



# DECODING EMOTIONS:

## HOW AI DECIPHERS FACIAL EXPRESSIONS

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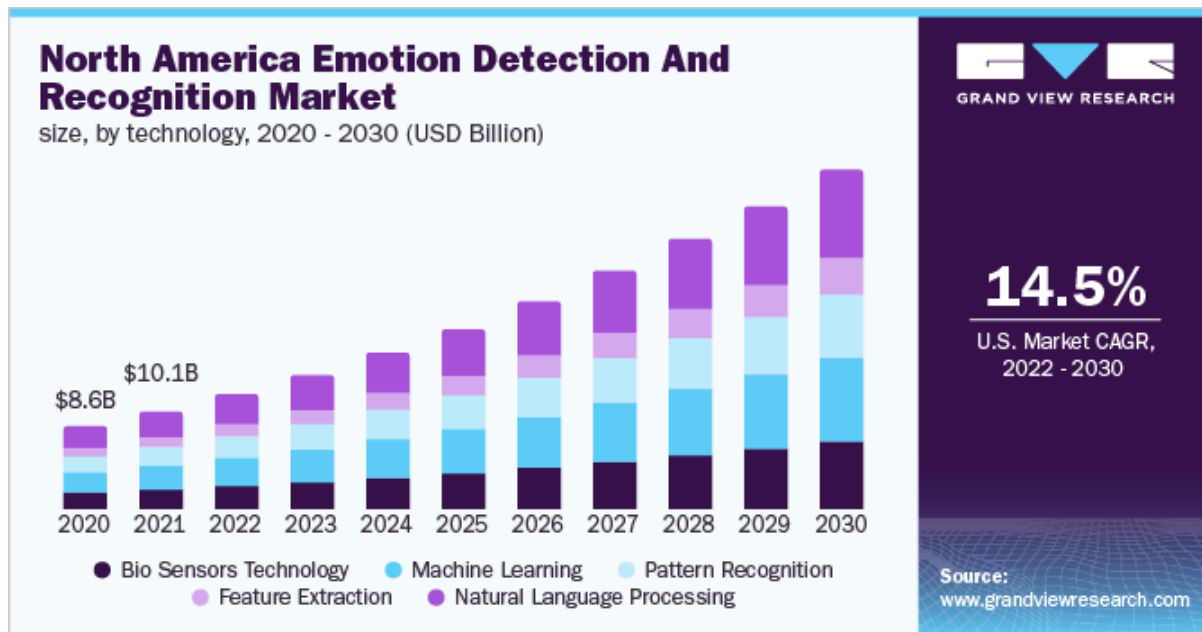
February 23, 2024

# INTRODUCTION

Emotions are what make us human.



**Emotion recognition software** uses artificial intelligence (AI) and machine learning to interpret human emotions from text, voice, facial expressions, and other non-verbal cues.



The global Emotion AI market generated **\$1.8 billion in 2022** and is projected to reach **\$13.8 billion by 2032**.

# INTRODUCTION

## Facial Emotion recognition

### Entertainment

- Face filters
- Virtual make up
- Emotion-aware Gaming

### Healthcare

- Telemedicine
- Patient Monitoring
- Autism Spectrum Therapy

### Automotive

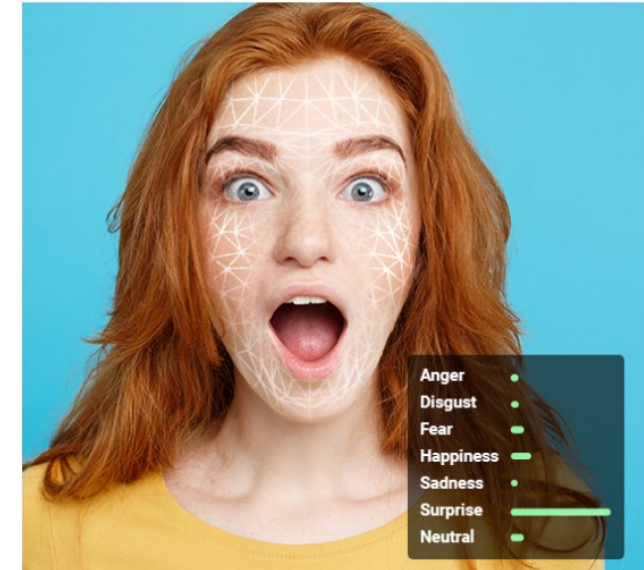
- Real-time driver monitoring
- In-car personalization

### Marketing

- Test emotions in ads for targeted marketing
- Evaluate user experience with digital interfaces

### On-line meetings

- Track people engagement
- Analyse emotions during hiring interviews



**MorphCast**  
Advanced Facial Emotion Recognition

 **smart eye**

 **iMOTIONS**

**viso.ai**

**Noldus**

**imentiv ai**

 **KAIROS**

 **Visage Technologies**

 **SKY BIOMETRY**

**Face++**

**NVISO**

**:) Affectiva**  
a smart eye company



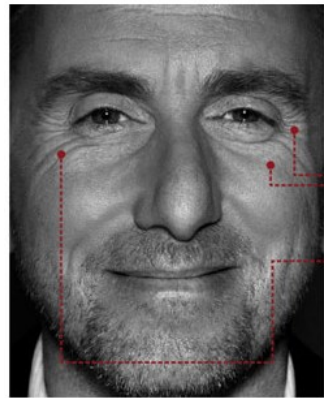
# Questions

- How good is AI in facial emotion recognition?
- What factors affect the algorithm performance?
- What emotions can be detected?



