DevFest Siberia 2016

#DevFest16 #dfSiberia #GDGNsk #GDGOmsk

DevFest
Siberia 2016

Google Cloud Vision API

moderation custom advertising images

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Russia

aitarget

- optimizing advertising expenses on the basis of Facebook Marketing API
- Facebook & Instagram official reseller
- a handy tool for the institution of advertising

Problem

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- bad publicity adversely affects the partnership with Facebook
- the number of customers grew strongly

Decision

Artificial Intelligence,

quickly and accurately discovering new ads

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- what properties of the image to draw?
- how to classify?
- how to assess the quality of the classification?

The possibility of Google Cloud Vision

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lena Söderberg

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- Image Attributes

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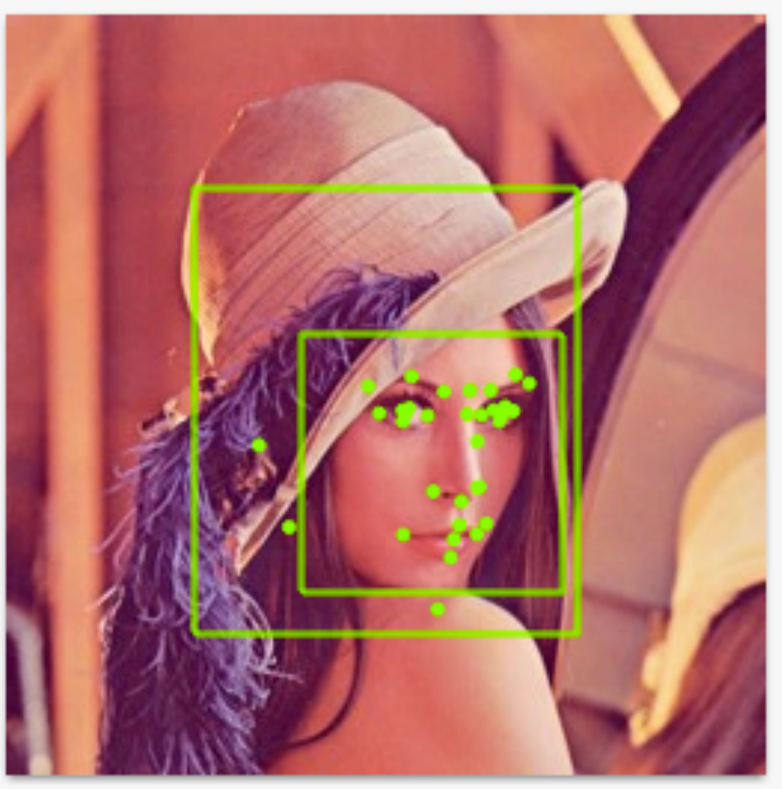
- Face Detection



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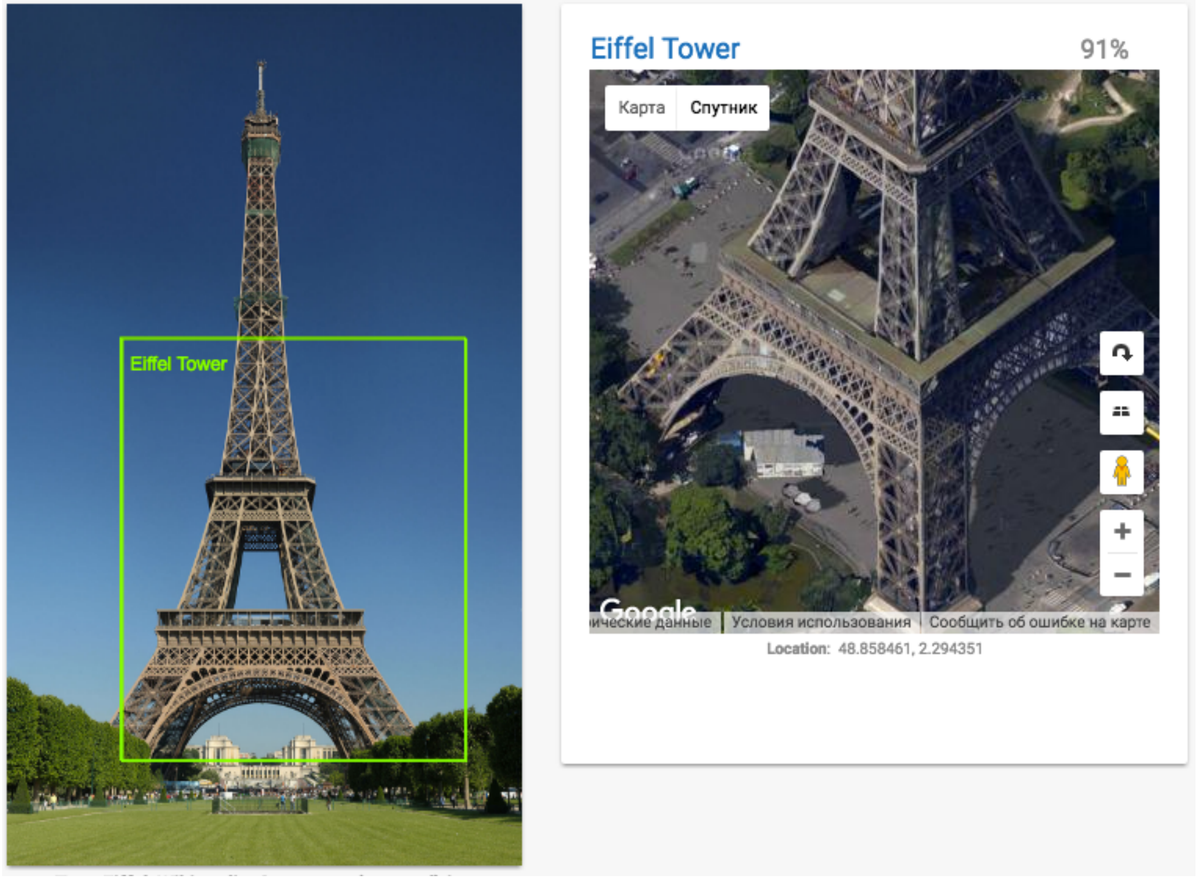

