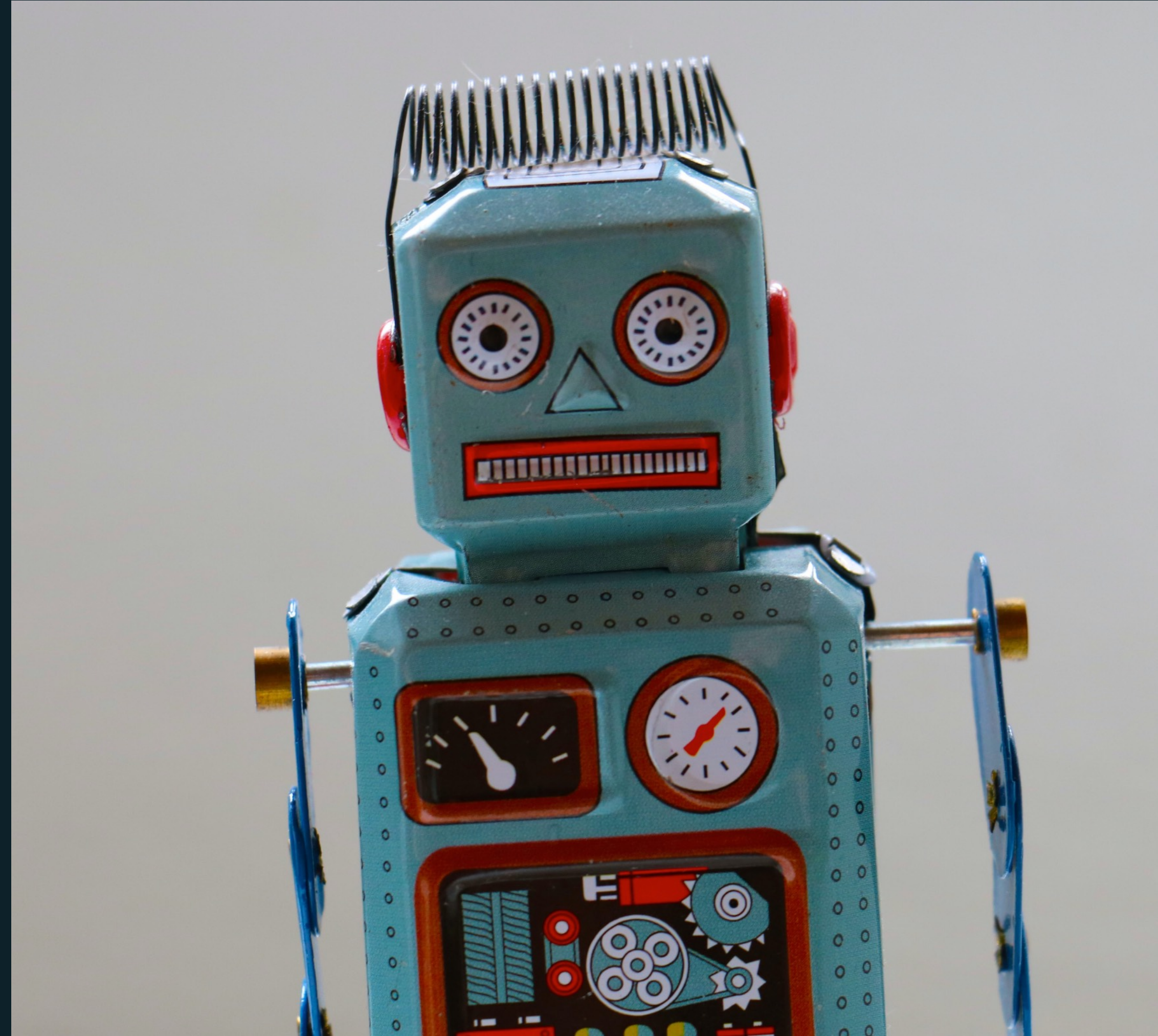
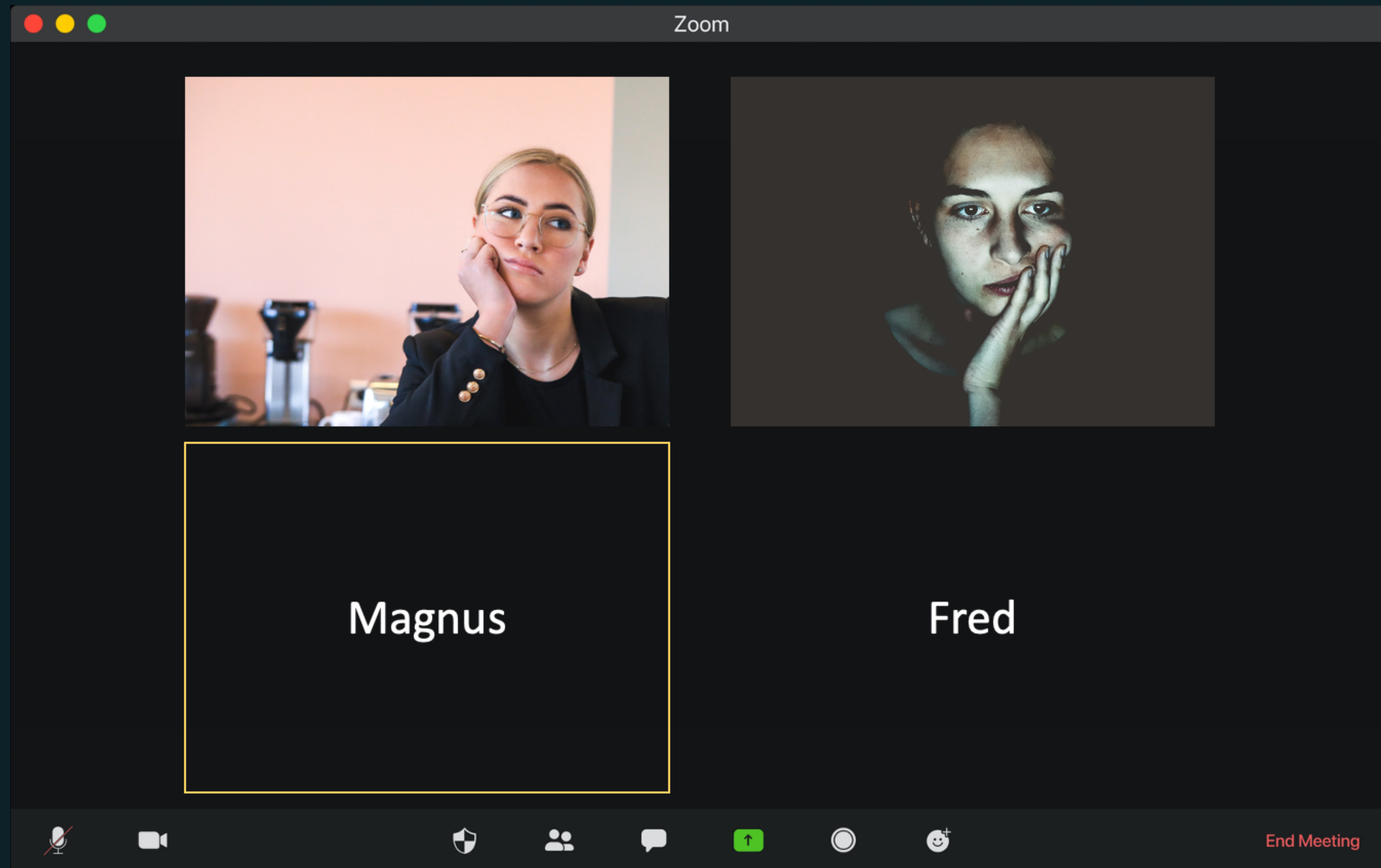


