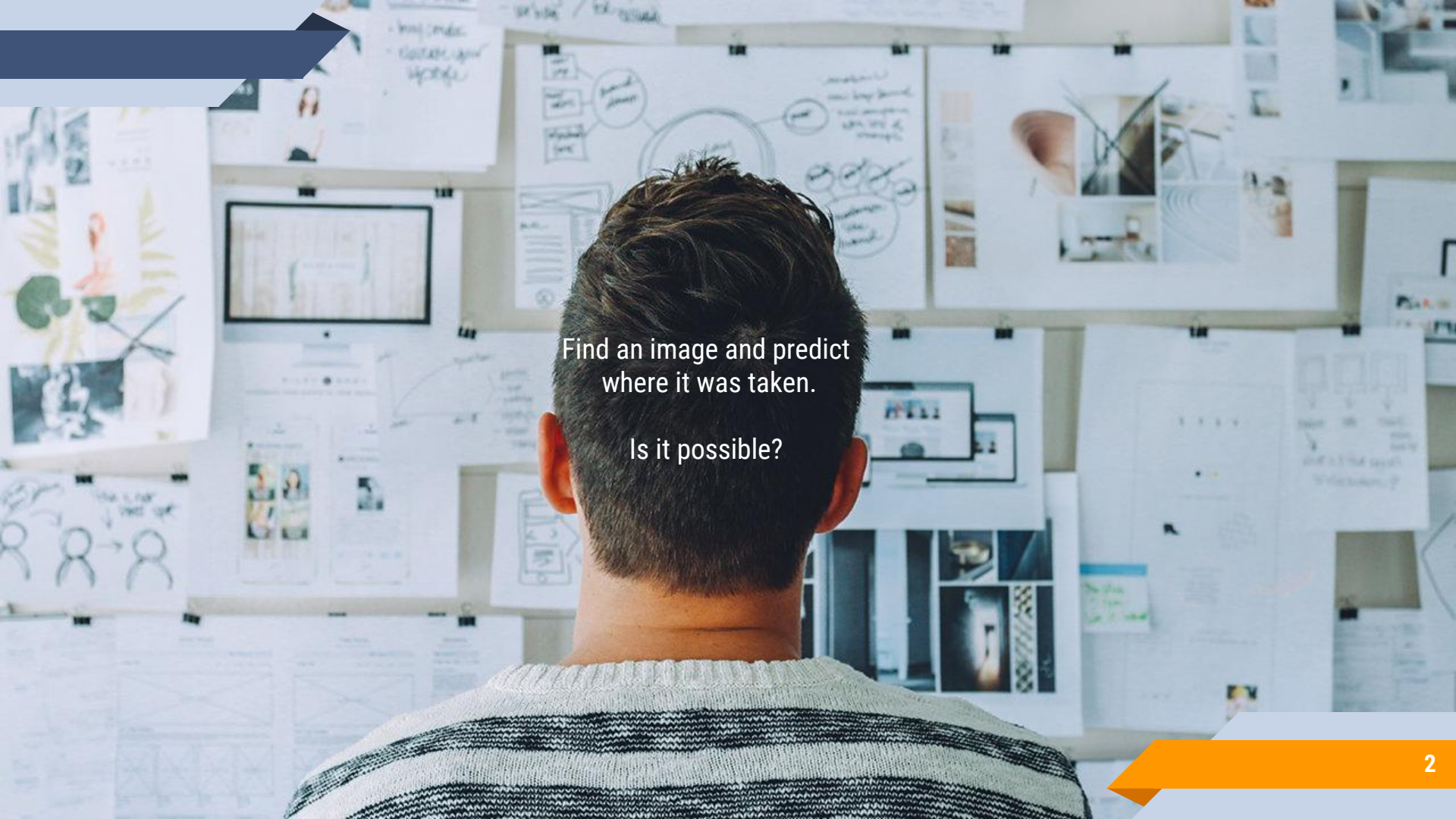
THE PLACING TASK

Data Mining Group Project

DATA MINERDS


Find an image and predict
where it was taken.
Is it possible?