Eiffel Tower, photo by Benh LIEU

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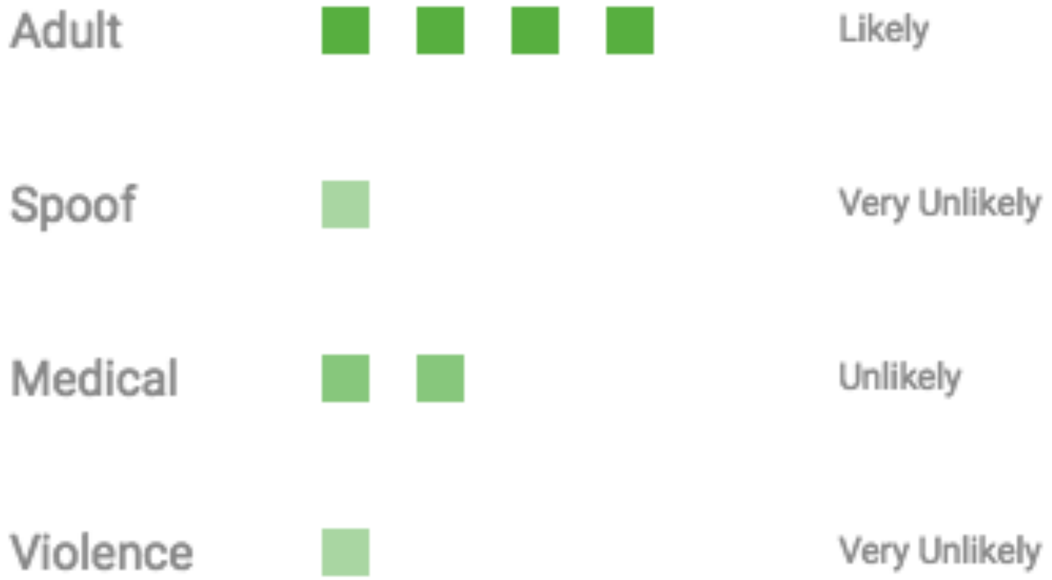
- Explicit Content Detection



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- Image Attributes
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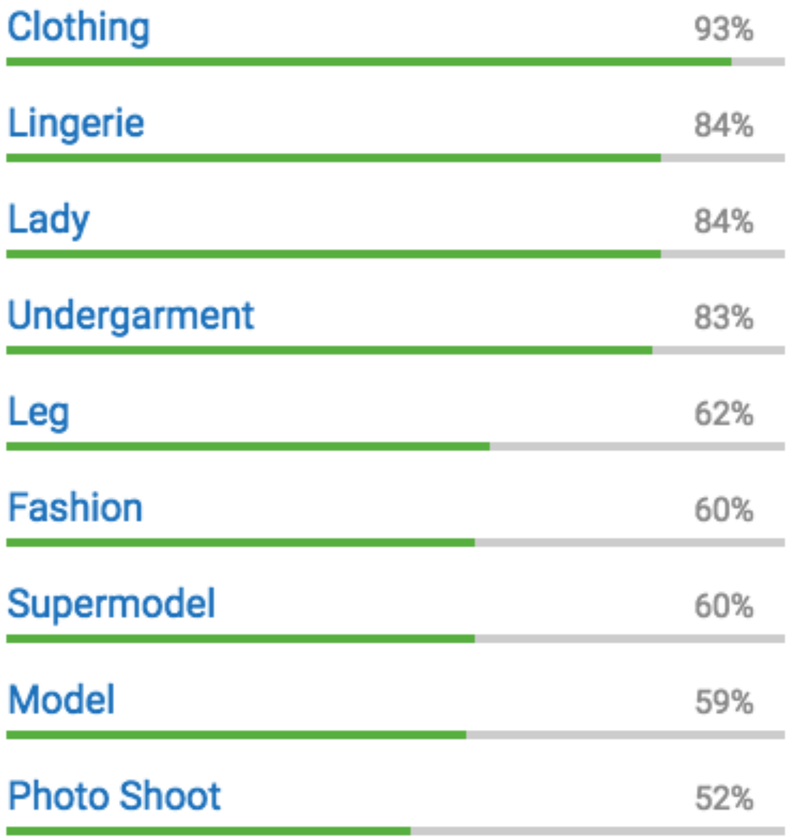
- Label Detection