# Using AI for the perfect pitch

Max Vorhauer  
Product Manager | Mataono GmbH

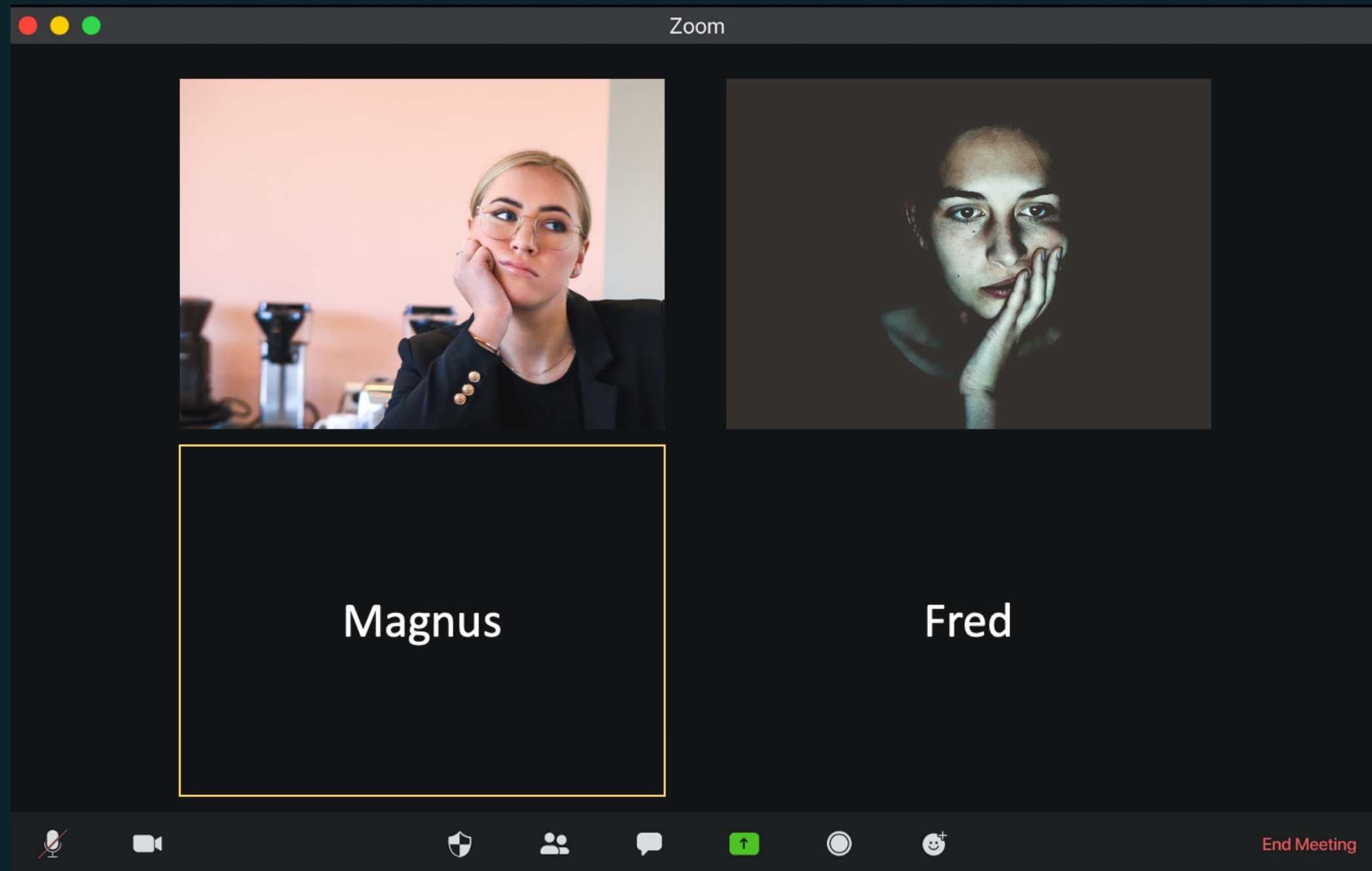






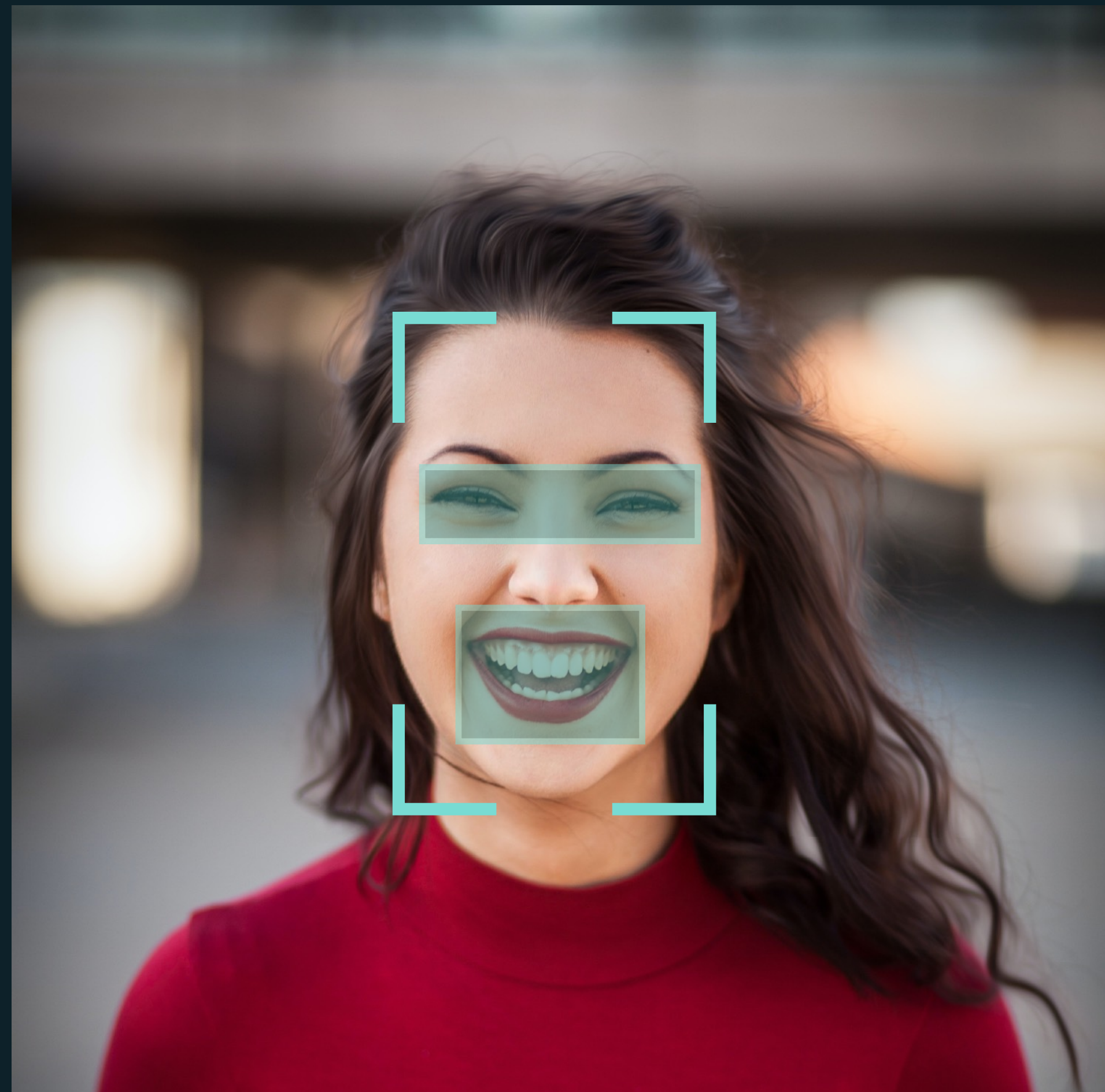
Using AI for the perfect pitch





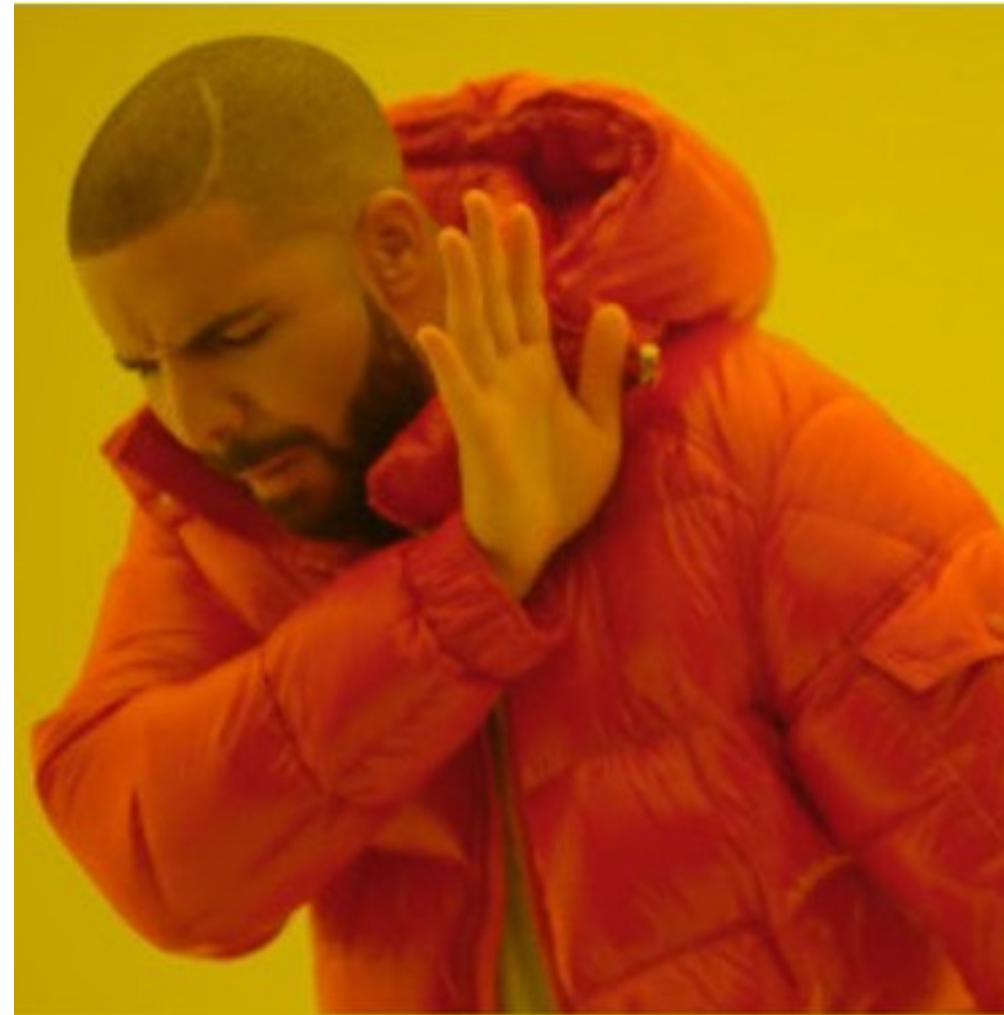
<https://www.marieclaire.com/culture/a25136189/unpopular-opinion-jack-and-rose-titanic/>





**Happiness**





Telling  
you about  
our awesome  
algorithms



Providing  
lessons  
learned so you  
can excel at  
your own projects

imgflip.com



## WHY AM I HERE TODAY?



### Hi, my name is Max

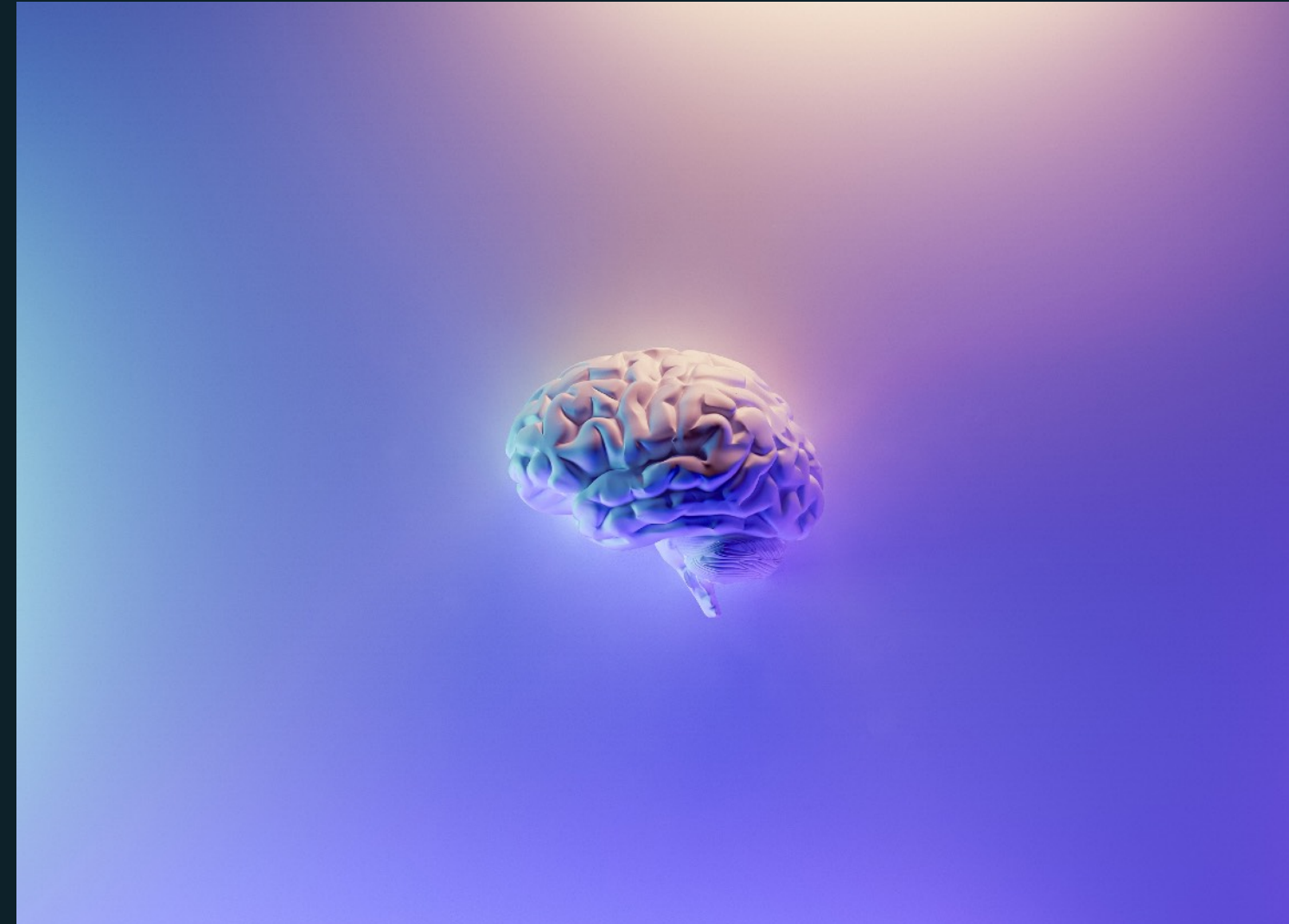
- 2014 – 2019 Diploma Business Information Systems (courses in machine learning)
- Since 2013 working on/off in software engineering
- Since 2017 working on the early concepts of Mataono
- Last year when development started I became product manager of Mataono

At Mataono we use the emotion analysis to support market research and sales trainings. We already worked with some of the biggest pharmaceutical corporates to prove our algorithms.