1

GOALS AND PREPROCESSING

The first steps

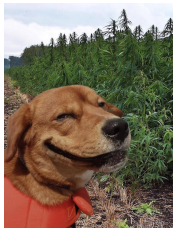
Goals

THE IDEA

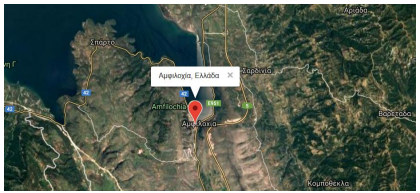
The project is a placing task from the MediaEval website.

GOAL

Our goal is to develop a system that can estimate the geographic location of a photo, more specifically latitude and longitude.



(38.862766 ,
21.164353)



Data

THE DATA WE USE:

- Images
- Metadata
- User profiles

2

METADATA PROCESSING

The first approach

Pre processing

1) Merge coordinates and metadata files.

2) Divide training and test sets

3) Clean the tags (text)

Output Activation Map

Divide the world up into a grid and assign images to cells of this grid.

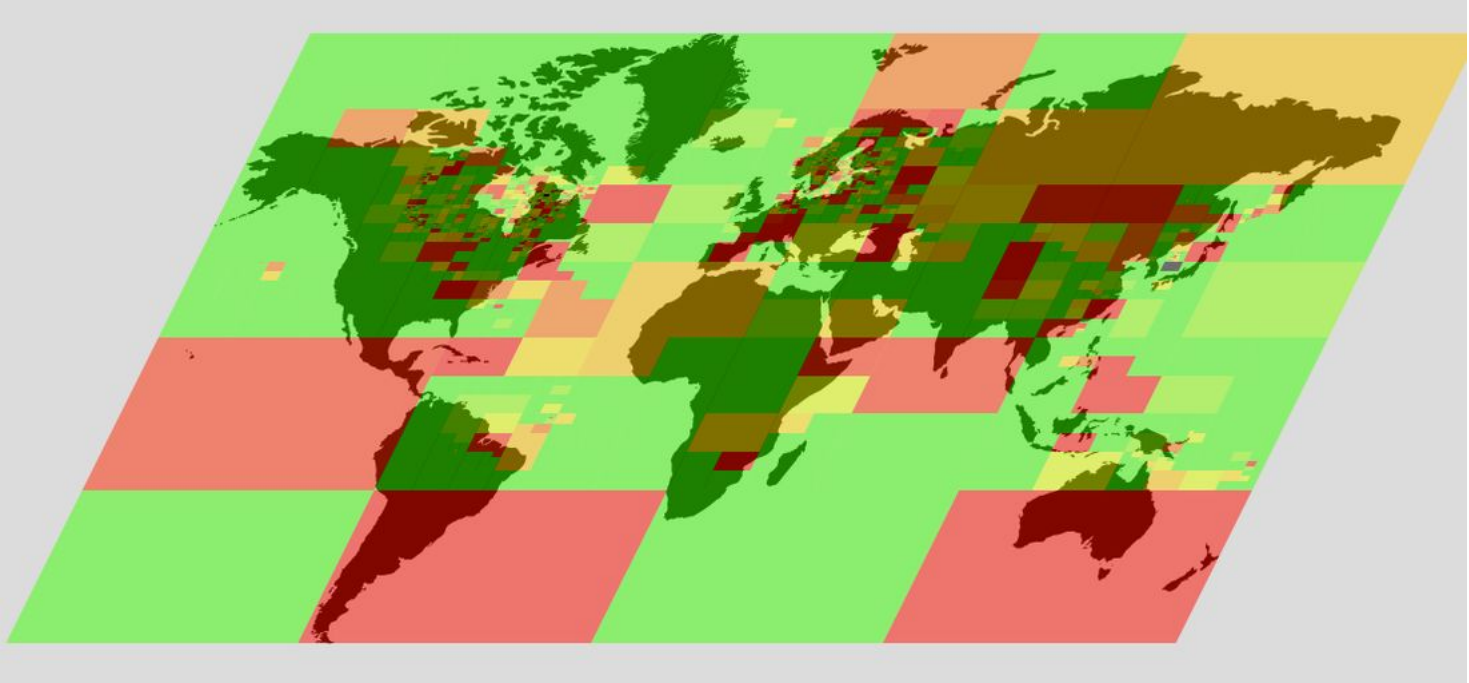


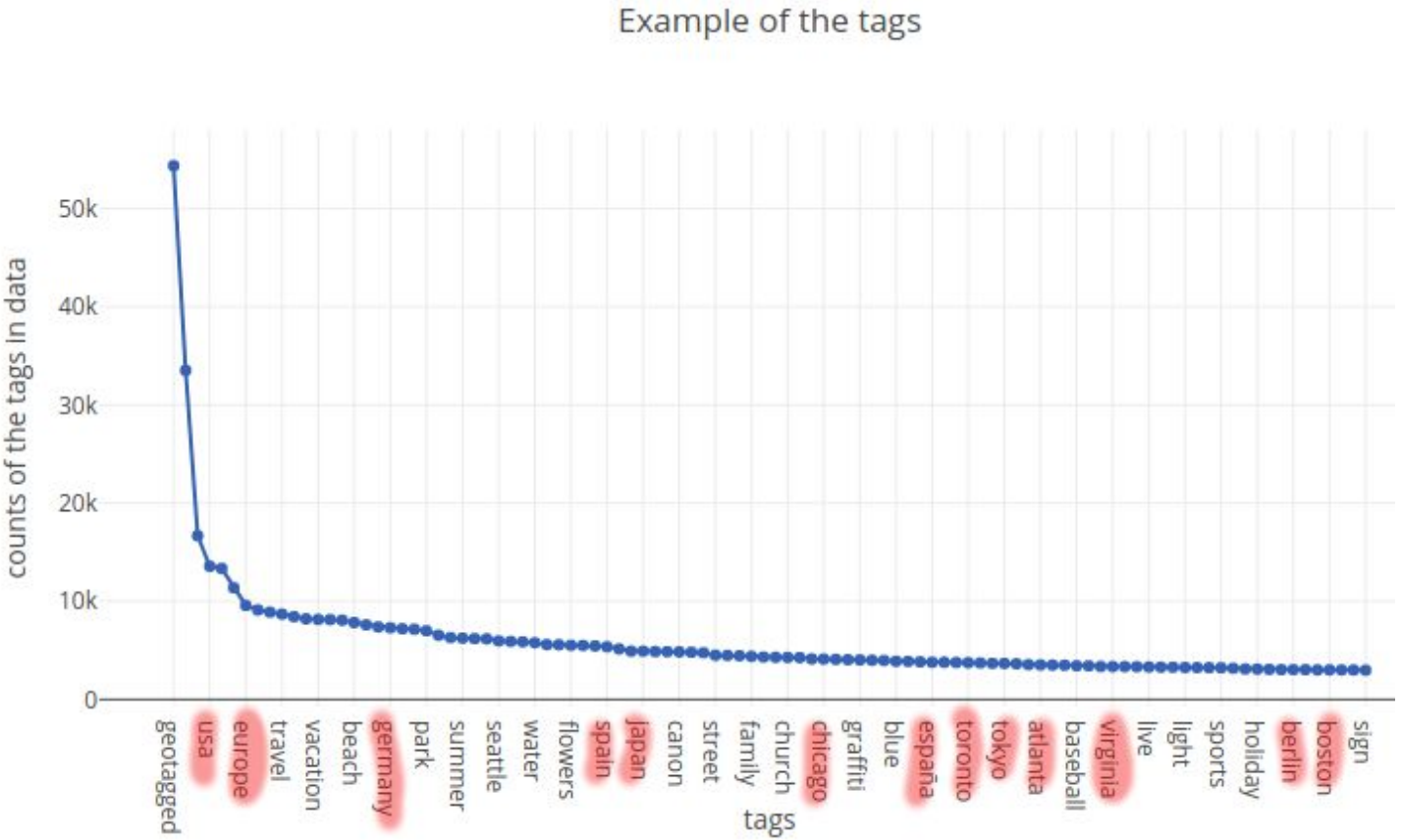
Image Tags Analysis

1) Create a bag-of-words language model for each cell based on the most frequently occurring tags.

2) Each new image's tags will be compared with all the existing images.

3) It will be given the coordinates of an image from the grid which has the maximum number of common tags.