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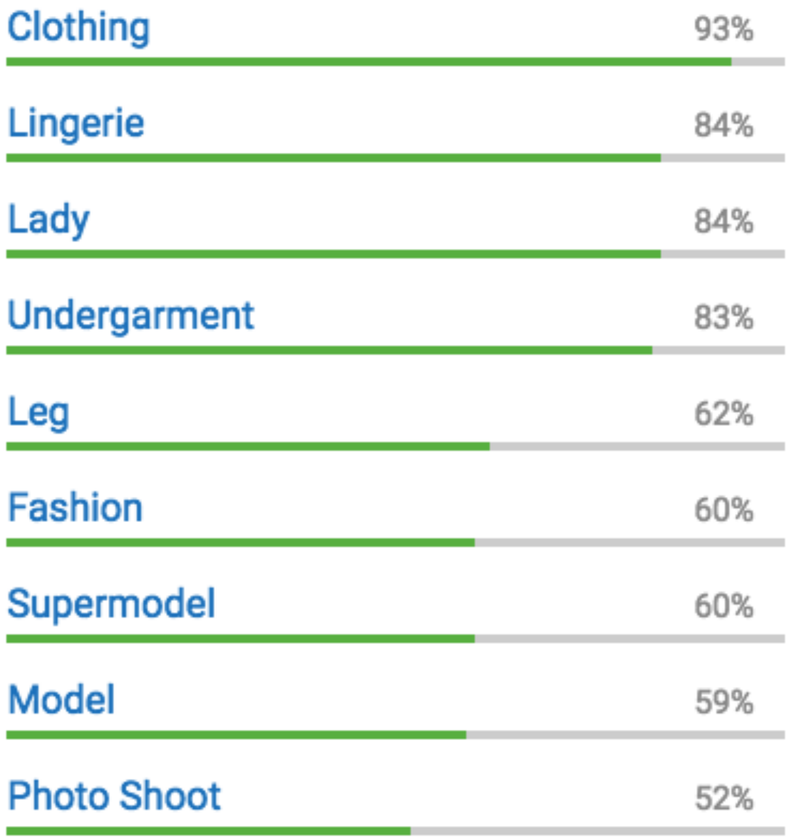

Examples bad creatives

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```
{"laptop"=>0.91677278,
 "gadget"=>0.84059191,
 "display device"=>0.82013196,
 "multimedia"=>0.7211495,
 "mobile device"=>0.6993314,
 "flat panel display"=>0.68291044,
 "computer hardware"=>0.6397137,
 "electronics"=>0.58456743,
 "technology"=>0.56951904,
 "desktop computer"=>0.54619628}
```

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{"laptop"=>0.91677278,
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Examples bad creatives


```
{"gadget"=>0.89334905,
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 "mobile device"=>0.71538937,
 "multimedia"=>0.68713027,
 "flat panel display"=>0.68291044,
 "computer hardware"=>0.6397137,
 "technology"=>0.57922119,
 "smartphone"=>0.55555558,
 "laptop"=>0.53619164,
 "mobile phone"=>0.51960129}
```

Examples bad creatives


```
{"handbag"=>0.97502095,
 "bag"=>0.95378673,
 "shoulder bag"=>0.78793412,
 "fashion accessory"=>0.71232265,
 "brand"=>0.59691668,
 "beige"=>0.53264713,
 "pattern"=>0.53114027}
```


