Introduction

CPS592 – Visual Computing and Mixed Reality

Lecturer

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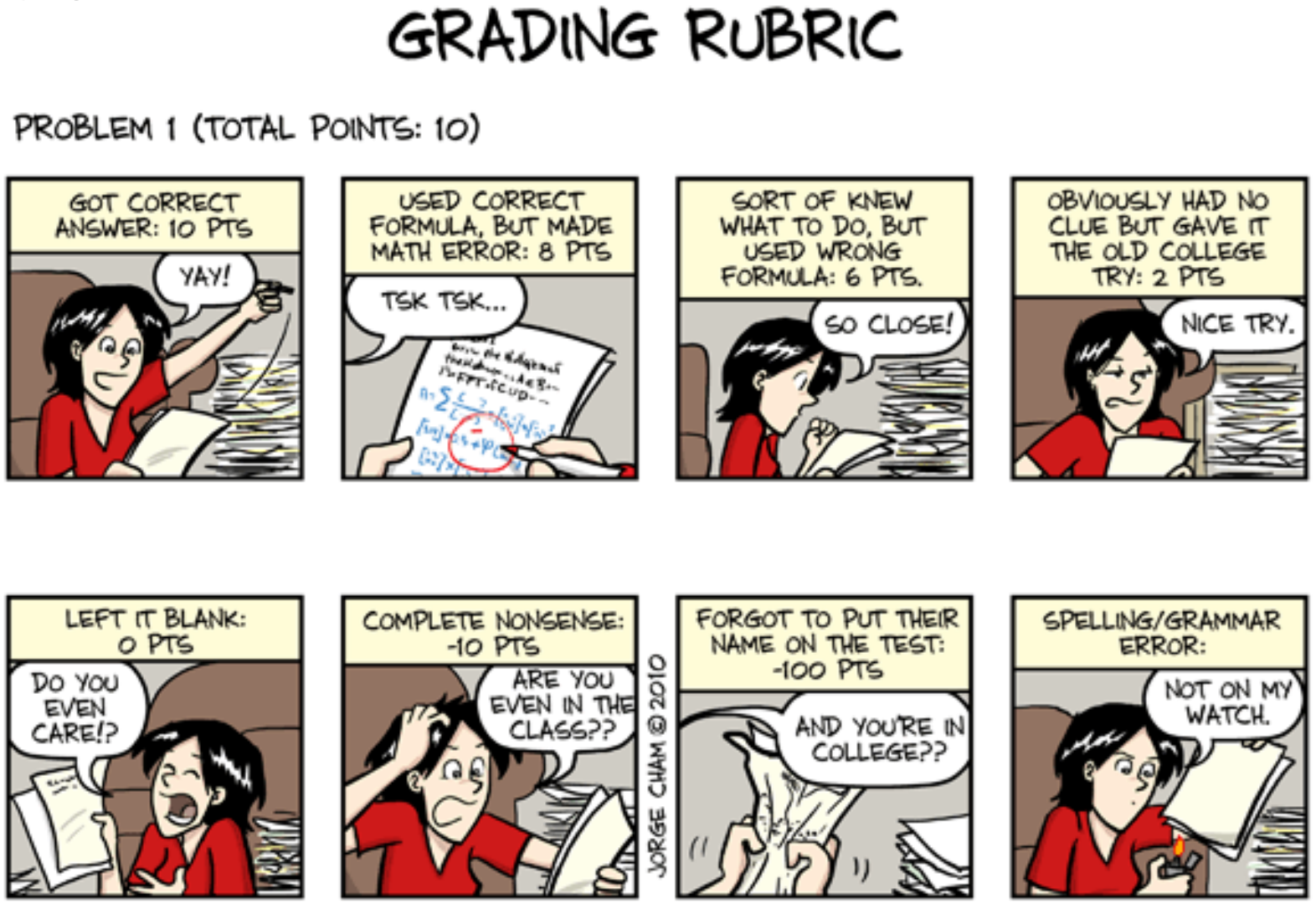
Welcome

- You probably have questions:
  - How much work is this course?
  - Will I get an A?
  - What is visual computing?
  - What is mixed reality?
  - What am I going to learn?
- Hope to answer these questions in today's lecture

How much work?