# WHAT ARE EMOTIONS?



## Sadness from Pixar's Inside Out

<https://insideout.fandom.com/wiki/Sadness>



# HOW ARE EMOTIONS EXPRESSED AND MEASURED?



**Vocal expressions**



**Facial expressions**



**Bodily symptoms**

<https://www.livescience.com/32349-what-causes-goose-bumps.html>



# FACIAL ACTION CODING SYSTEM



- System based on micro expressions
- Micro expressions are subconscious
- Micro expressions are universal
- Seven basic emotions can be derived from micro expressions

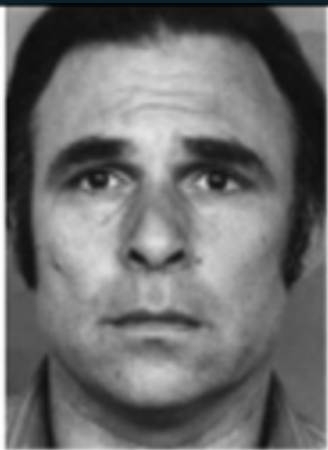
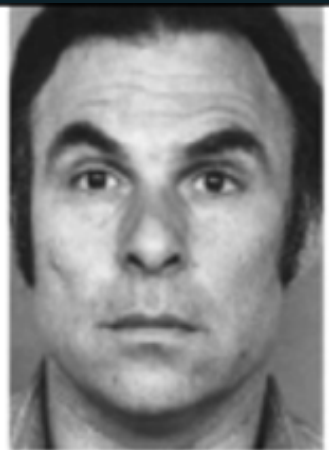

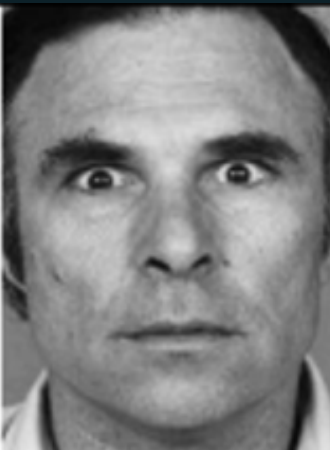

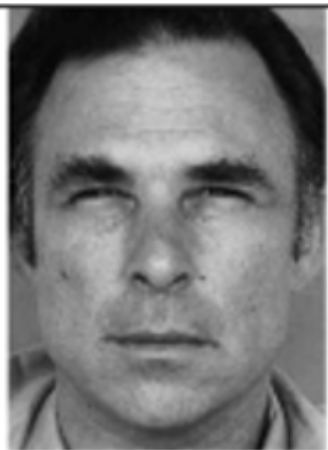
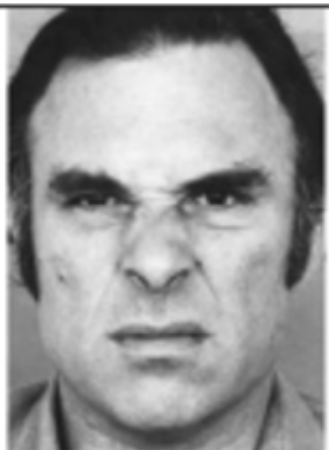



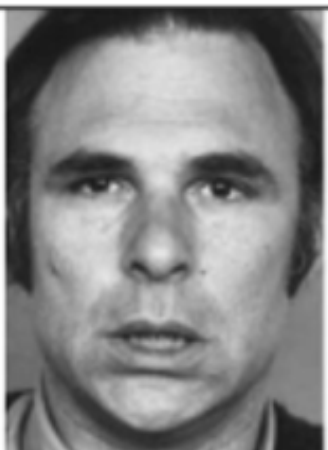
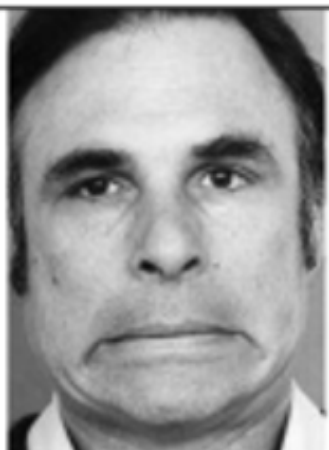
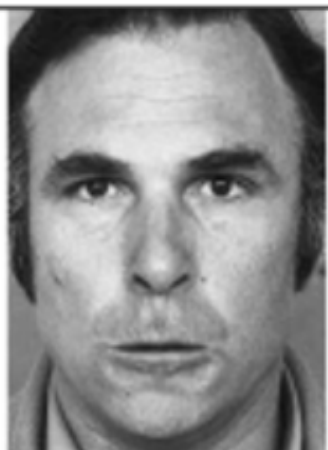
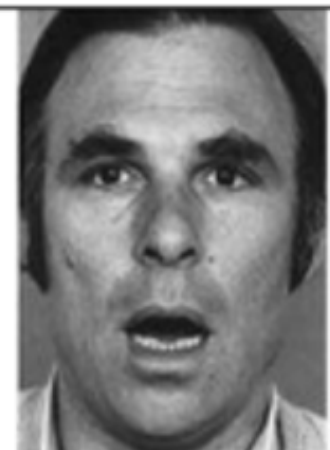



Paul Ekman



# ACTION UNITS



				
(a) AU1 Inner Brow Raiser	(b) AU2 Outer Brow Raiser	(c) AU4 Brow Lowerer	(d) AU5 Upper Lid Raiser	(e) AU6 Cheek Raiser
				
(f) AU7 Lid Tightener	(g) AU9 Nose Wrinkler	(h) AU12 Lip Corner Puller	(i) AU14 Dimpler	(j) AU15 Lip Corner Depressor
				
(k) AU16 Lower Lip Depressor	(l) AU20 Lip Stretcher	(m) AU23 Lip Tightener	(n) AU26 Jaw Drop	(o) AU45 Blinking

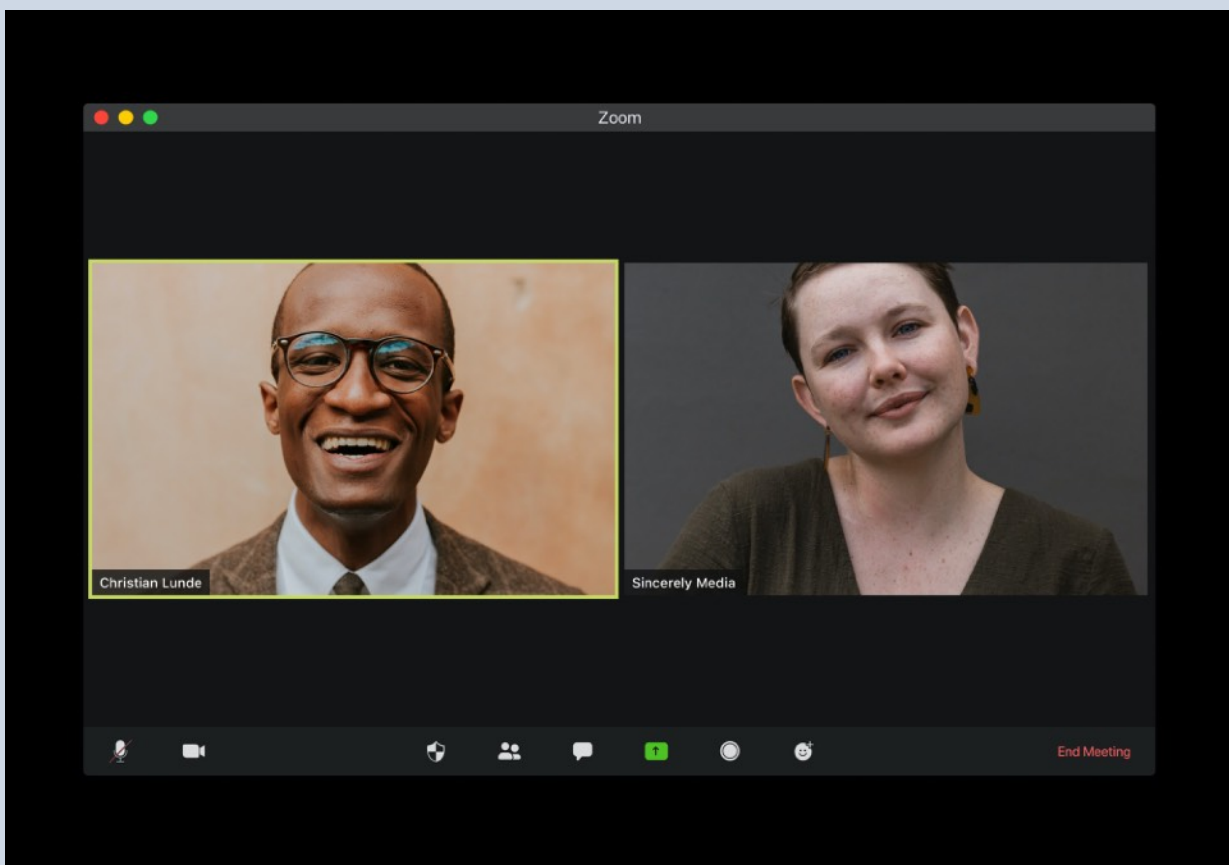
Wan et al.: Action unit classification for facial expression recognition using active learning and SVM