# READING HUMAN EMOTIONS FROM FACIAL EXPRESSIONS

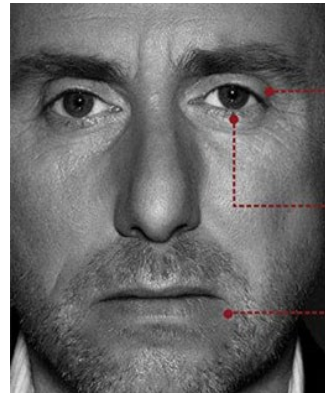
Universal facial expressions that we all use, even across cultural divides (research by Dr. Paul Ekman)



## happiness

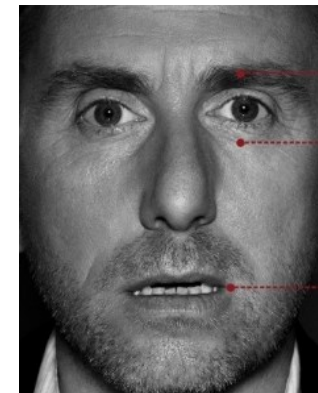
A real smile always includes:

- ① crow's feet wrinkles
- ② pushed up cheeks
- ③ movement from muscle that orbits the eye



## sadness

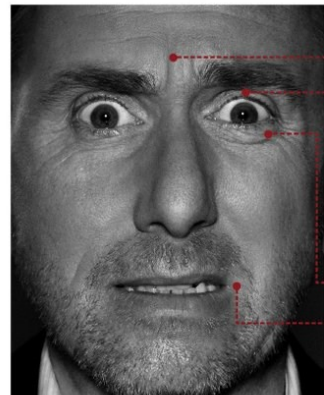
- ① drooping upper eyelids
- ② losing focus in eyes
- ③ slight pulling down of lip corners



## surprise

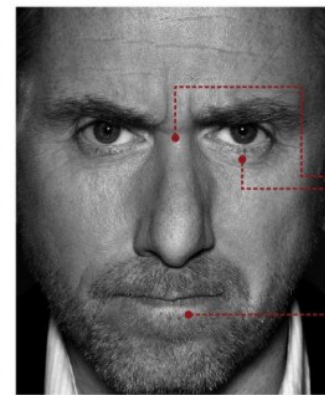
Lasts for only one second:

- ① eyebrows raised
- ② eyes widened
- ③ mouth open



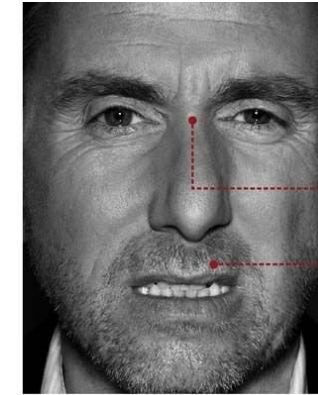
## fear

- ① eyebrows raised and pulled together
- ② raised upper eyelids
- ③ tensed lower eyelids
- ④ lips slightly stretched horizontally back to ears