- 3 Programming Assignments
- Tentative Assignments
  - Assignment 1: basic image processing functions
  - Assignment 2: image saliency and seam carving
  - Assignment 3: augmented reality application
- 1 Mid-term exam

Will I get an A?



What is visual computing?

- Visual computing is a generic term for all computer science disciplines handling with images and 3D models, i.e. computer graphics, image processing, visualization, computer vision, virtual and augmented reality, video processing, but also includes aspects of pattern recognition, human computer interaction, machine learning and digital libraries

Examples

- Enhance the quality of the image

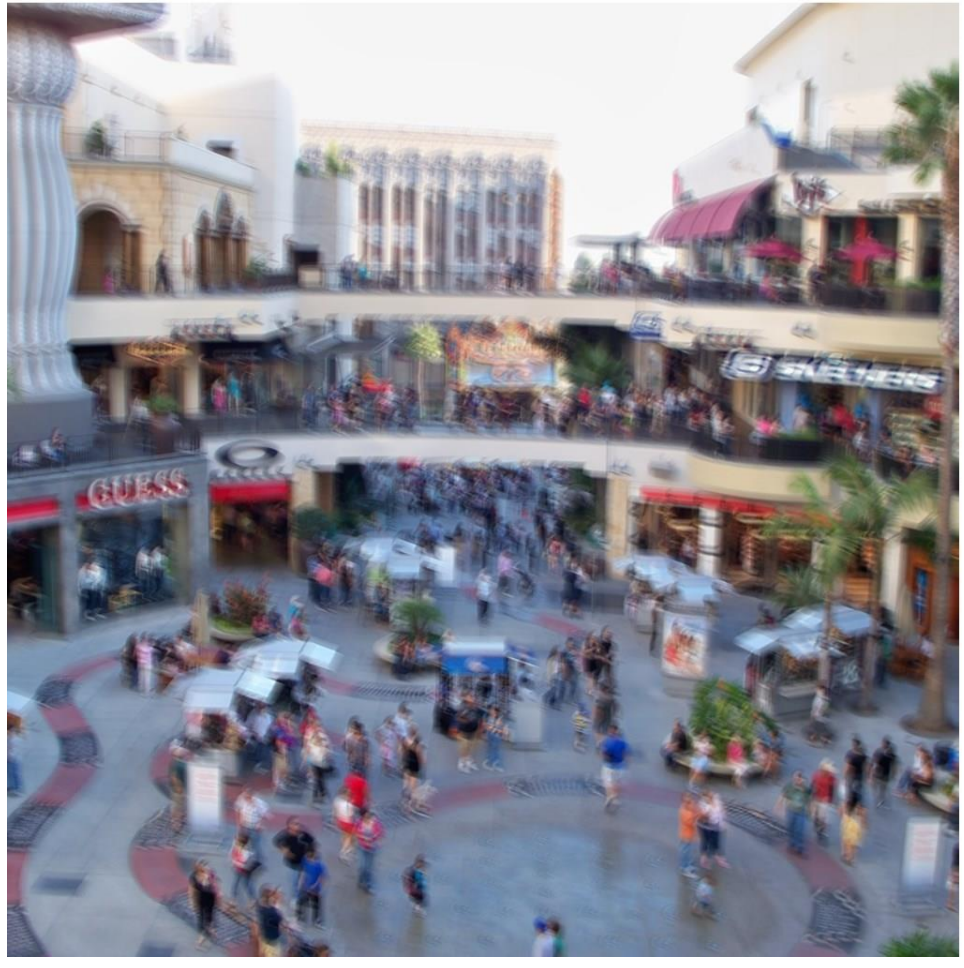
Noisy image

Denoised image

Examples

- Enhance the quality of the image

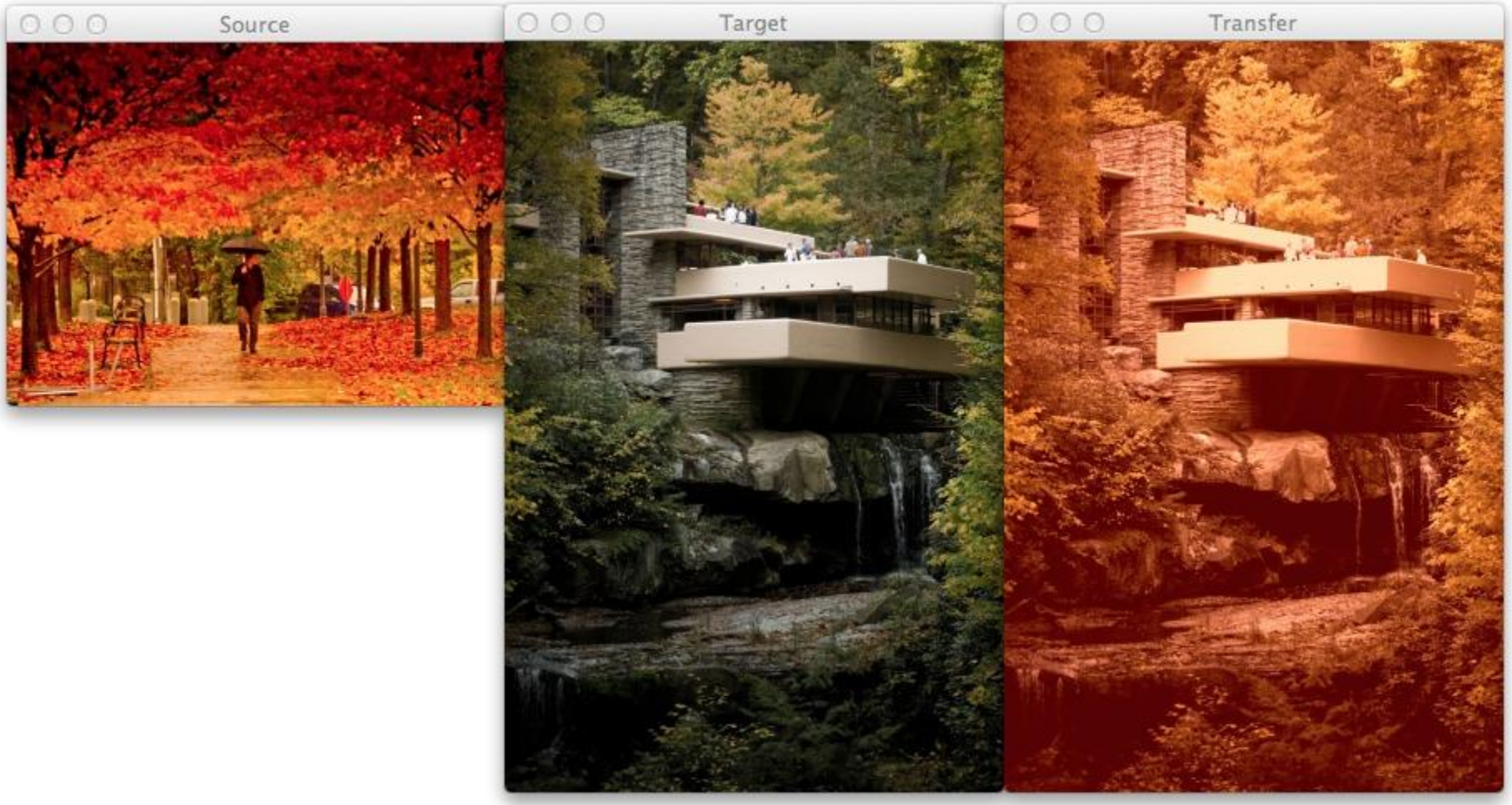
Blurred image



Deblurred image