# FROM ZOOM TO DATA

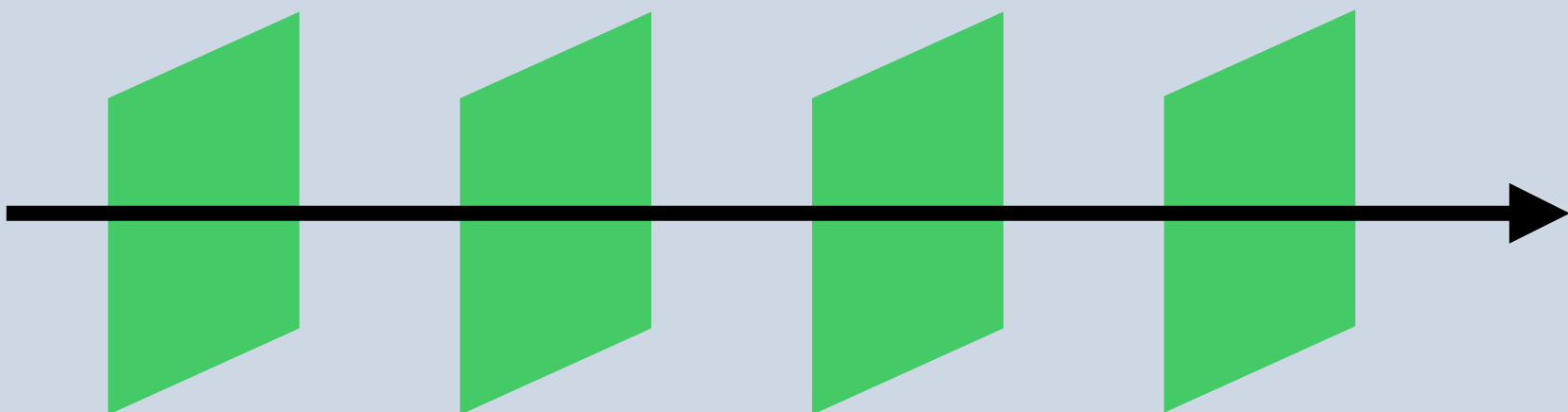


1



2

Layer of neural networks



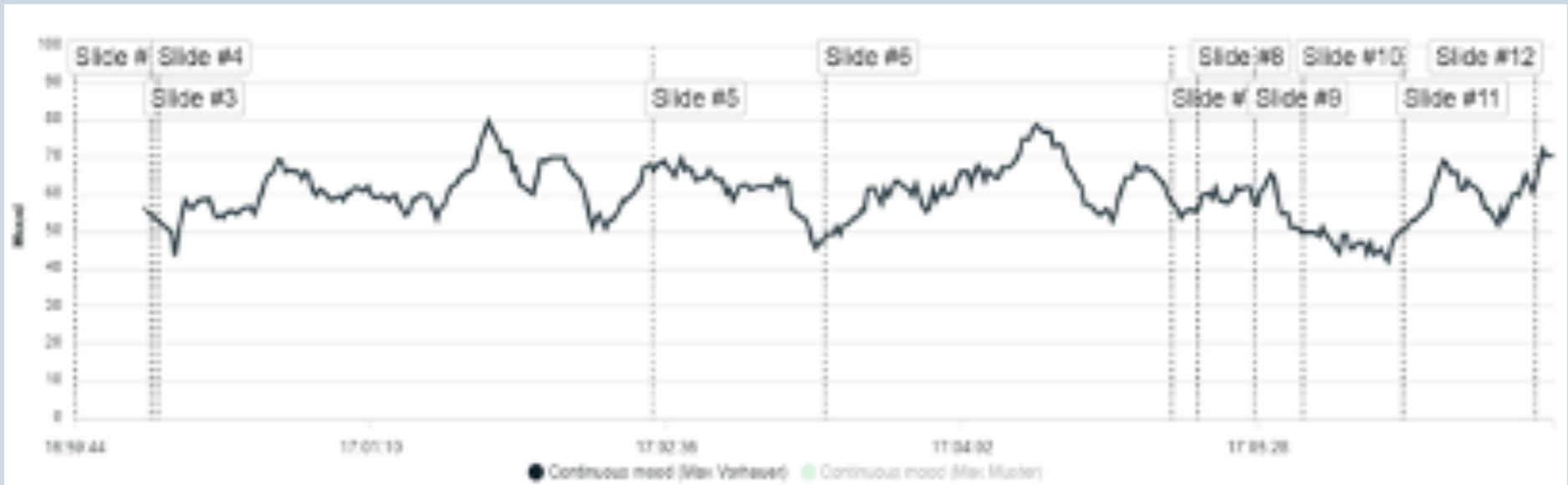
3

Calculation of Emotion Score

$$ES = \frac{\sum_{t=1}^T e}{E}$$

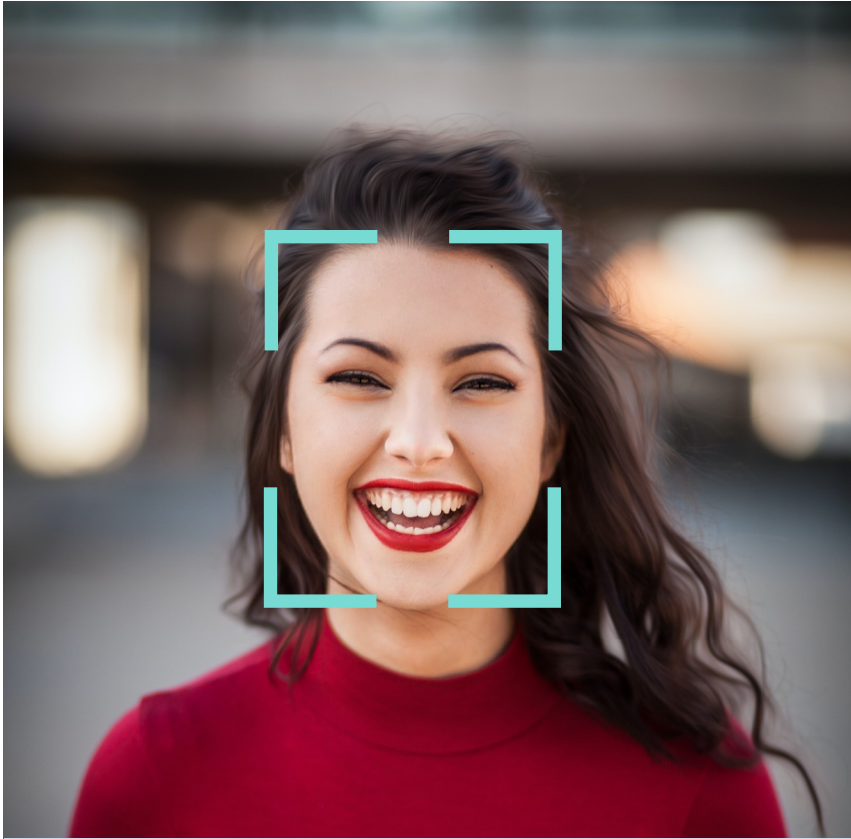
4

Final application

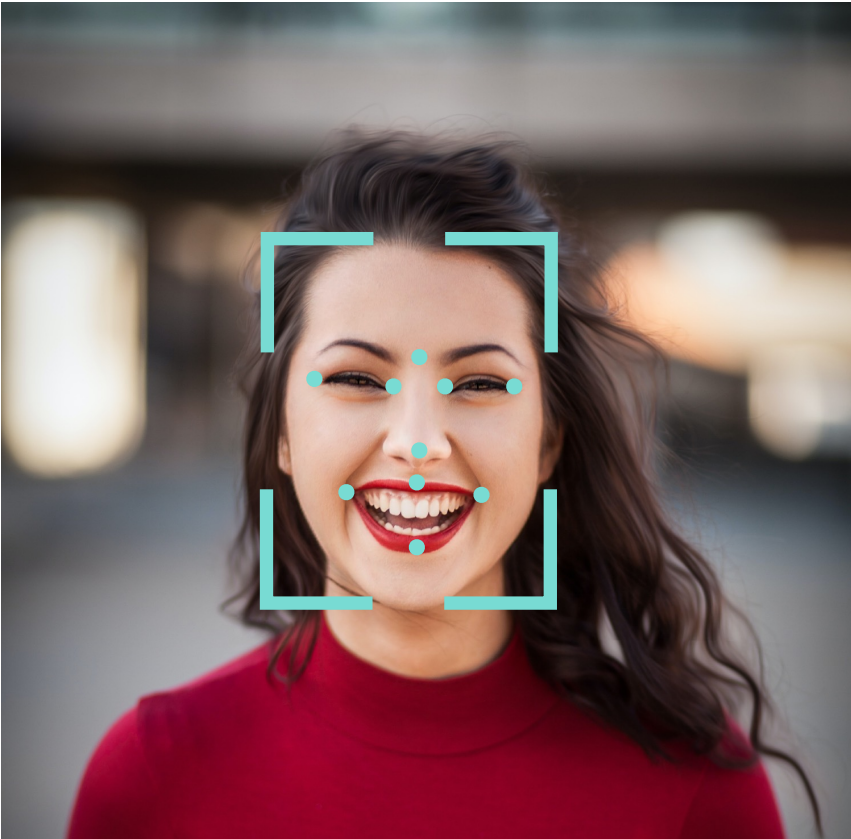




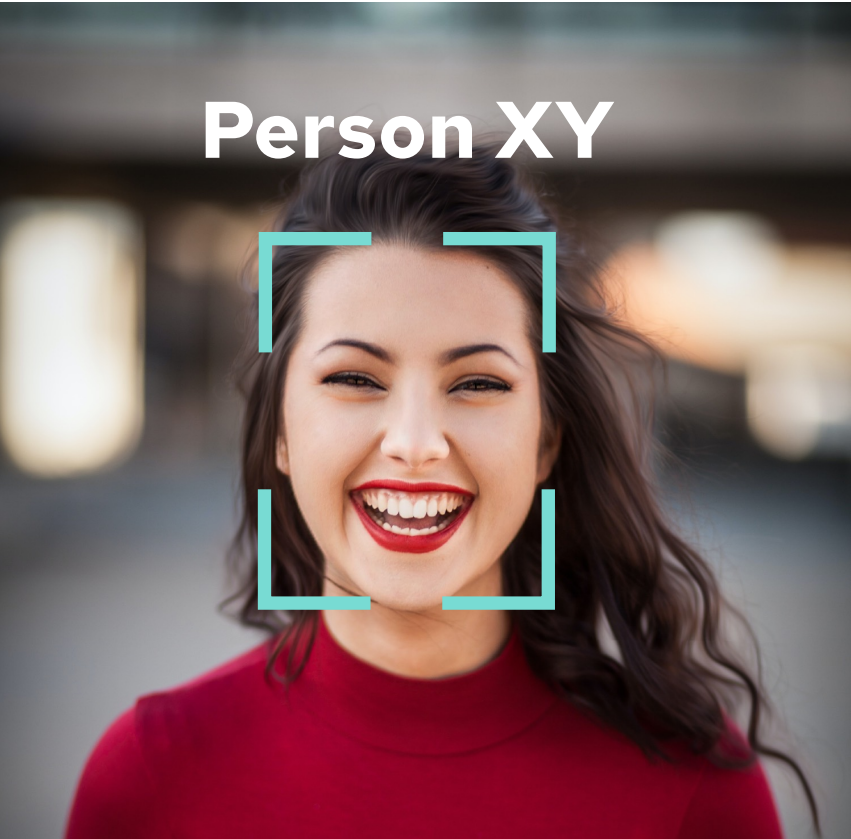
# FROM ZOOM TO DATA



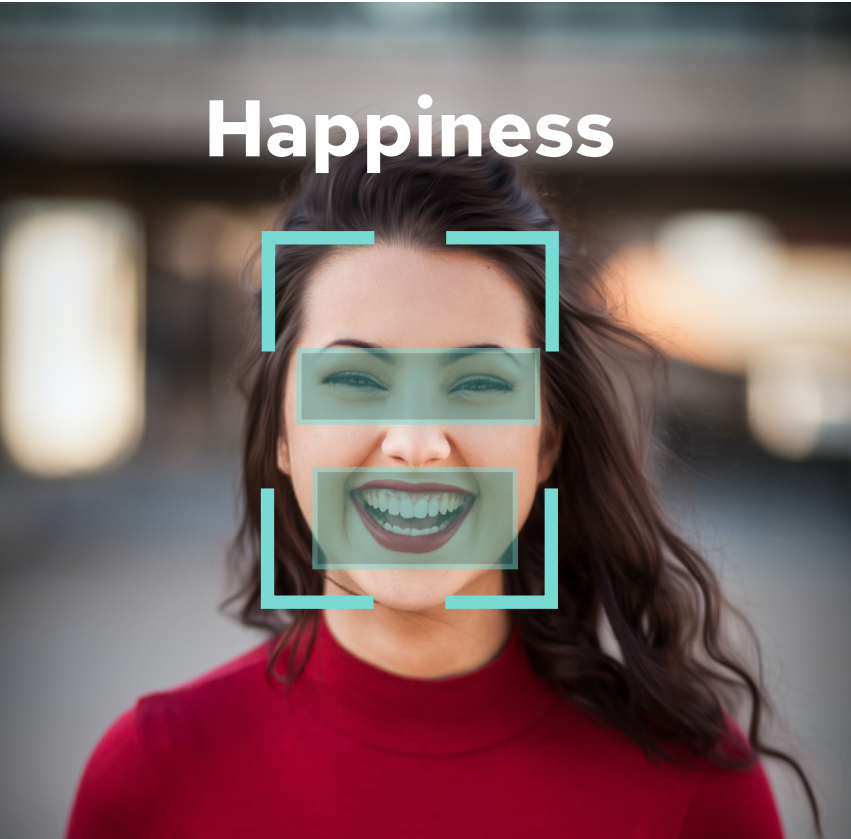
**Detect face**



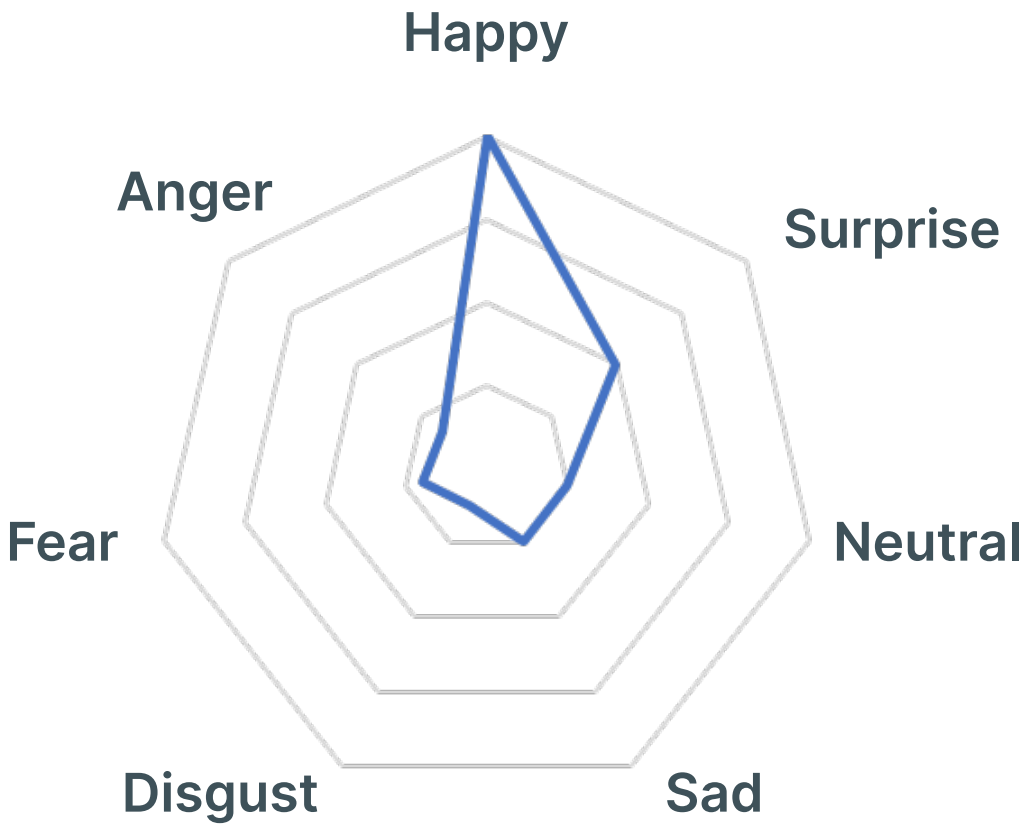
**Detect front**



**Recognize person**



**Detect action units**



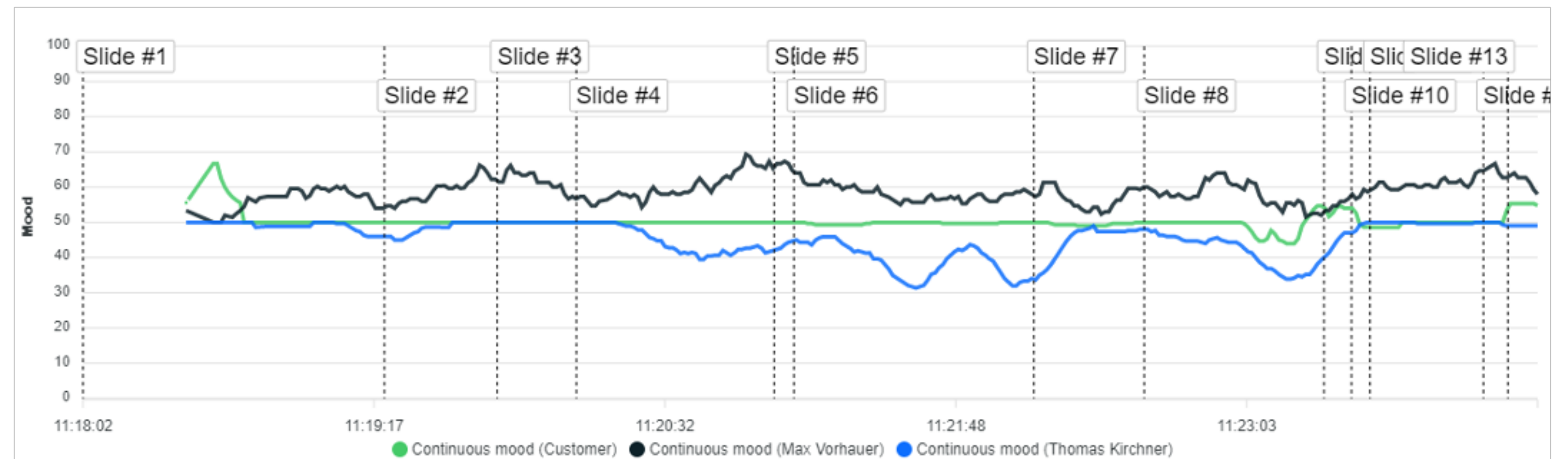