```
{"bag"=>0.92931736,
 "handbag"=>0.89487547,
 "coin purse"=>0.61771047,
 "brand"=>0.59691668}
```

Evaluation of the quality prediction

k-fold cross-validation -> confusion matrix

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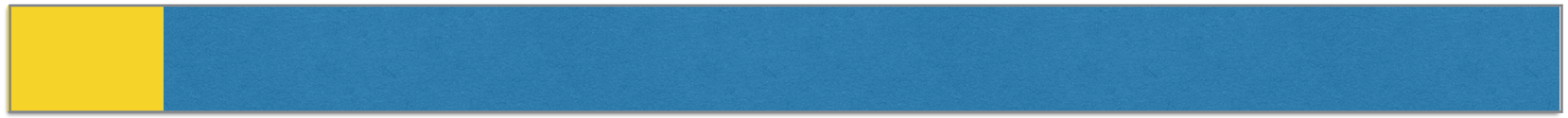
10% **k-fold cross-validation ->** confusion matrix



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k-fold cross-validation -> confusion matrix

10% FN (false negative)

= 90% acc

Evaluation of the quality prediction

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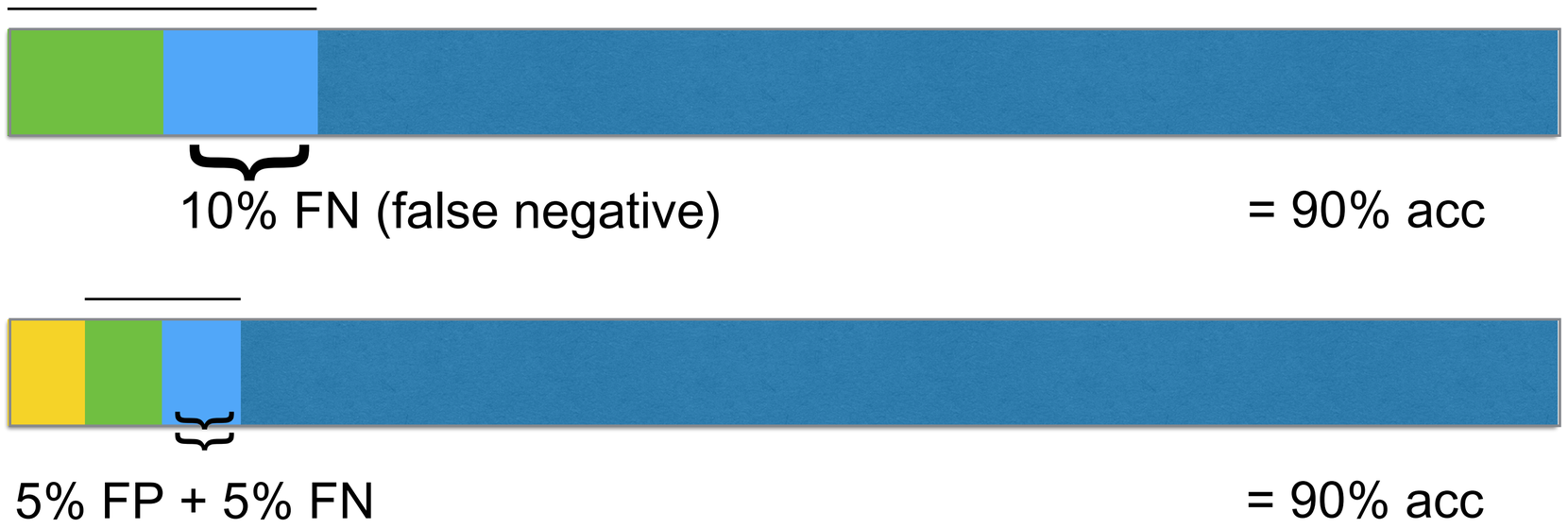