Examples

- Alter the color theme of an image



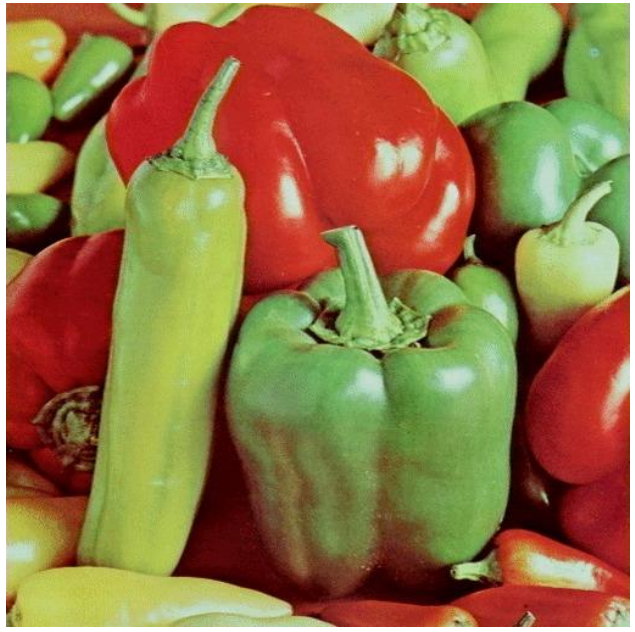
Examples

- Resize the image while maintaining the content and the quality.

Examples

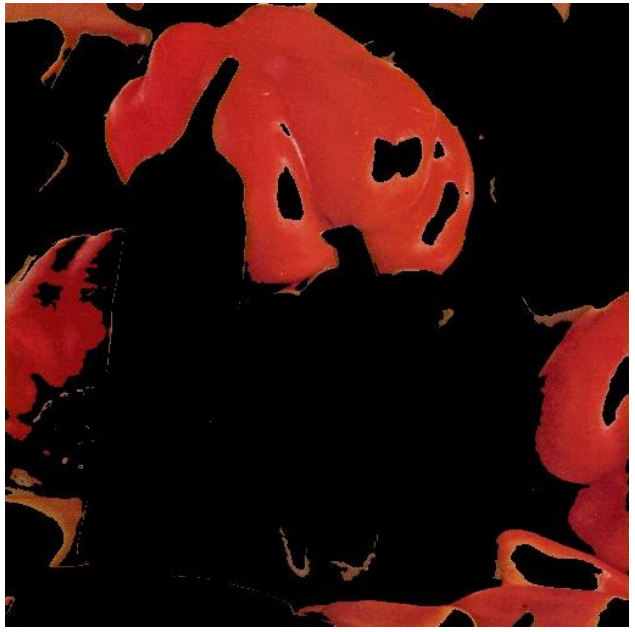
- Segment the input image

Input image



4 segments

Segment #1



What is Mixed Reality?

- Mixed reality (MR), sometimes referred to as hybrid reality, is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time.