**Confidence**



# FROM ZOOM TO DATA



$$ES_t = \frac{\sum w * e}{E}; w = \begin{cases} x, e = happy \\ y, e = sad \\ z, e = \dots \end{cases}$$





# HOW MANY FRAMES ARE NEEDED?



Using AI for the perfect pitch



# HOW MANY FRAMES ARE NEEDED?



Using AI for the perfect pitch



# IMPROVING RECOGNITION



$$f(A, B) = \frac{A \cdot B}{\|A\| * \|B\|}$$





# IMPROVING RECOGNITION



Using AI for the perfect pitch

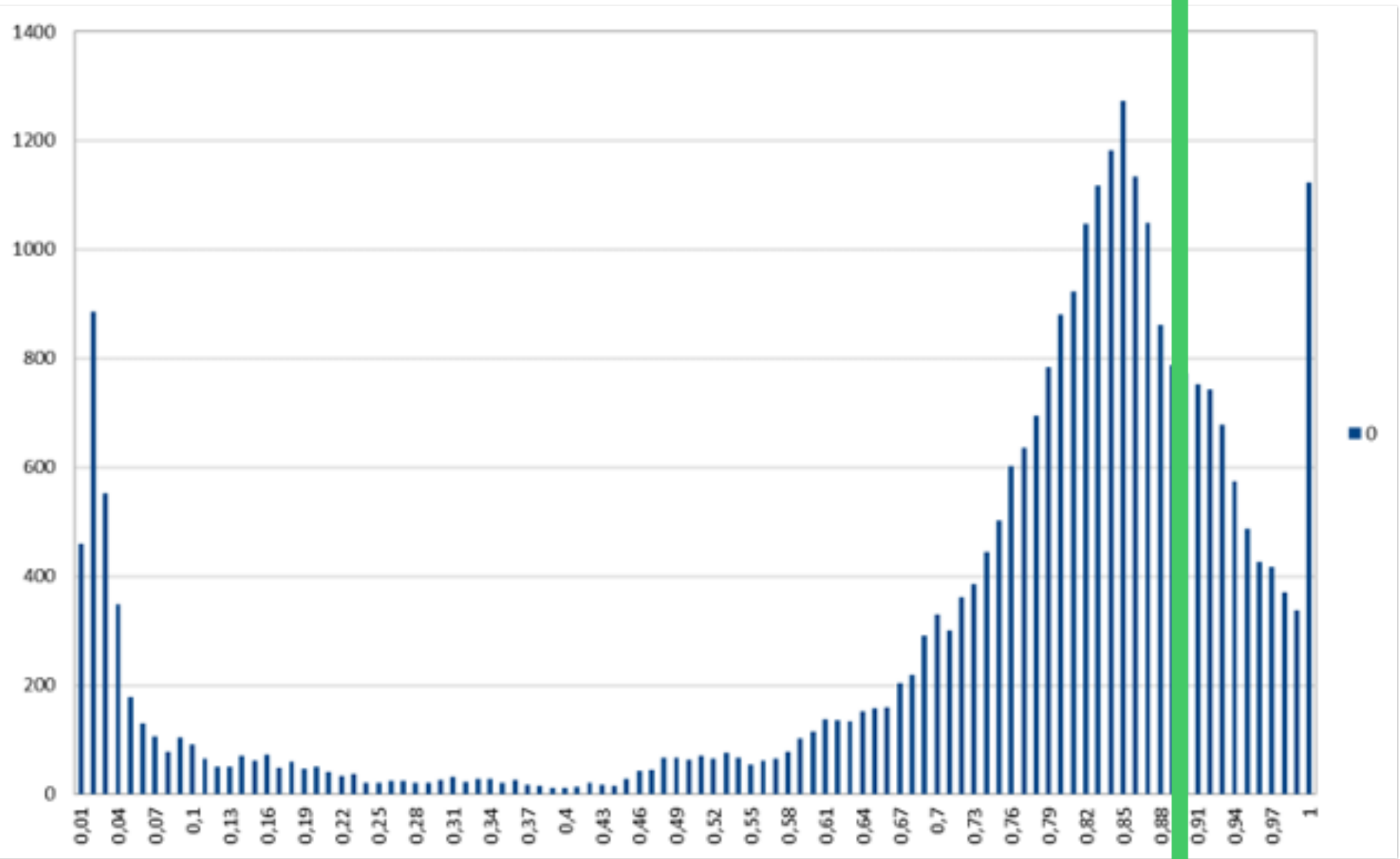
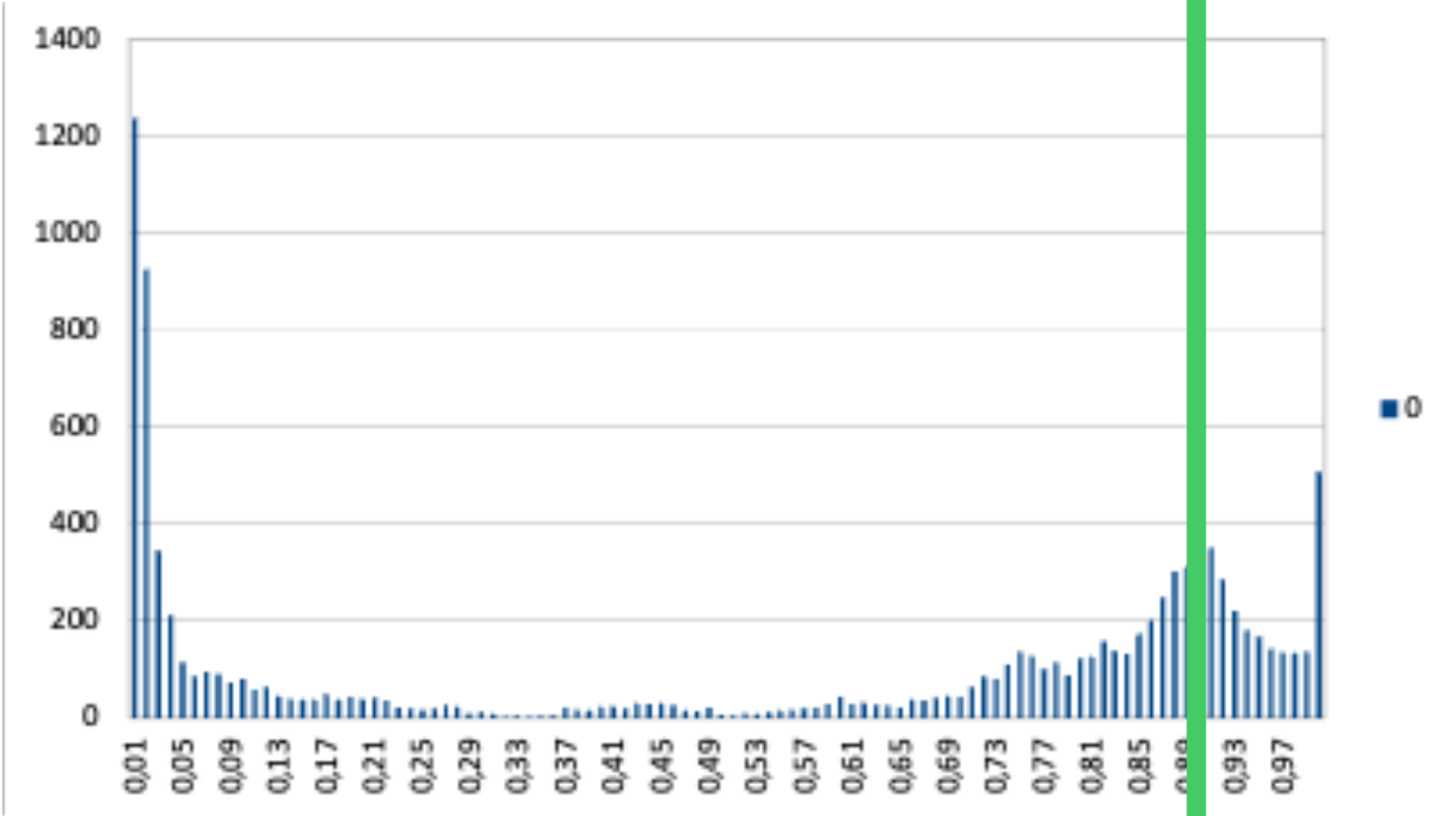


