Computer Vision

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- BEng in Electrical and Computer Engineering @ FEUP, Portugal
- PhD in Electronic Engineering @ Queen Mary University of London, UK
  – Computer Vision
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  – Biomedical imaging

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Program

- Digital image (4 classes)

- Image processing (2 classes)

- Pattern recognition (4 classes)

- Segmentation (2 classes)

- Advanced deep learning (2 classes)

Methodology

- **Theoretical-practical classes:**
  - Presentation of content
  - Discussion of examples
  - Practical demonstration of the contents lectured
- **Additional work:**
  - Java/Android/C/Python/Other Programming
  - Implementation of the studied algorithms

Evaluation - Theoretical Evaluation

- Two possibilities:
  - Final Exam (EF)
    - Theoretical examination with the whole syllabus
    - Minimum score 40%
  - Simplified Final Exam (EF-S)
    - For those who presented practical work
    - Theoretical examination with half of the syllabus (T1-T8)
    - Minimum score 40%

Evaluation - Practical Evaluation

- Practical evaluation (PA):
  - Optional
  - Implementation project done by groups of two students
  - Theme chosen among the various proposed by the teacher
  - (Optional) Preparation of a small simple report describing the implementation of the project
  - Minimum AP score = 40%

Evaluation - Final grade

- Option 1
  - Practical Evaluation (PA), Simplified Final Exam (EF-S)
  - $NF = AP*0.5 + EF\text{-}S*0.5$
- Option 2
  - Final Exam (EF)
  - $NF = EF*1.0$

Some (old) inspirational links

- http://www.dfki.uni-kl.de/mp3konzertarchiv/exhibition
- http://www.youtube.com/watch?v=MTSWjkXBHOs&feature=youtu.be
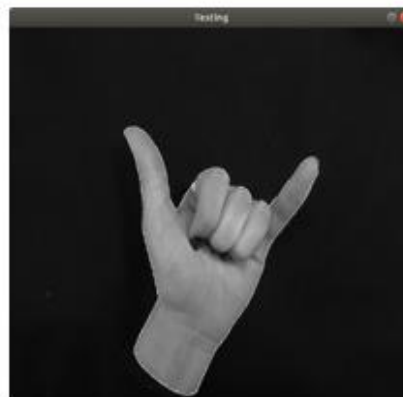- http://www.nytimes.com/video/2013/02/27/science/100000002087758/finding-the-visible-in-the-invisible.html
- http://cbarker.net/blog/projects/applications/cubr

https://www.youtube.com/watch?v=csuS2ibPVtU

VC 21/22 - Presentation

1:55 / 2:51

Imagens de teste	Segmentação da imagem	Resultado/Tradução

Gesture Recognition

Corresponde -> Y
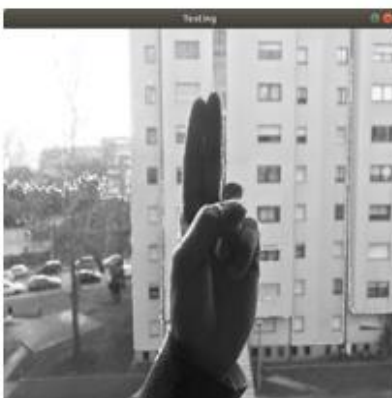
Várias traduções se assemelham, nomeadamente:
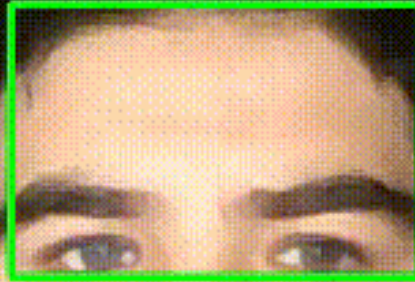| -> Y
| -> O
| -> U
| -> 5
| -> 5
| -> 4
| -> 3
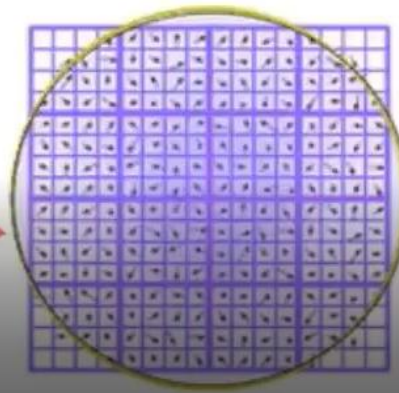| -> 2

