인풋 하드웨어 — 이미지 처리 — 아웃풋 하드웨어

카메라
키보드. 마우스
터치스크린.

Part 1: Introduction

3. AR and Interaction

1. 영상획득 → camera. graphics. AR
2. 영상 출력.

Outline

I. Interaction
   A. Body Interaction
   B. 모션 센서
II. Applications

1 Interaction

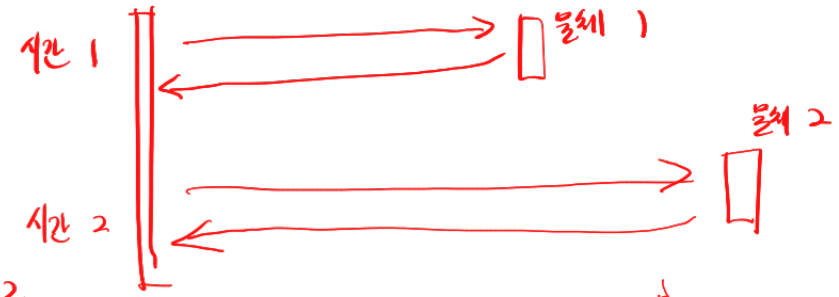
상호작용.
사람 ⟷ 컴퓨터

VR 기기 (여러 하드웨어)

조작 인식 기기.
손의 위치 파악.
손 · 손가락 센서 …

1.1 Body Input

- Depth

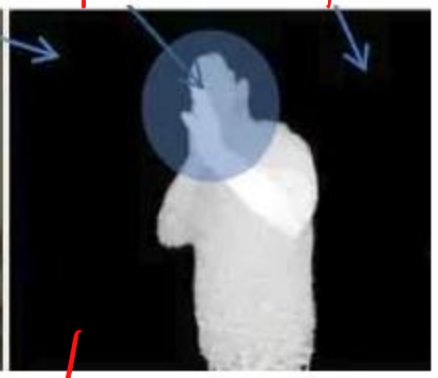


키넥트. 게임콘솔의 동작인식 센서.

Kinect for Xbox 360. The Xbox 360 E revision has an Xbox logo to the left of the Xbox 360 branding.

카메라

depth 카메라.

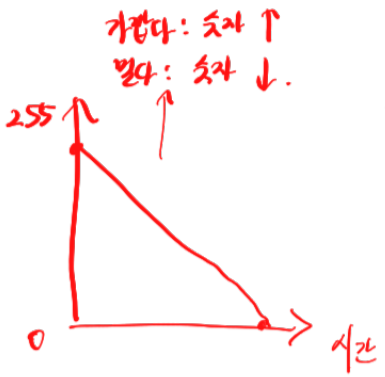


왼쪽을 표현. (거리 표현)

사람 - 배경 분리.

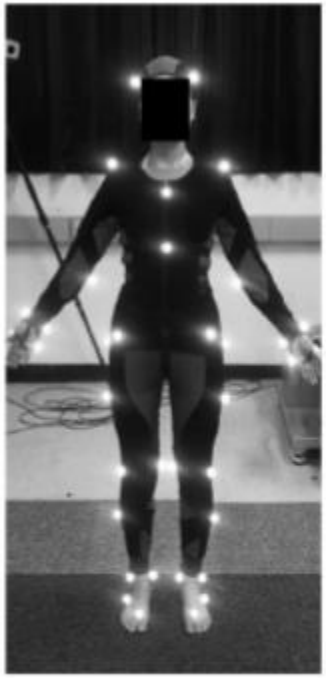
몸 - 앞으로 나와있는 손 분리.

거리값을 0 ~ 255로 표현..
(시간)



1.1 Body Input

- Body and Hand Motion



vicon 반사 센서

반사체가 붙어 있음

ex) 수화 인식.

실제 영상을 트래킹.

핸드모션.

글러브를 이용해

손 위치를 파악함.

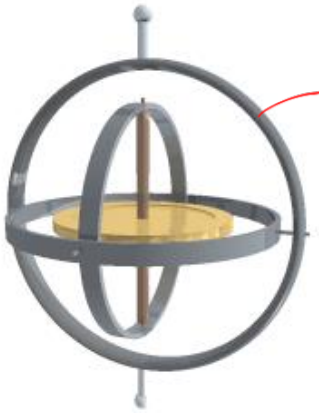
카메라로 인식: Passive ⟷ 다른 방법으로 인식: Active 센싱

1.2 Motion 인식

- **Inertial Sensing** Active. 센싱 이용.