# IMPROVING RECOGNITION



60%

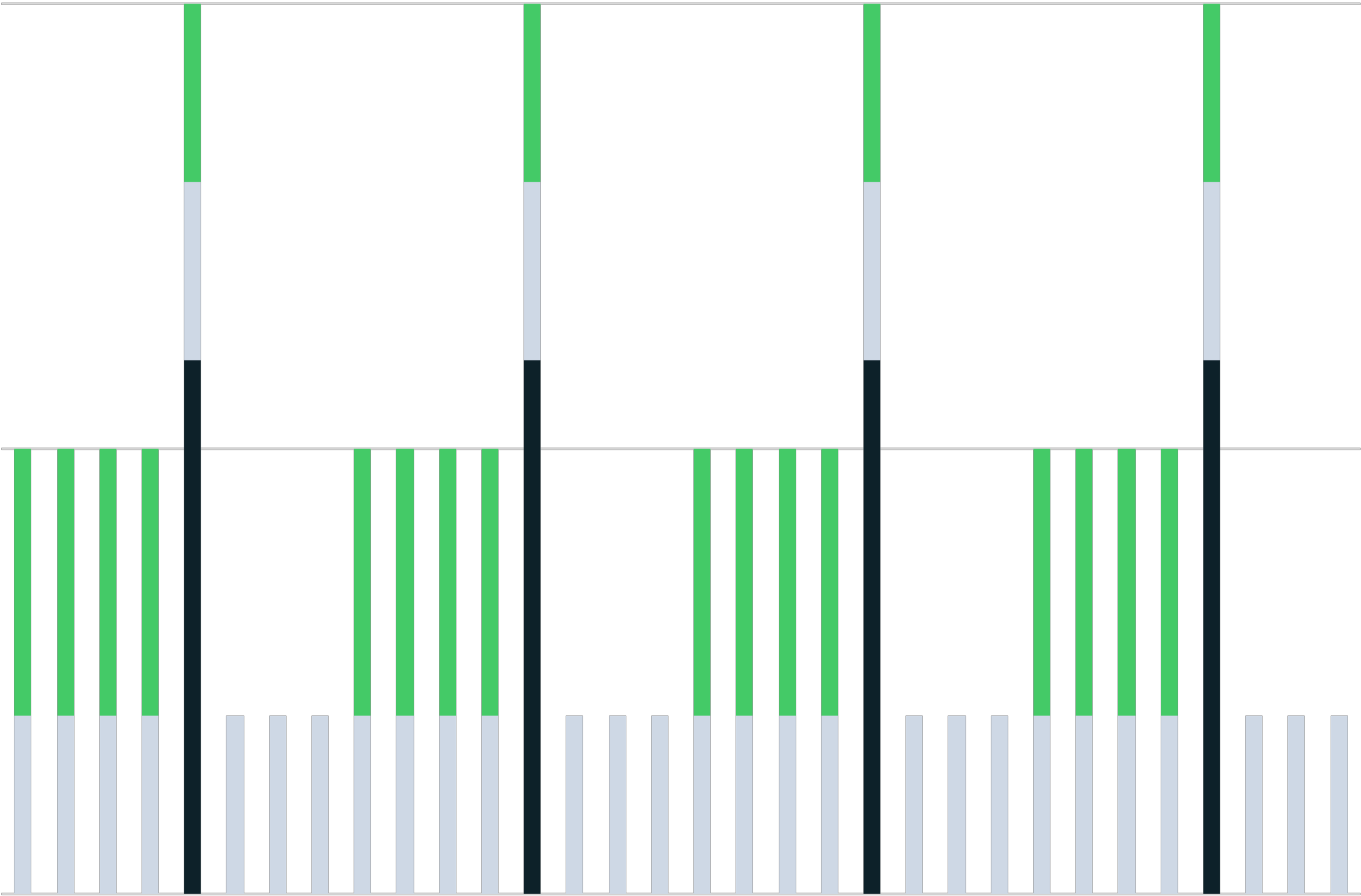
Reduction of detected person that need to be merged manually