Corresponde -> O
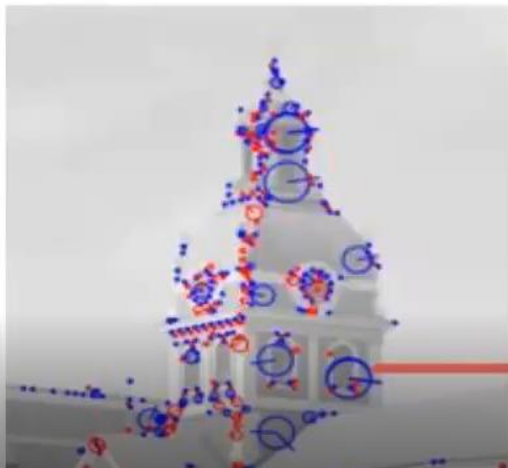
Heartbeat Quantification

BPM: 72

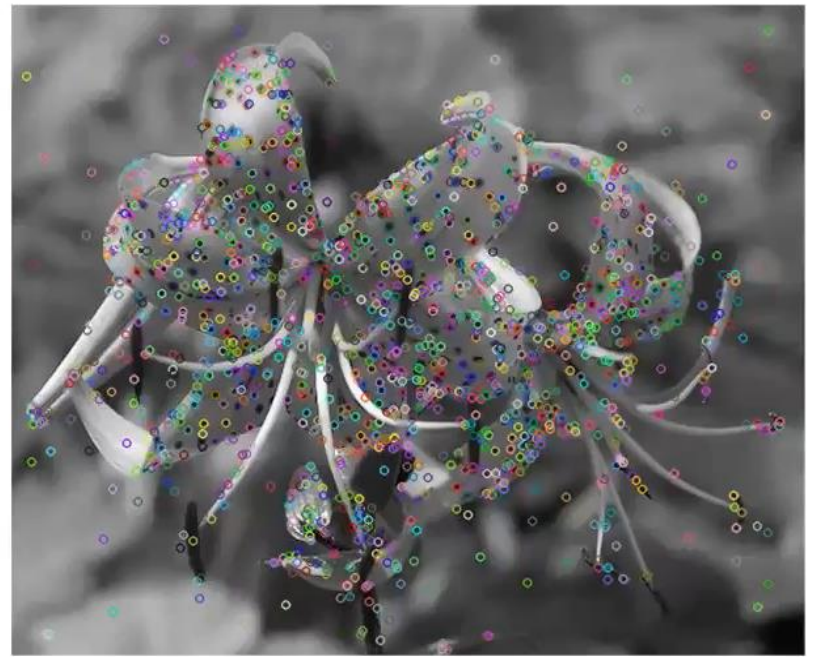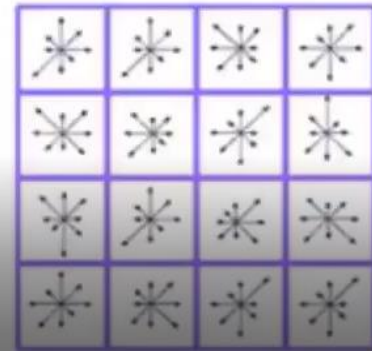(x=331,y=407) ~ R:207 G:197 B:202
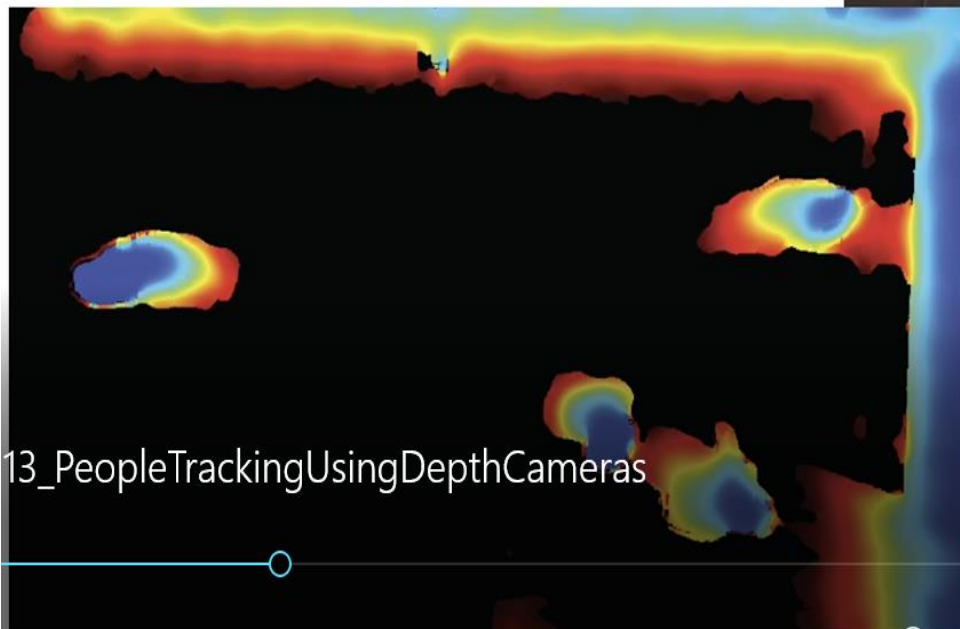
Self-Driving System
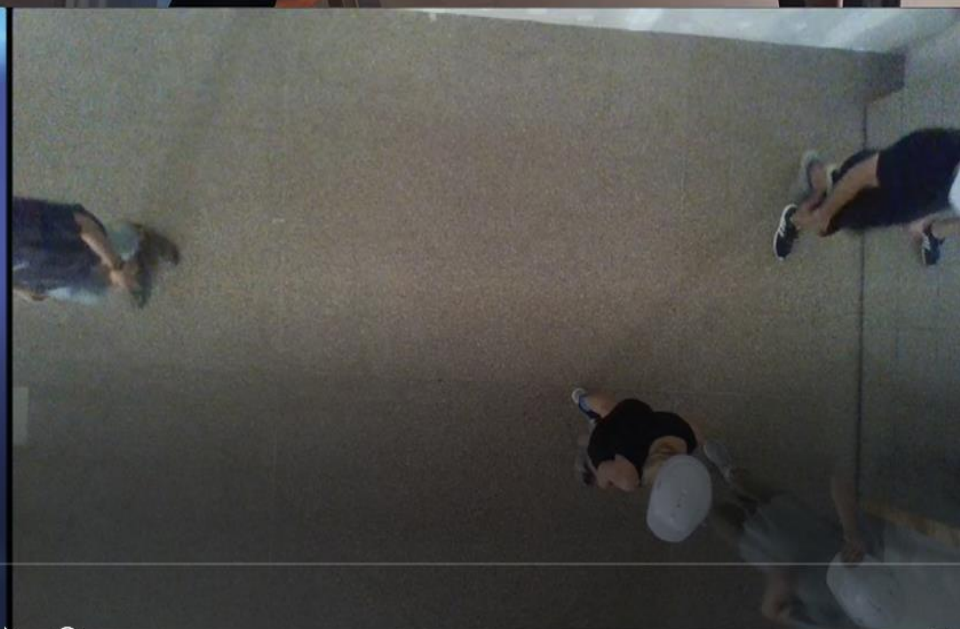
Image gradients

Keypoint descriptor

Flower Classification

People tracking using depth cameras

- **6 depth cameras** placed on the ceiling in a matrix
- **already collected** a dataset ~60 GB of recordings

Bibliography

1. R. Szeliski, "Computer Vision: Algorithms and Applications", Springer, 2011, ISBN: 978-1-84882-935-0

2. R. Gonzalez, R. Woods, and S. Eddins, "Digital Image Processing using Matlab", Prentice Hall, 2004

3. I. Goodfellow, Y. Bengio, and A. Courville. Deep learning. Vol. 1. Cambridge: MIT press, 2016. (https://www.deeplearningbook.org/)

~~Good Luck~~ Good Work!

- Forget luck
- You work well and you don't need it
- Focus on enjoying classes!

- "Luck favors the bold"
  – John Wick tattooed it so it must be true… right?