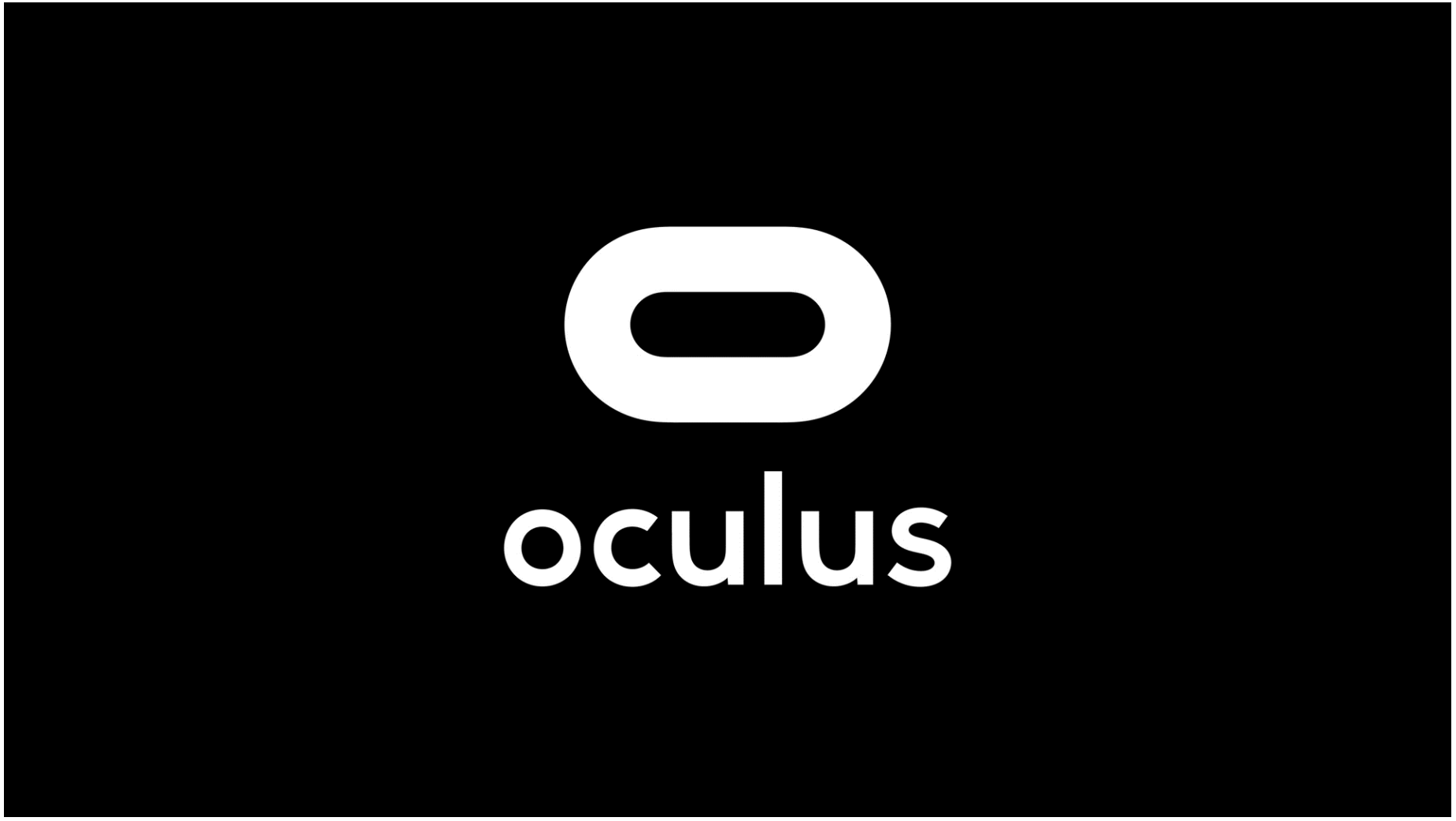
Mixed Reality

- Virtual reality: only virtual environment is seen by human.

https://www.youtube.com/watch?v=iFEMiyGMa58

Mixed Reality

- Interaction is also important in virtual reality



Mixed Reality

- Augmented Reality: renders the virtual objects into the real scene.