Threshold is important



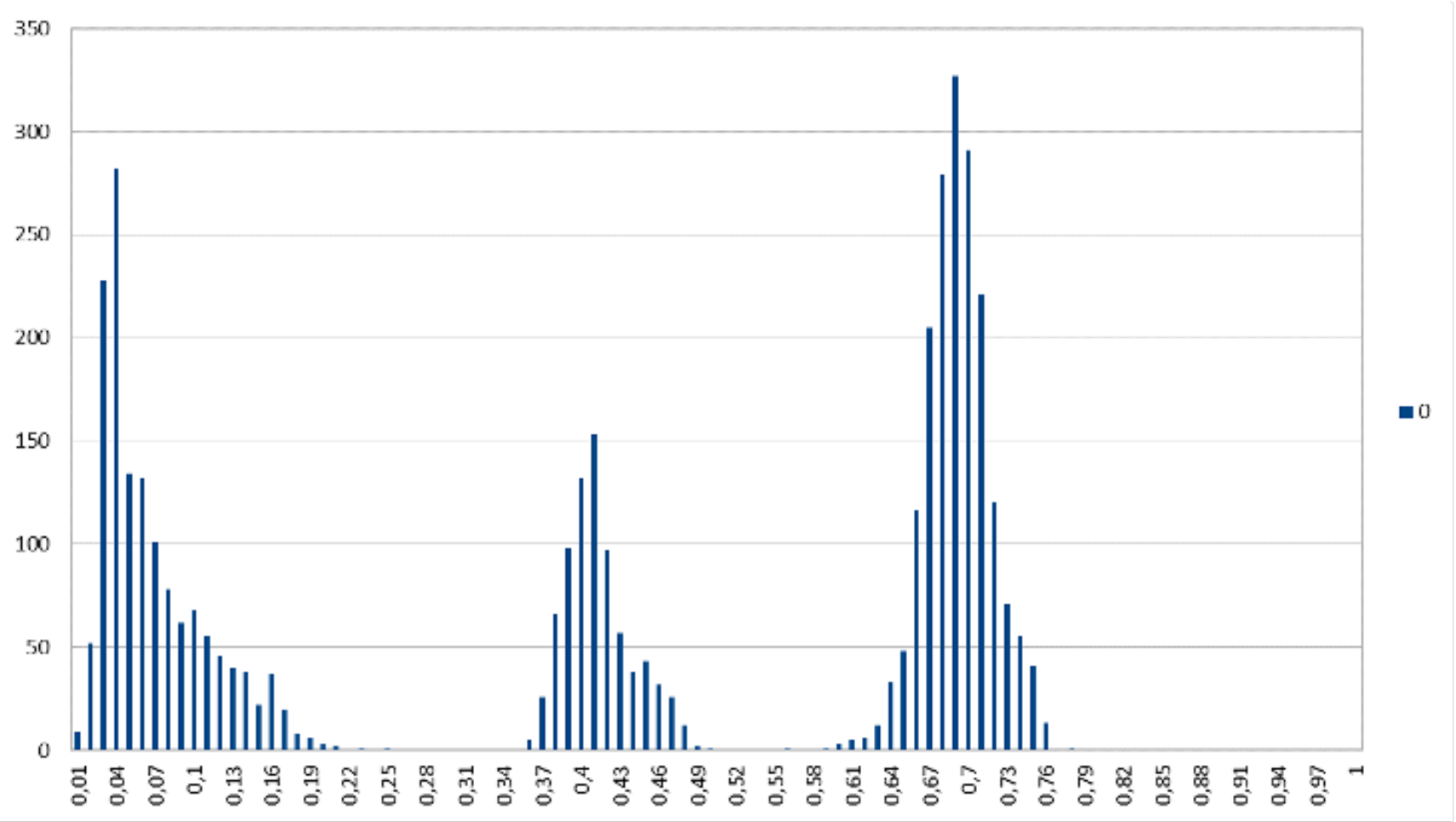
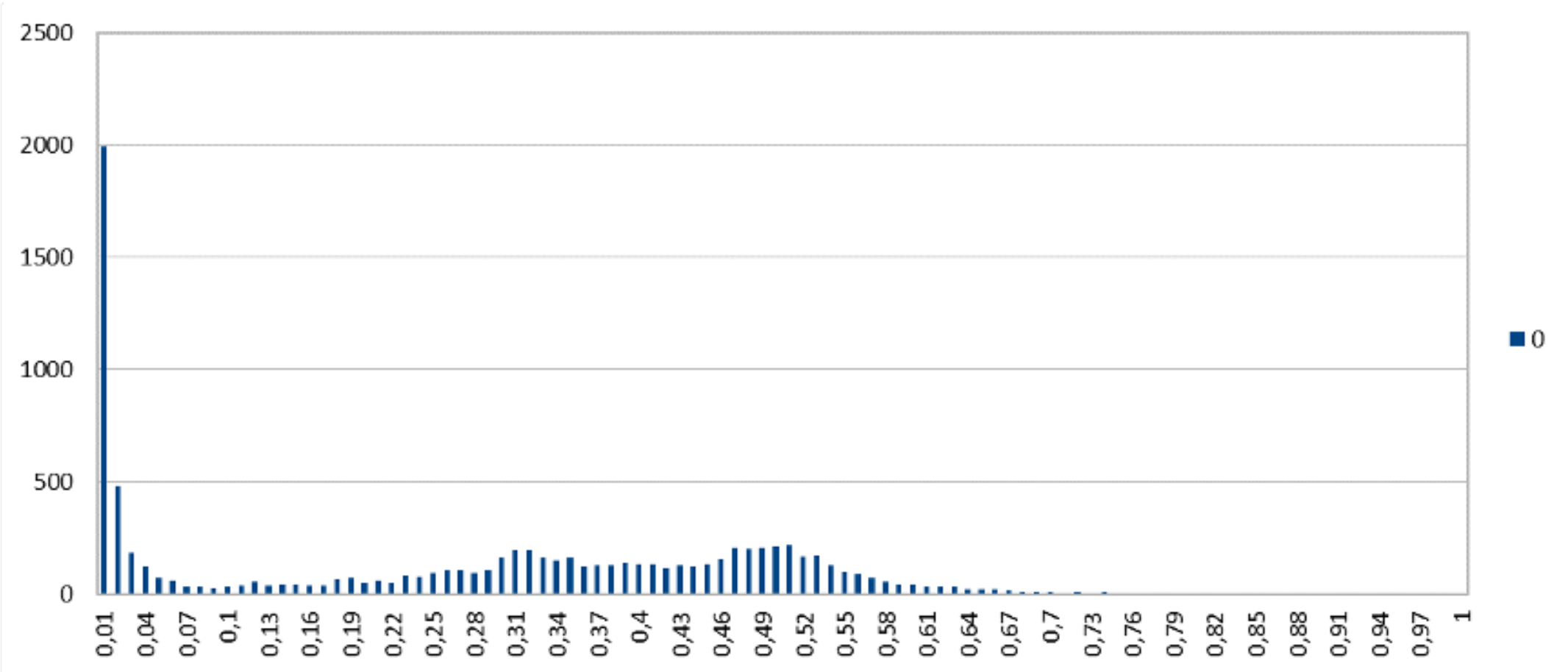
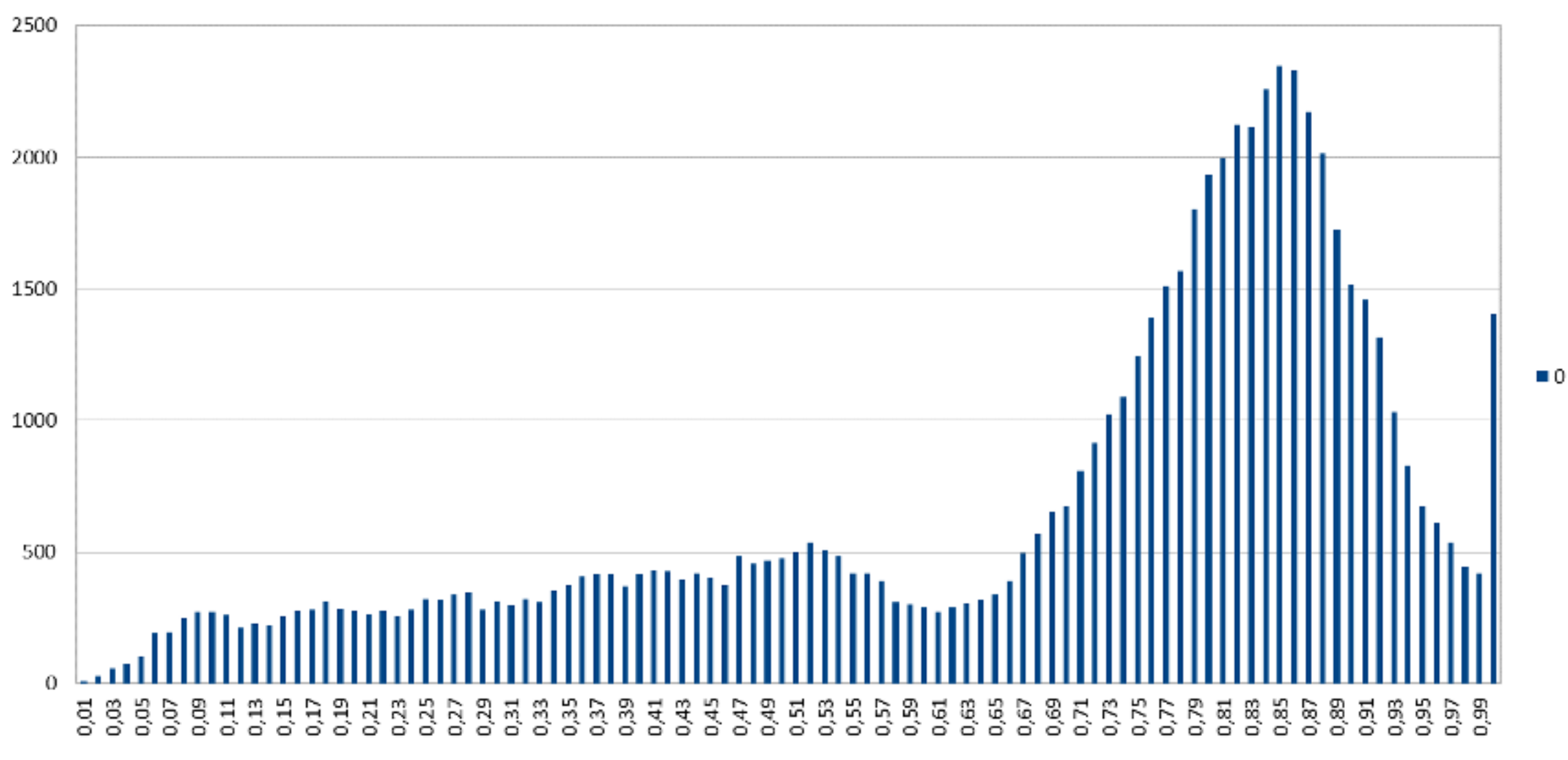
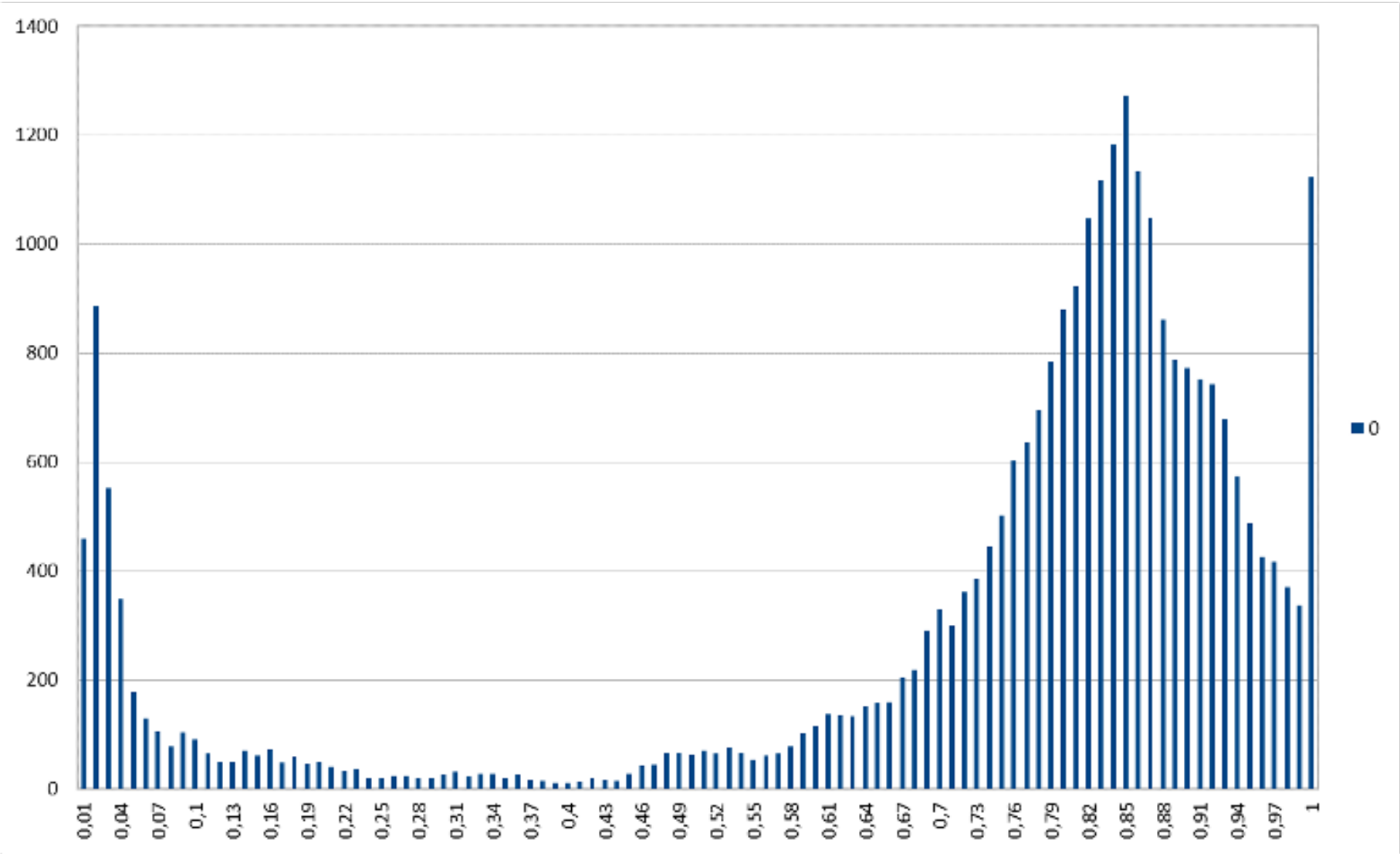
# PEAK MEMORY CONSUMPTION



Memory usage over time



# BENCHMARKING IS ALSO A GOOD IDEA



Using AI for the perfect pitch



# SOMETIMES IT'S BAD TO BE LAZY ...



```
{
  "emotion_data": {
    "score": 85,
    "predictions": [{
      "happy": 0.7
    },
    {
      "surprise": 0.2
    },
    {
      "sad": 0.1
    }
    ...
  ],
  "frames": 25,
  "timestamp": 1545925769
}
```



```
class MoodPredictedData(models.Model):
    event = models.OneToOneField(Event)
    number_of_frames = models.IntegerField()
    [...]

class Emotions(models.Model):
    mood_predicted_data = models.ForeignKey(MoodPredicatedData)
    timestamp = models.IntegerField()
    predictions = ArrayField(models.FloatField(), size=7)
```



## ... AND SOMETIMES IT'S RECOMMENDED



```
correlations = {}
for customer in customers:
    for consultant in consultants:
        customer_moods = []
        consultant_moods = []
        for moods_of_timestamp in
moods_by_created.values():
            if customer in moods_of_timestamp and
consultant in moods_of_timestamp:

customer_moods.append(moods_of_timestamp[customer])

consultant_moods.append(moods_of_timestamp[consultant])

        if customer_moods and consultant_moods:
            correlation_matrix =
np.corrcoef([customer_moods, consultant_moods])
            correlation_coefficient =
correlation_matrix[0, 1]

            if customer not in correlations:
                correlations[customer] = {}

            if consultant not in correlations:
                correlations[consultant] = {}

            correlations[customer][consultant] =
correlation_coefficient
            correlations[consultant][customer] =
correlation_coefficient
```



```
correlation_matrix =
self.per_person_intermediate_data_frame['value']
    .corr().replace({np.nan: 0})
```



