

LABORATORIO DI REALTÀ AUMENTATA

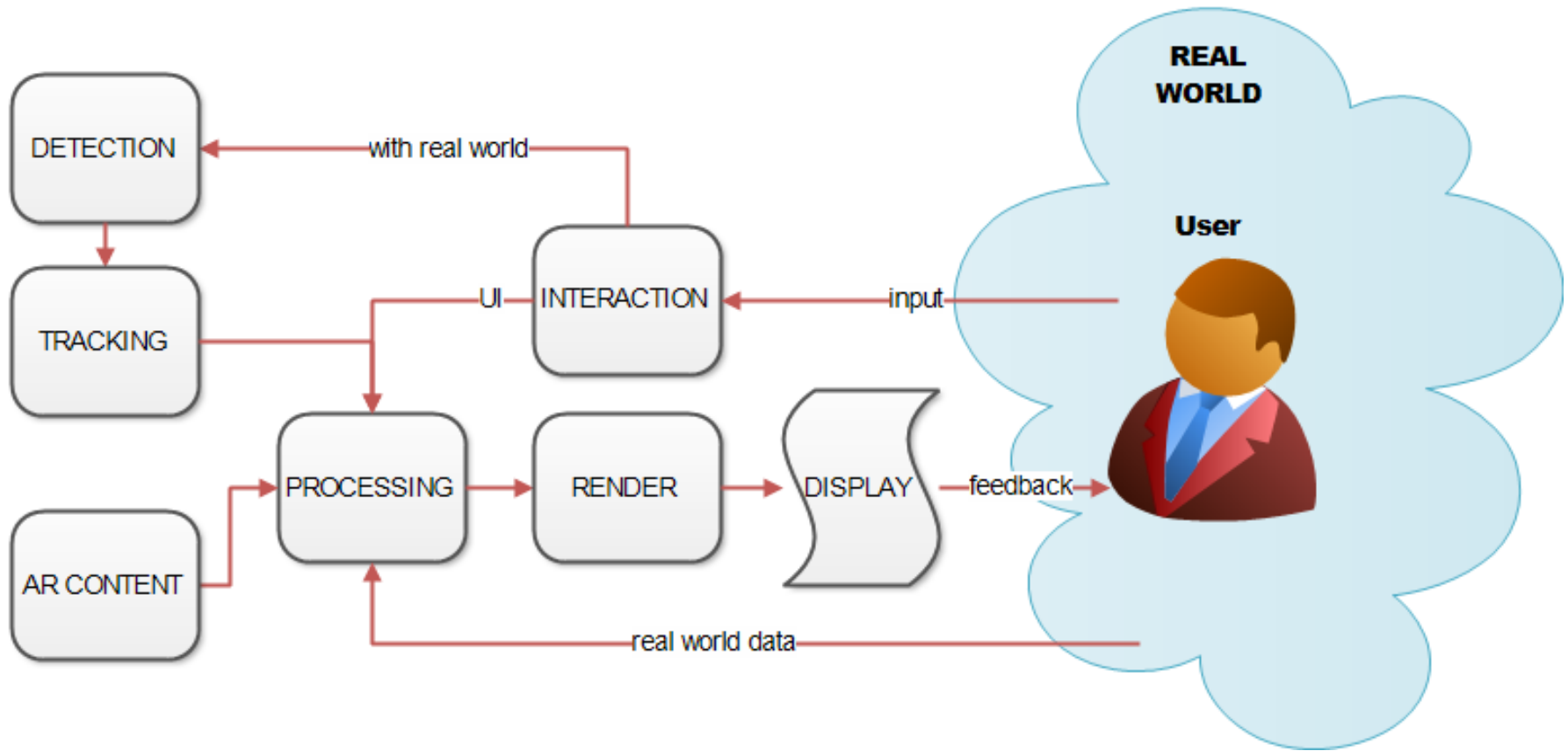
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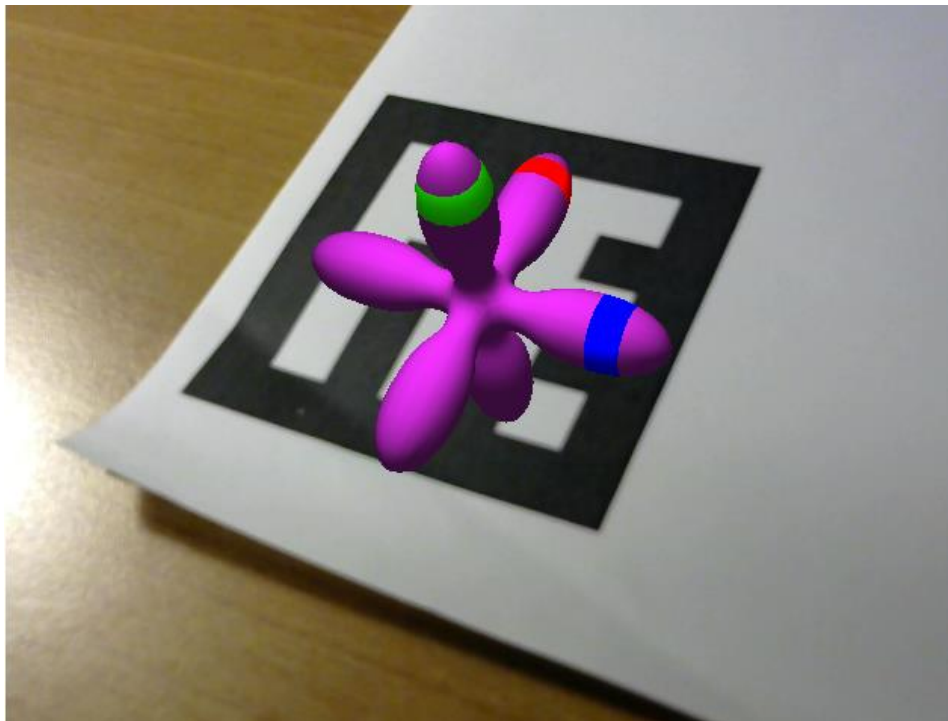
Project introduction