## anger

- ① eyebrows down and together
- ② eyes glare
- ③ narrowing of the lips



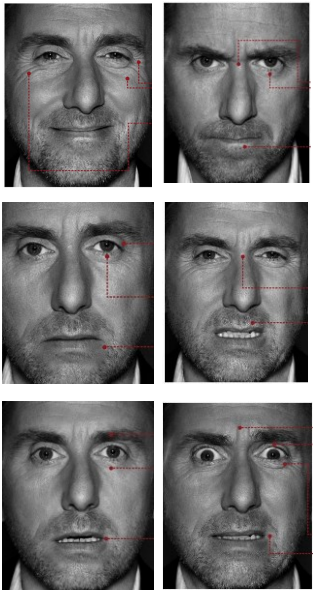
## disgust

- ① nose wrinkling
- ② upper lip raised

# KEY INGREDIENTS IN FACIAL EXPRESSIONS RECOGNITION

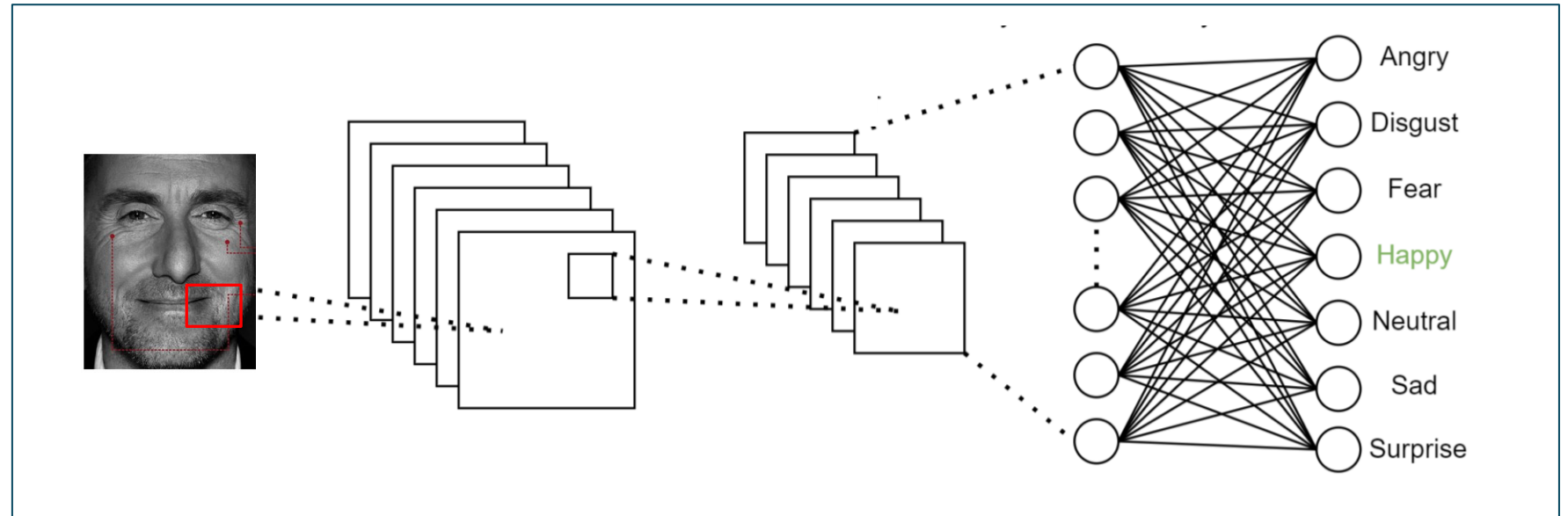
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## Images of faces



...a lot of them

## Model



Learning Process with Convolutional Neural Network (not easy...)

# HTTP://LOCALHOST:8501/#WHAT-EMOTION-DO-YOU-SEE

## What Emotion Do You See?



Discover the magic of AI emotion recognition. Select an image from pre-processed collection or upload your own. Try out the app for yourself!

Choose from library...



Drag and drop file here

Limit 200MB per file • JPG, JPEG, PNG

Browse files

Or upload any image you like...



Drag and drop file here

Limit 200MB per file • JPG, JPEG, PNG

Browse files



II Aplikacja <http://localhost:8501> udostępnia Twój ekran.



Zatrzymaj udostępnianie

[Ukryj](#)

# IS AI GOOD AT RECOGNIZING HUMAN EMOTIONS?



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Loaded image	Extracted face	Emotion
		My Model: <b>angry</b> DeepFace: <b>angry</b>



Loaded image	Extracted face	Emotion
 Original Image		My Model: <b>angry</b> DeepFace: <b>happy</b>

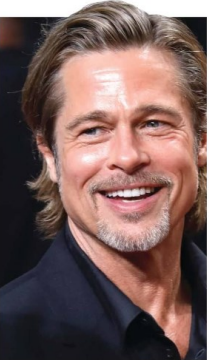





# IS AI GOOD AT RECOGNIZING HUMAN EMOTIONS?

Loaded image	Extracted face	Emotion
	 Extracted Face	My Model: <b>angry</b> DeepFace: <b>surprise</b>



Loaded image	Extracted face	Emotion
 Original Image		My Model: <b>angry</b> DeepFace: <b>happy</b>



Loaded image	Extracted face	Emotion
 Original Image		My Model: <b>angry</b> DeepFace: <b>surprise</b>



Loaded image	Extracted face	Emotion
	 Extracted Face	My Model: <b>angry</b> DeepFace: <b>happy</b>

Loaded image	Extracted face	Emotion
	 Extracted Face	My Model: <b>angry</b> DeepFace: <b>happy</b>

# IS AI GOOD AT RECOGNIZING HUMAN EMOTIONS?

Loaded image	Extracted face	Emotion
 Original Image		My Model: <b>angry</b> DeepFace: <b>fear</b>

Loaded image	Extracted face	Emotion
	 Extracted Face	My Model: <b>angry</b> DeepFace: <b>Oops, face not detected...</b>

Loaded image	Extracted face	Emotion
 Original Image		My Model: <b>angry</b> DeepFace: <b>neutral</b>

# IS AI GOOD AT RECOGNIZING HUMAN EMOTIONS?

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Loaded image



Oops, face not  
detected...

Emotion

DeepFace: Oops, face  
not detected...

Loaded image



Oops, face not  
detected...

Emotion

DeepFace: Oops, face  
not detected...

# SUMMARY

- AI emotion recognition **works with videos**, not just images!
- Creating an effective model from scratch is a demanding process, requiring time and resources.
- **Data quality and quantity matter.**
- **Algorithms can fail** to detect faces or predict emotions accurately.
- **Limited number of emotions** can be recognized (for the moment).

**The big question – do we really want our every emotion on display?**