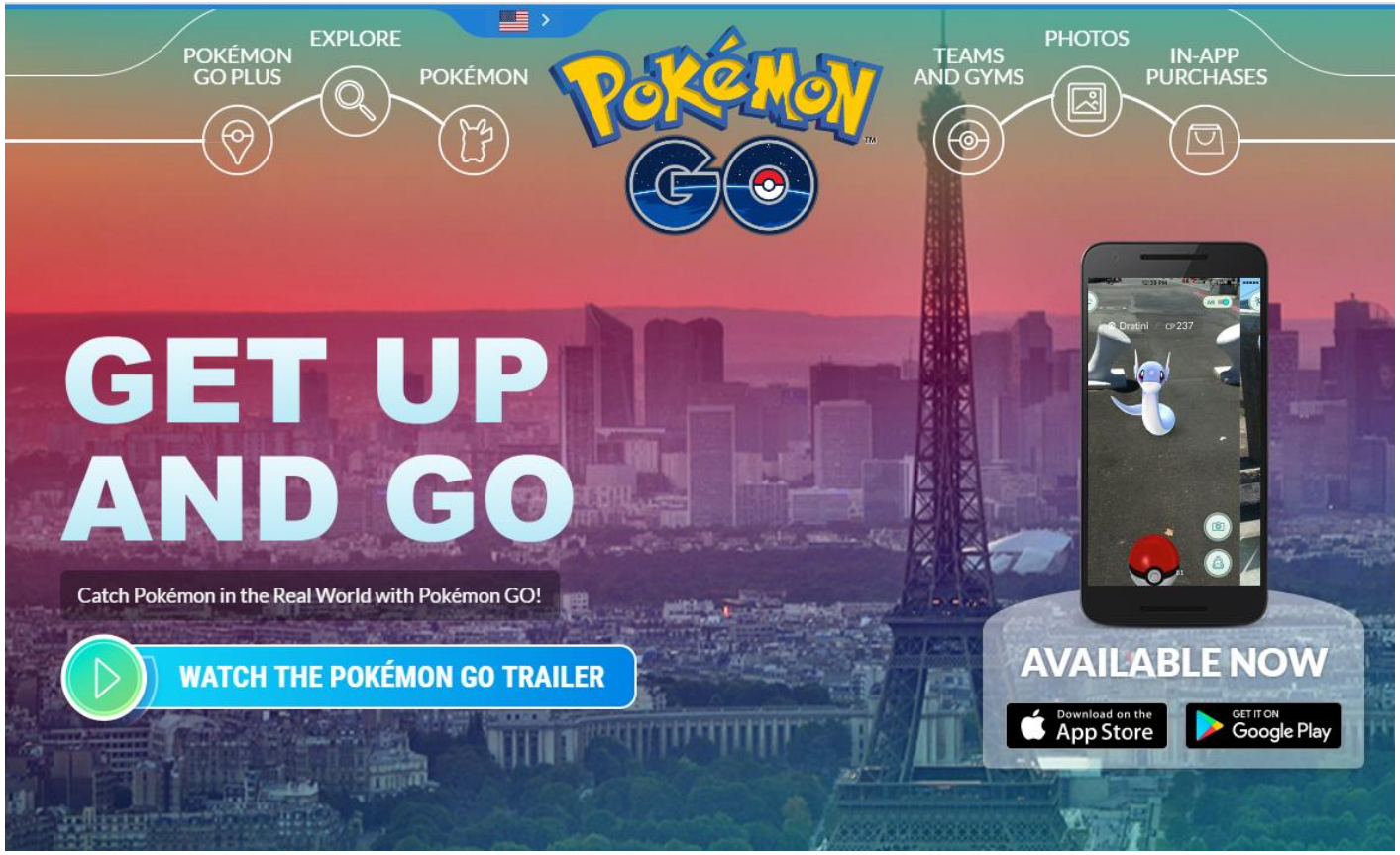
Mixed Reality

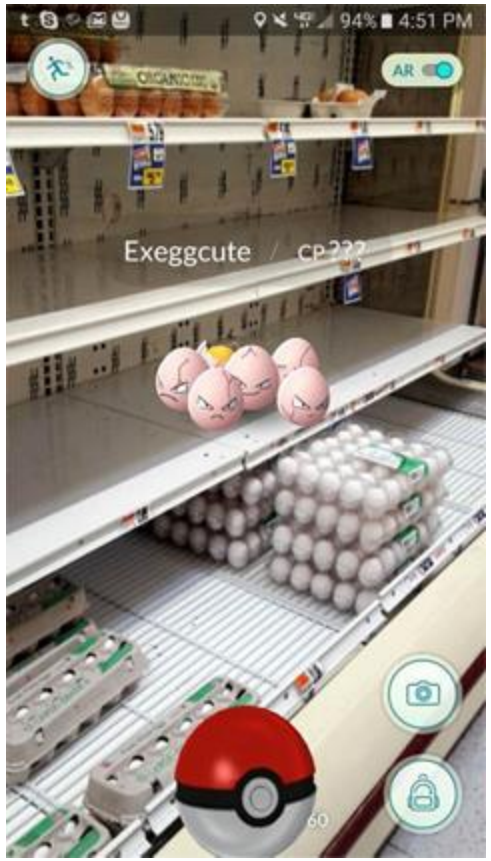
Mixed Reality

- Ikea app allows customers to virtually test products

Mixed Reality

- Pokemon Go is a Mixed Reality based application





What am I going to learn?

- Visual computing
  - Already, most images are touched up via software.
  - Cameras have built-in algorithms that modify the picture directly (sometimes without you knowing).
- Mixed reality technology is developing
  - Pokemon Go is a trend now.
  - Augmented Reality can be adapted well in reality.
- You will learn some advanced technologies in visual computing and mixed reality.

What can I get after the course

- Doctoral studies in Visual Computing or Mixed Reality
- Software Engineers in these fields get good pay
- Start-up on cool applications

http://www.indeed.com/salary/Visual-Computing-Technologies-Company.html

Q&A