Distribution of photos from the 1st dataset: 5000 images


Example of the tags
counts of the tags in data
50k
40k
30k
20k
10k
0
geotagged
usa
europe
travel
vacation
beach
germany
park
summer
seattle
water
flowers
spain
japan
canon
street
family
church
chicago
graffiti
blue
españa
toronto
tokyo
atlanta
baseball
virginia
live
light
sports
holiday
berlin
boston
sign
tags


geolat264826666666667
geolon142966666666667
argentina
sunset
geo:lat=13444445
geo:lon=16722232
christmas
飛行機
snow
146kmtotencininrhônealpesfrance

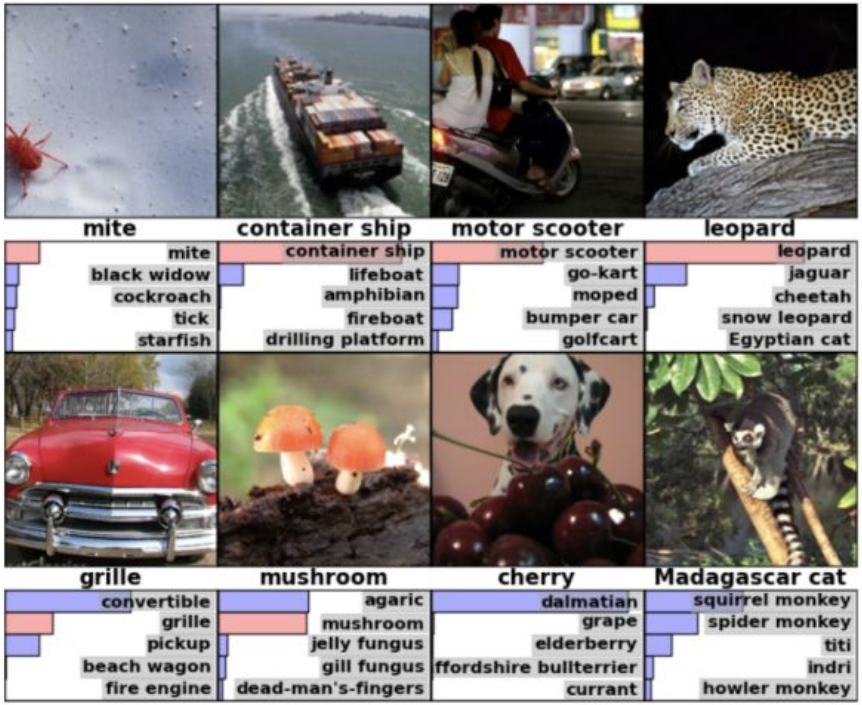
3

VISUAL FEATURES PROCESSING

The second approach

1) Use a powerful pretrained deep neural network as a feature extractor

2) Apply machine learning techniques on those features

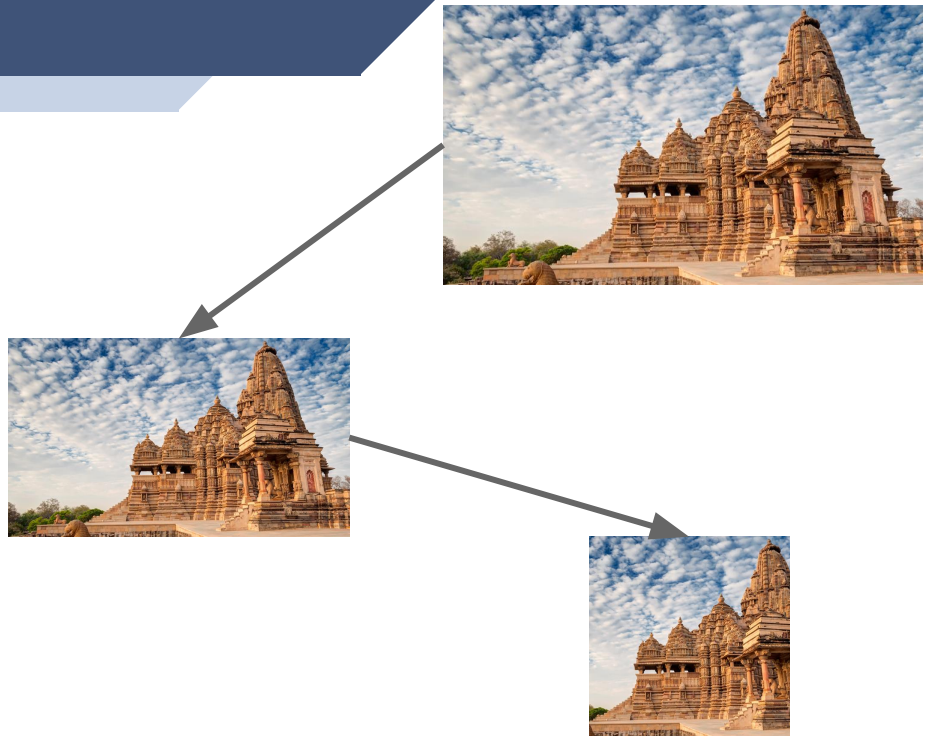


Preprocessing images

1) The deep feature extractor expects images of shape 224 x 224 x 3