Architecture of an AR system




A simple AR project

- In the next lessons, we will develop a simple AR system based on visual tracking of fiducial markers



AR tools

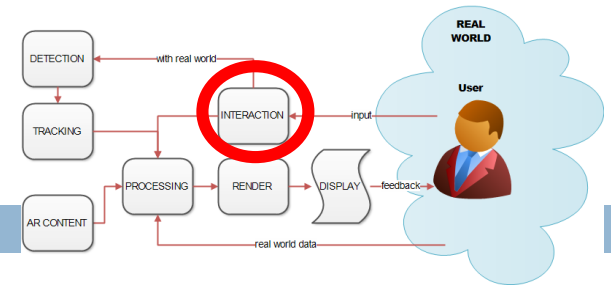
- There is a plethora of AR SDK...
 - Vuforia □ D'Fusion □ ...
 - Metaio □ DroidAR
 - Wikitude □ ARLab

 - Our aim is to be the most independent possible from a specific development tool / environment
- 
- Web-based augmented reality (***augmented web***)

Web-based AR

- In Web-based AR, we use standard web development techniques
 - ▣ HTML 5
 - ▣ Javascript
 - ▣ ...
- Major advantage: you just need a web browser to run the AR application!
- Easily portable to mobile apps too (e.g. through Android's webview...)

Input



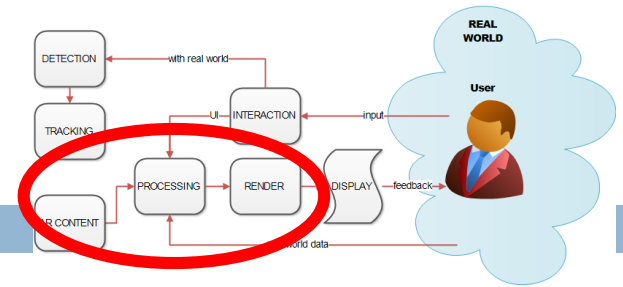
- Video input will be acquired from a webcam, or simulated with a video
- Videos in web pages: HTML 5 `<video>` tag
- Access to webcams: WebRTC API



The diagram illustrates the AR system architecture. It features a central processing loop: **DETECTION** (circled in red) feeds into **TRACKING**, which feeds into **PROCESSING**. **PROCESSING** feeds into **RENDER**, which feeds into **DISPLAY**. **DISPLAY** provides **feedback** to the **User** (represented by a person icon). The **User** provides **input** to **INTERACTION**, which feeds into **PROCESSING**. **INTERACTION** also receives **data** from **DETECTION**. **PROCESSING** receives **AR CONTENT** from the bottom left. **DISPLAY** outputs **real world data** back to **DETECTION**. The entire system is connected to the **REAL WORLD** (represented by a cloud shape).