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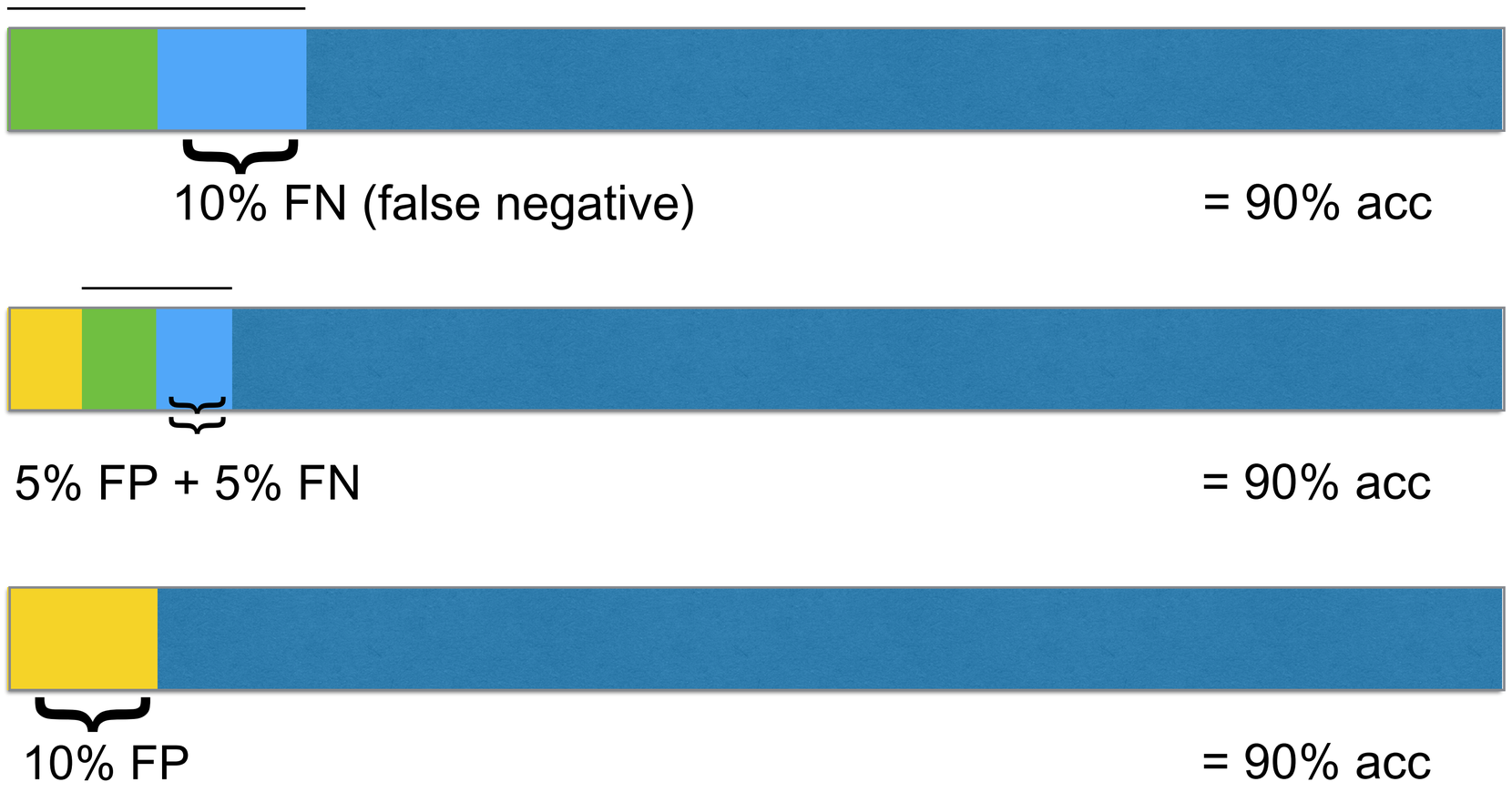


Evaluation of the quality prediction

k-fold cross-validation -> confusion matrix

Fowlkes-Mallows index as the similarity metric subsets

10% FN (false negative) = 90% acc

$$FM = \sqrt{\frac{TP}{TP+FP} \cdot \frac{TP}{TP+FN}}$$

5% FP + 5% FN = 90% acc

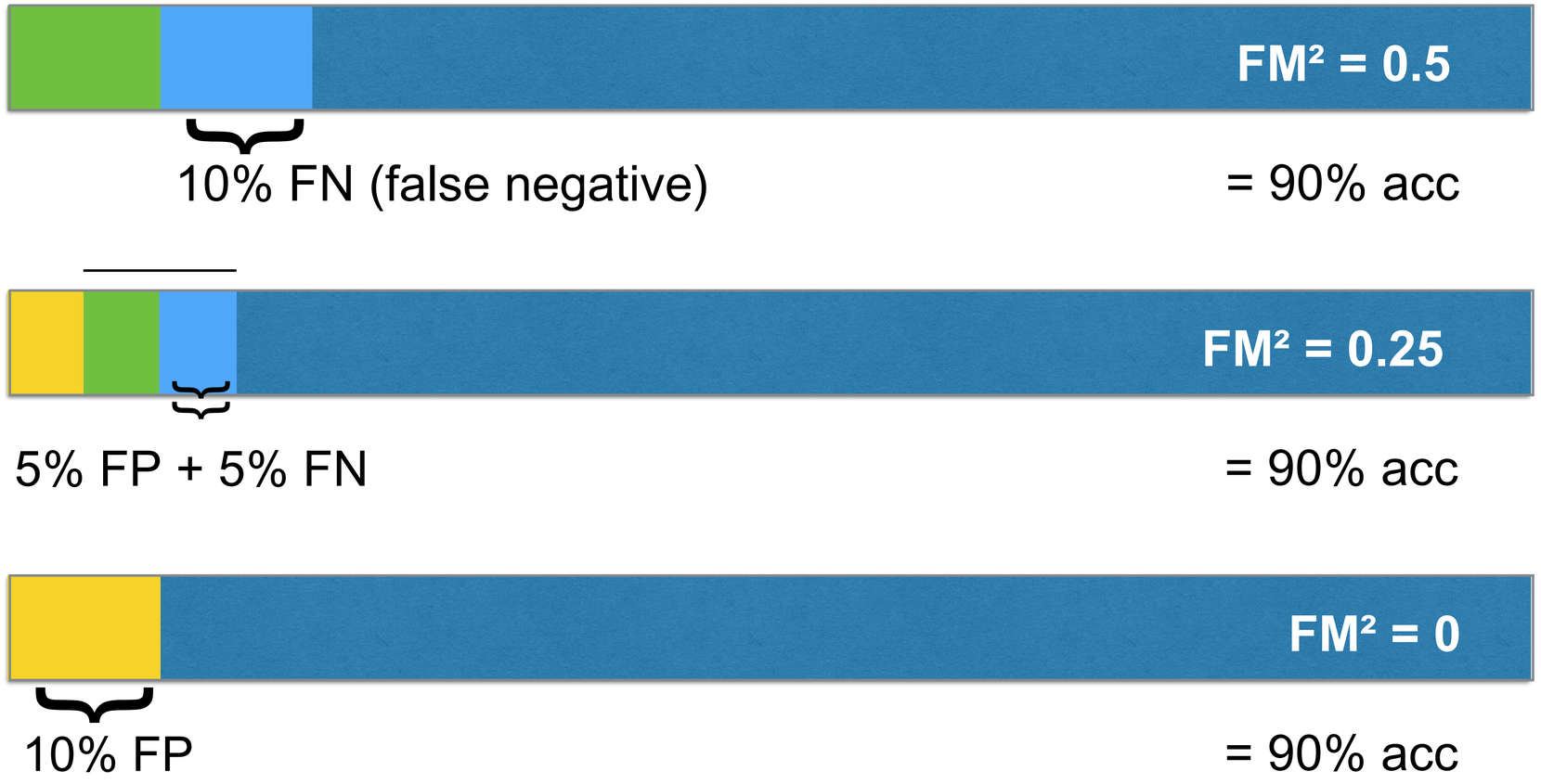
TP - true positive FP - false positive FN - false negative

10% FP = 90% acc

Evaluation of the quality prediction

k-fold cross-validation -> confusion matrix

Fowlkes-Mallows index as the similarity metric subsets



classification method