  Inertial sensors use a variety of inertial measurement devices, such as angular rate gyroscopes, linear accelerometers, and magnetometers.

  Gyroscope is a device used for measuring or maintaining orientation and angular velocity. It is a spinning wheel or disc in which the axis of rotation is free to assume any orientation by itself. When rotating, the orientation of this axis is unaffected by tilting or rotation of the mounting, according to the conservation of angular momentum.



자이로스코프.

1.2 Motion 인식

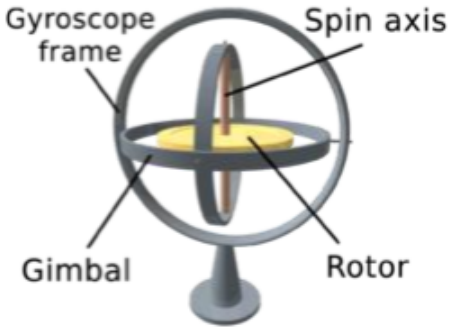
"MEMS" → 반도체 속에 들어 있는 기기들을 볼 수 있음.
ex) 스마트폰 · 내비게이션 ·

- **Inertial Sensing**

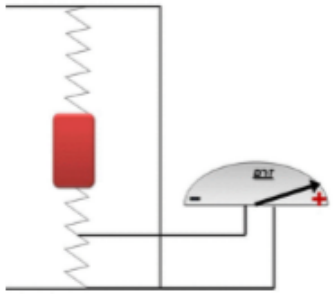
  Inertial sensors use a variety of inertial measurement devices, such as angular rate gyroscopes, linear accelerometers, and magnetometers.

  Gyroscope is a device used for measuring or maintaining orientation and angular velocity. It is a spinning wheel or disc in which the axis of rotation is free to assume any orientation by itself. When rotating, the orientation of this axis is unaffected by tilting or rotation of the mounting, according to the conservation of angular momentum.

F = ma.



gyroscope
회전 방향 측정.



accelerometer
가속도계.
가속도의 방향 측정.
(힘의 방향)

magnetometer
나침반. 자기력계.

1.2 모션 인식

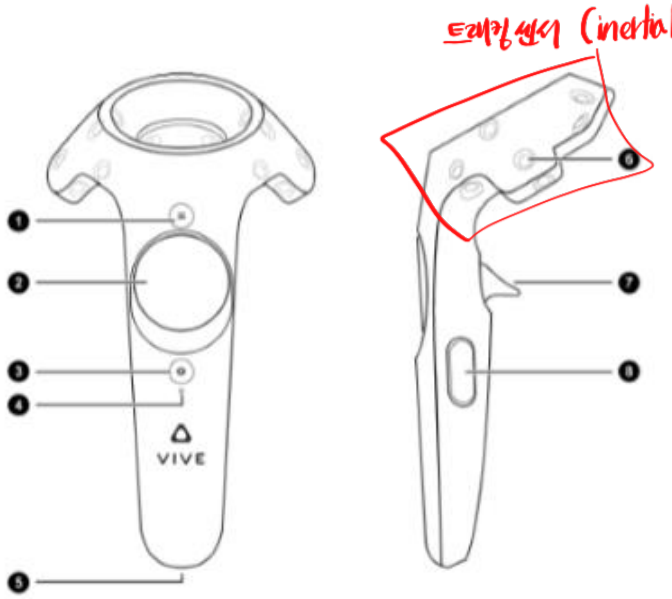
- Output Hardware – HUD
  - **Motion Tracking – Active (HTC VIVE)**

About the VIVE controllers

Use the controllers to interact with objects in the VR world.

The controllers have sensors that are tracked by the base stations.