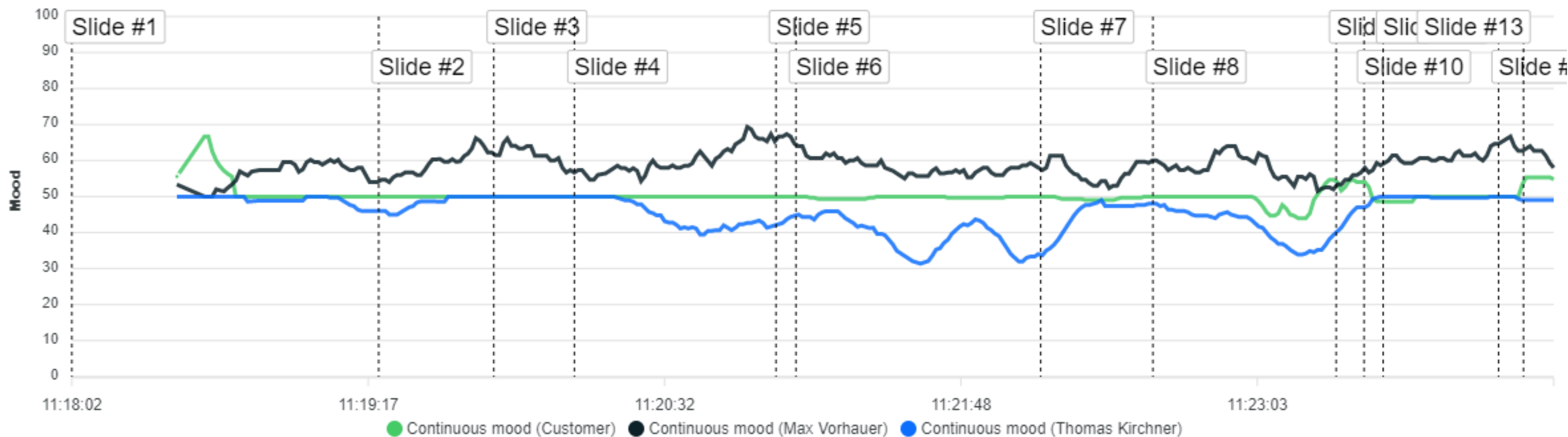
# TRADE-OFFS BETWEEN PRIVACY AND TRAINING



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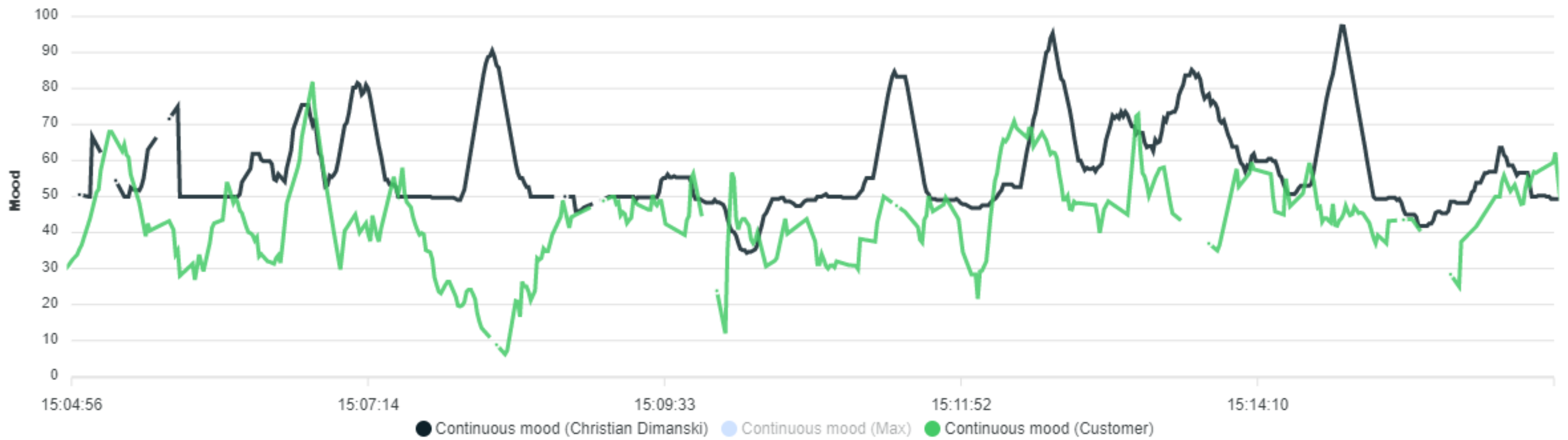


# INSIGHTS AND WHAT THEY TELL US



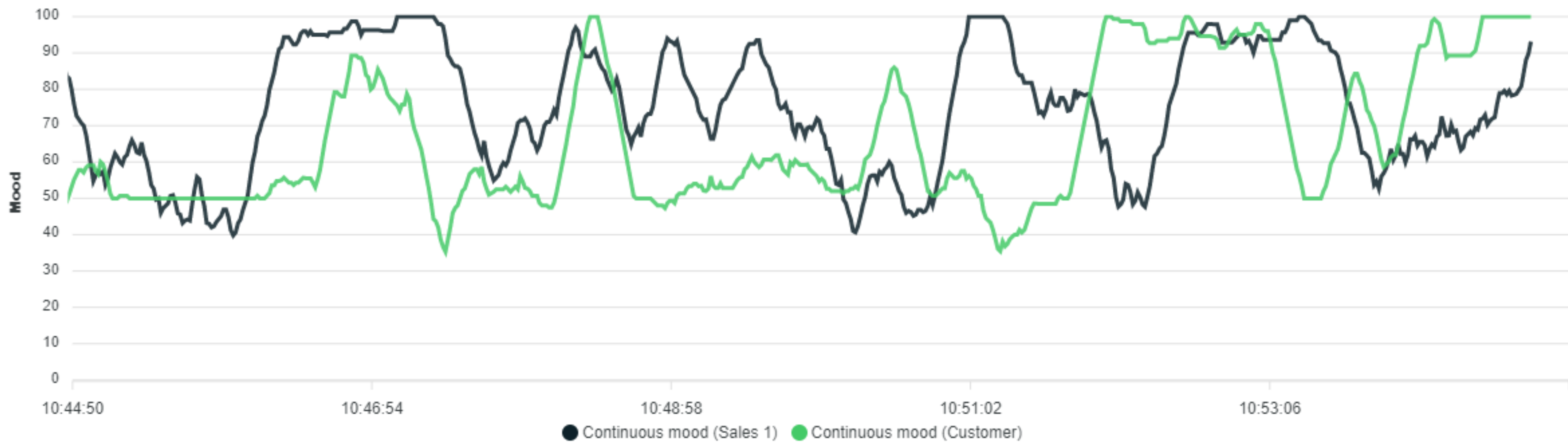


# INSIGHTS AND WHAT THEY TELL US



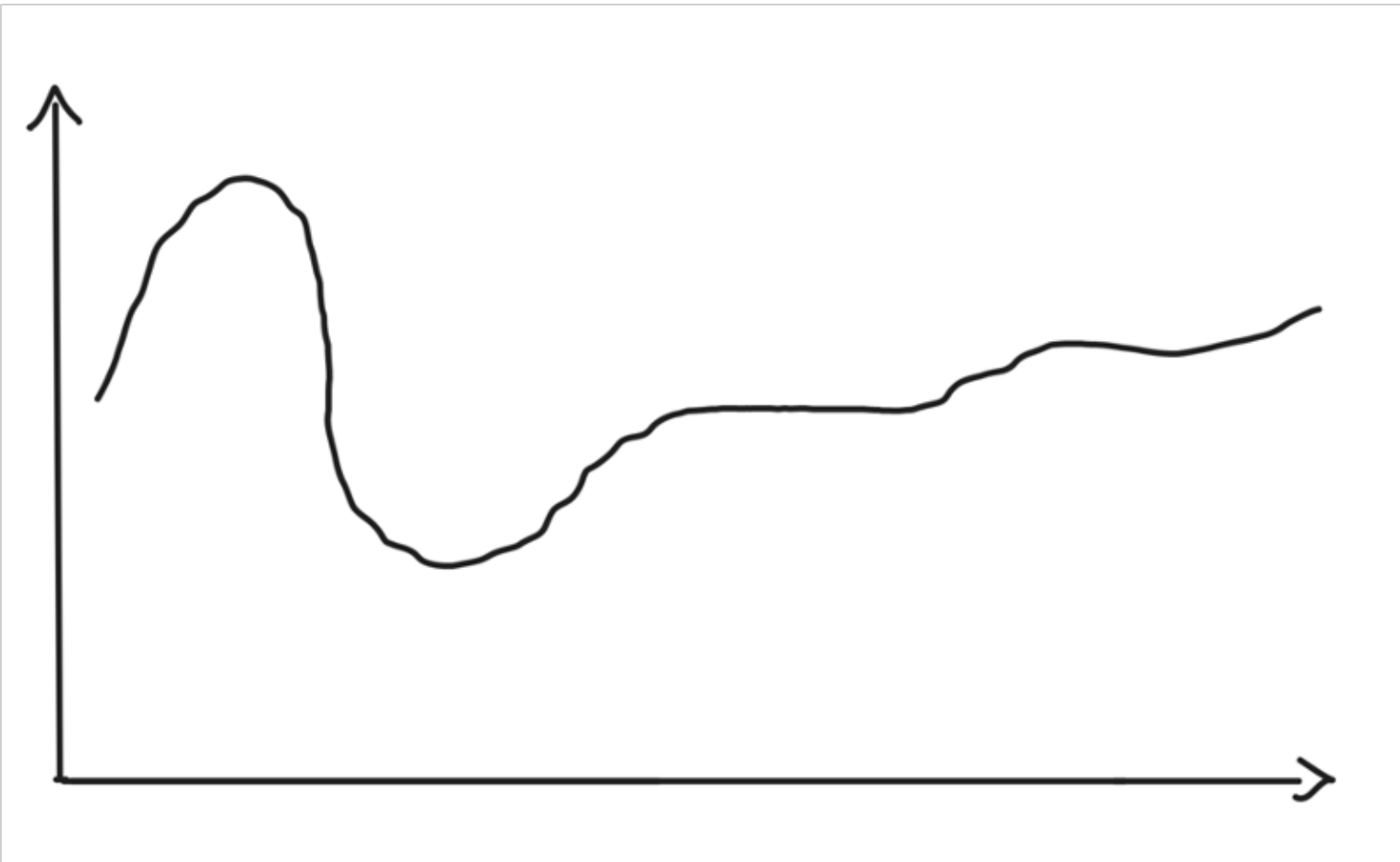


# INSIGHTS AND WHAT THEY TELL US





CURRENT USE CASES



Strategy  
vs.



Reality



# CURRENT USE CASES



HOW MANY FRAMES ARE NEEDED?

Old slide  
Emotion Score **25**

HOW MANY FRAMES ARE NEEDED?

Using AI for the perfect pitch

New slide  
Emotion Score **49**





# Takeaways

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BYE BYE

## Would you like to do better pitches?

Request your free 30 minutes consultation and learn more about

- Fundamentals of emotions in pitches
- How to build a remarkable pitch
- Keeping track of your pitch performance



**Max Vorhauer**

Product manager

[max@mataono.com](mailto:max@mataono.com)



Write me an e-mail



I will get in touch with you soon

[www.mataono.com](http://www.mataono.com)