Nearest neighbors algorithm (NN)

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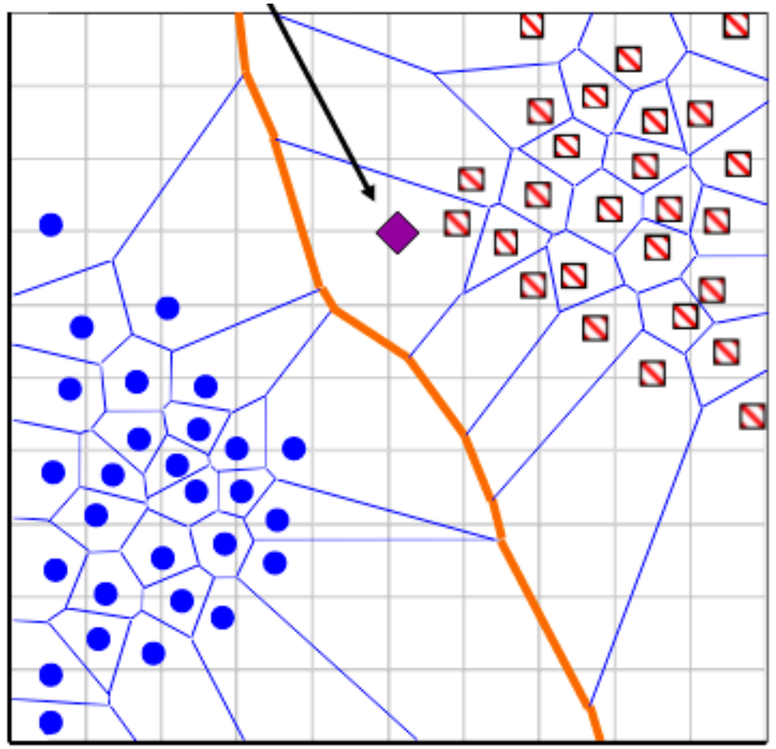

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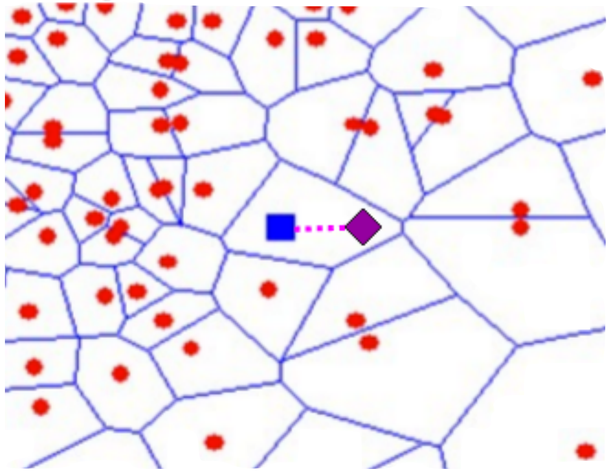
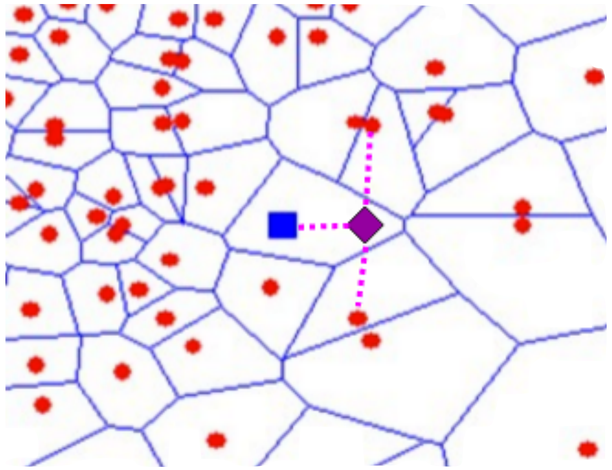
classification method

Nearest neighbors algorithm (NN)

- We are fighting with noise - kNN
- even neater - (k, r) NN, k> r> 0



K = 1



K = 3

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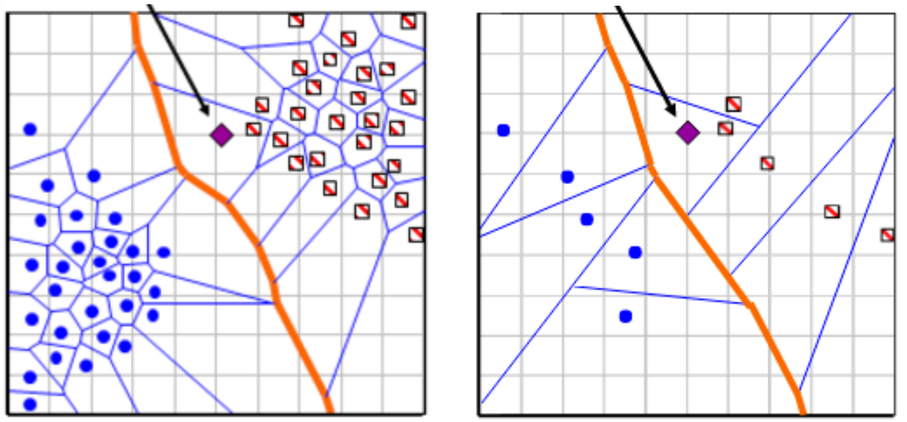

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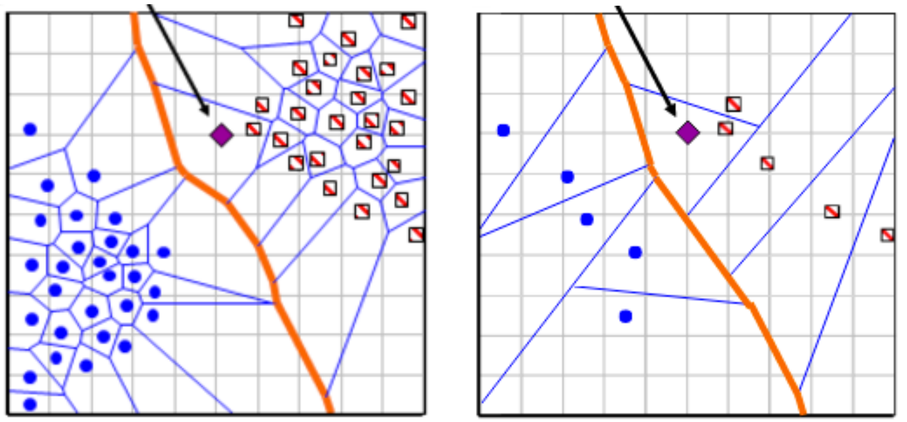