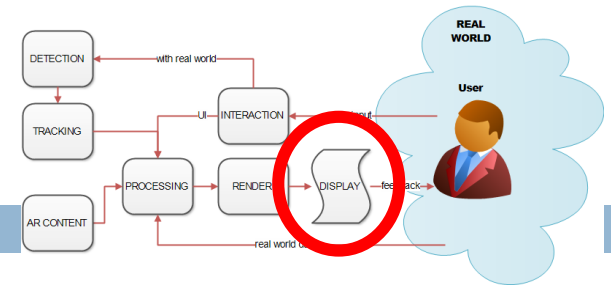
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- A large, stylized white Swastika symbol is centered on a black background. The symbol is composed of four arms of equal length, each bent at a 90-degree angle. The top arm is horizontal, the right arm is vertical, the bottom arm is horizontal, and the left arm is vertical. The symbol is a simple, bold representation of the Swastika, which is a common religious icon in many cultures.

Processing

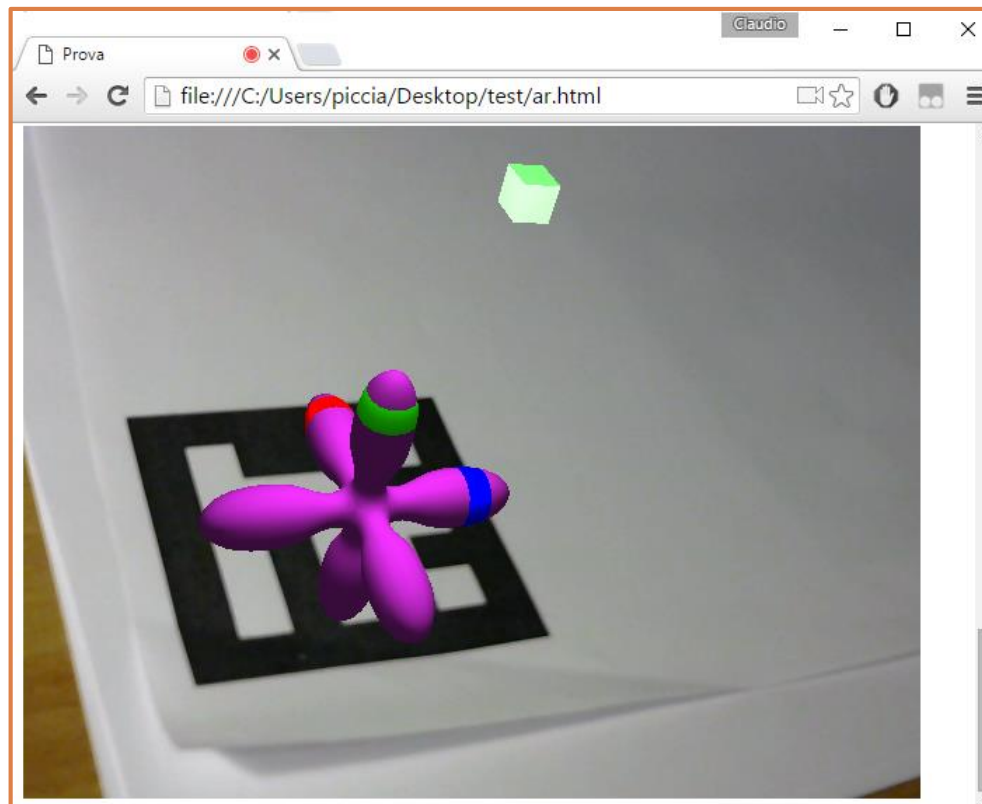


- 3D content can be either created “online” from the javascript code or loaded from external files
- The three.js library will be used to handle all the 3D content, aligning it with the markers detected by jsartoolkit and rendering the final scene

Display



- Of course the display will be a browser window!
- We will use Firefox as the default browser



Rationale

- There are several augmented web development tools, maybe easier to use than our approach
- But our goal is to learn what happens “behind the curtain”
- At the end of the course, you will have gained a comprehensive understanding of the computational steps involved in reality augmentation

Prerequisites

- Prior knowledge needed:
 - ▣ Javascript programming (basic)
 - ▣ HTML 5 (very basic)