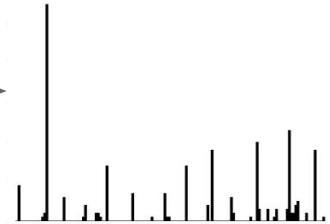
2) Scale input images so that their smaller side is 224

3) Crop the centre to obtain a 224 x 224 image

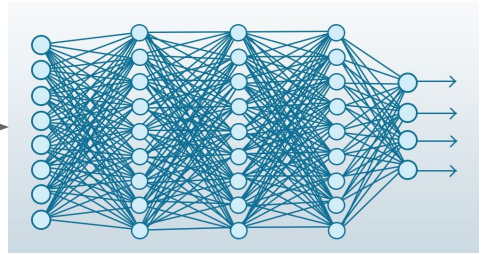


Image

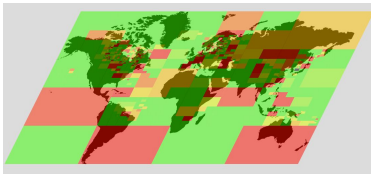
Image feature



Machine Learning Model

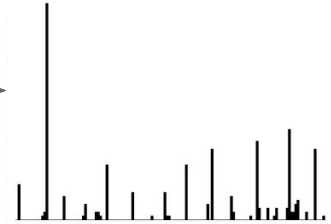


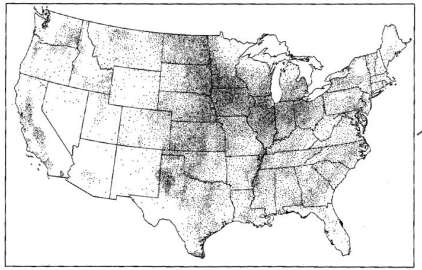
Geo Location



Image

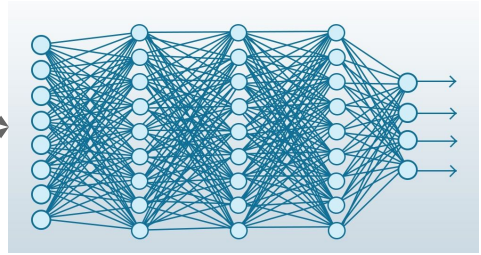
Image feature



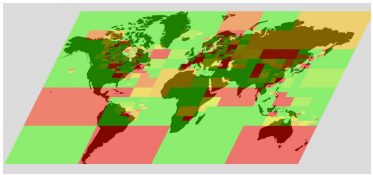


Prior probability distribution

Machine Learning Model



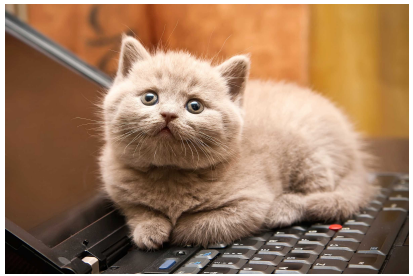
Geo Location



Challenges

1) The problem itself is extremely complex
2) Enormous amount of images ~ 8 million !
3) Some images are invalid / missing
4) Is the dataset roughly balanced ?
5) Many images are non-informative

VS



4

COMBINE 1ST AND 2ND

The third approach

THANK YOU!

Any questions?