    while accuracy is not stop growing



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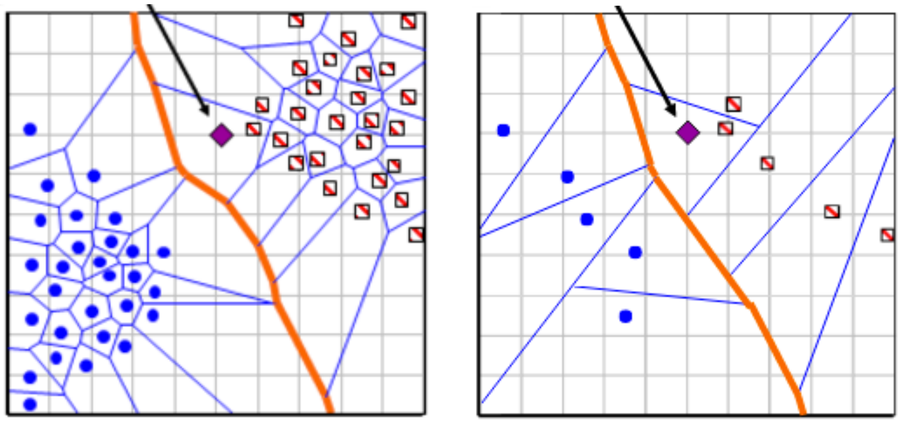
  - or search in width / depth



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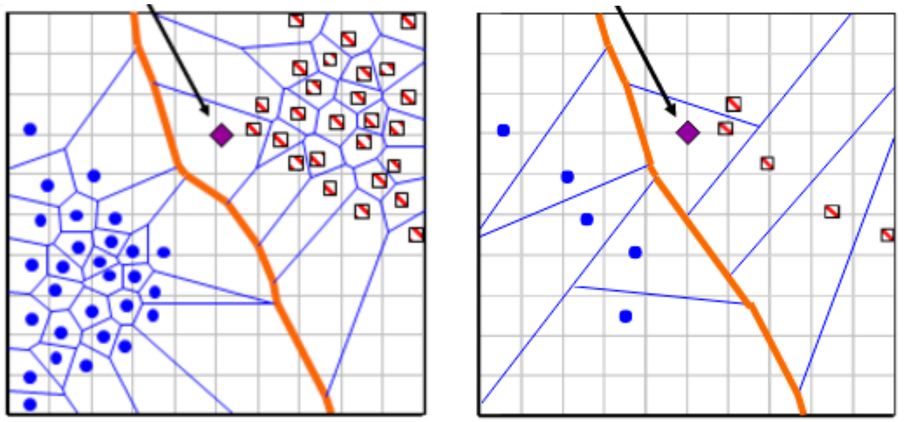
  - or search in width / depth
  - or PCBR with heuristics



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distance function

as a measure of similarity between two sets of labels

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```
(L1.keys & L2.keys).empty?

(L1.keys & L2.keys).size

(L1.keys & L2.keys).size / (L1.keys | L2.keys).size
```

distance function

as a measure of similarity between two sets of labels

```
(L1.keys & L2.keys).map do |label|
  L1[label] * L2[label] / popularity[label]
end.reduce(:+)

(L1.keys | L2.keys).map do |label|
  ((L1[label] || 0) - (L2[label] || 0)).abs
end.reduce(:+)
```

distance function

as a measure of similarity between two sets of labels

```
(L1.keys & L2.keys).map do |label|
  L1[label] * L1[label] / L1.values.reduce(:+) *
  L2[label] * L2[label] / L2.values.reduce(:+)
end.reduce(:+)
```

Example of the Vision API to Ruby

```
ENV["GCLOUD_KEYFILE"] = "key.json"
require "gcloud"

GV = Gcloud.new("my_app").vision

GV.annotate(
  GV.image("sushi.jpg"),
  labels: true,
).gapi.to_h
```

Example of the Vision API to Ruby

```
{:label_annotations=>
  [{:mid=>"/m/02wbm", :description=>"food", :score=>0.89055115},
   {:mid=>"/m/01ykh", :description=>"cuisine", :score=>0.82375544},
   {:mid=>"/m/07030", :description=>"sushi", :score=>0.75976396},
   {:mid=>"/m/01r1z5", :description=>"asian food", :score=>0.75802159},
   {:mid=>"/m/02q08p0", :description=>"dish", :score=>0.69421244},
   {:mid=>"/m/01hklv", :description=>"smoked salmon", :score=>0.65994775},
   {:mid=>"/m/09wzfj", :description=>"california roll", :score=>0.63172776},
   {:mid=>"/m/042ck", :description=>"japanese cuisine", :score=>0.53775597},
   {:mid=>"/m/036qh8", :description=>"produce", :score=>0.50954938}]}
```

Possible problems of using API

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- it seems that Google Cloud Vision slow? - cached

```
require "digest"

labels_filename = "cache/#{Digest::MD5.file image_filename}.yaml"

labels = if File.exist? labels_filename
  YAML.load File.read labels_filename
else
  GV.annotate(GV.image(image_filename), labels: true).gapi.to_h.tap do |labels|
    File.write labels_filename, YAML.dump(labels)
  end
end
```

Possible problems of using API

- it seems that Google Cloud Vision slow? - cached
- You do not want to check the image again? - cached, apply pHash

```
ENV["PHASH_LIB"] = "/usr/local/lib/libpHash.dylib"
require "phash/image"

Phash.image_similarity(
  Phash.image_hash(image_1_filename),
  Phash.image_hash(image_2_filename)
) > 0.7
```

Possible problems of using API

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- You do not want to check the image again? - cached, apply pHash
- fails 4MB image thicker? - apply sips or Image Magic

```
FileUtils.copy_file image_filename, temp = "temp.image"
if Gem::Platform.local.os == "darwin"
  `sips -Z #{
    `sips -g pixelWidth #{temp}`[/^\s+pixelWidth: (\d+)/, 1].to_i / 2
  } #{temp}`
else
  `mogrify -resize 50% #{temp}`
end while 4000000 < File.size(temp)
```

Possible problems of using API

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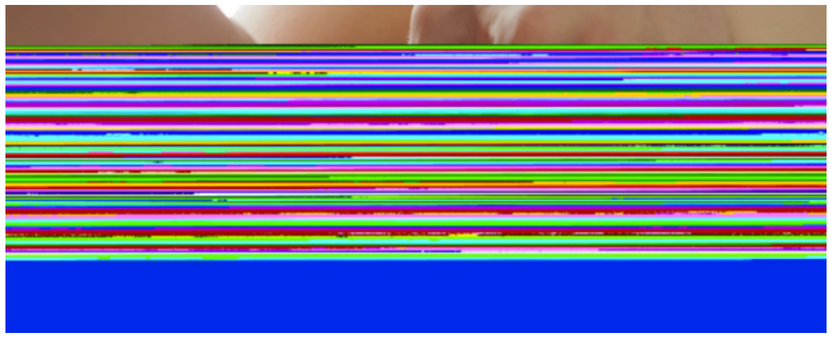
- Gcloud :: InvalidArgumentError? - check image



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- label-s can greatly improve, but you do not warn

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- become better identify bad content
- steel themselves to better understand the advertising policies
- the speed of our response was reduced from weeks to hours

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NB: costs are proportional to the Cloud Vision API
the popularity of our service

- **Google Cloud Vision API and Docs -** https://cloud.google.com/vision/
  http://googlecloudplatform.github.io/google-cloud-ruby/#/

- **Machine learning -** http://slideplayer.com/slide/7779839/
  https://en.wikipedia.org/wiki/Confusion_matrix
  https://en.wikipedia.org/wiki/Fowlkes-Mallows_index
  https://en.wikipedia.org/wiki/Cross-validation_(statistics)
  https://en.wikipedia.org/wiki/K-nearest_neighbors_algorithm

- **code snippets -** https://git.io/vXKSO

- https://github.com/toy/pHash

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