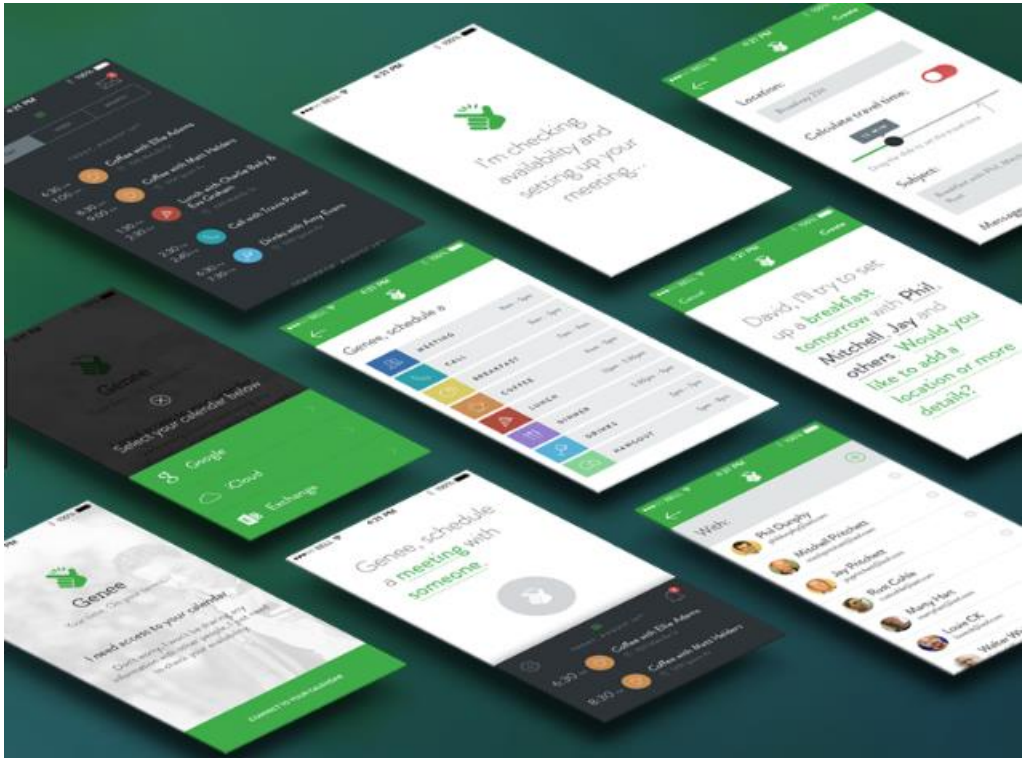
Important: The sensors on the controllers are sensitive. Do not cover or scratch the sensor lenses.



1	Menu button
2	Trackpad 2차원 공간 선택. (메뉴판)
3	System button
4	Status light
5	Micro-USB port
6	Tracking sensor → 3차원 모션 좌표 획득.
7	Trigger
8	Grip button

2.1 Application

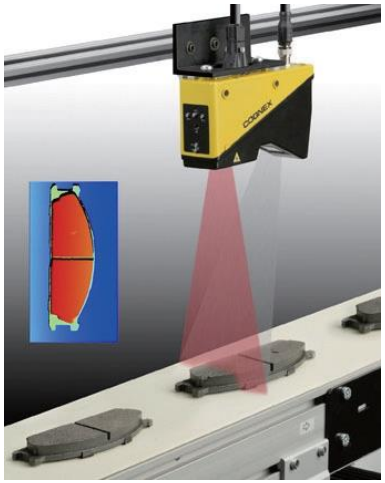
- Mobile



2.2 Application

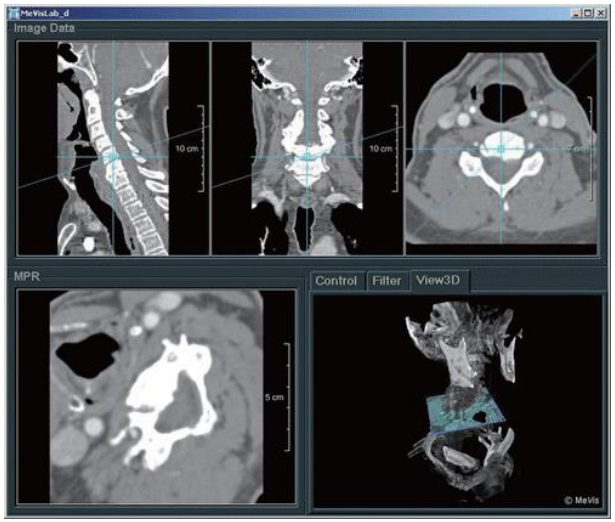
- 공장 자동화 분야

스마트 팩토리.



스마트 시티.

- 의료 분야 디지털 영상.
  컴퓨터 단층 촬영(CT)
  자기 공명영상 (MRI)
  양전자 단층촬영 (PET)



사람 ⟷ 컴퓨터.

└ 상호작용으로

컴퓨터가 대신 해결.

2.3 Application

- Games

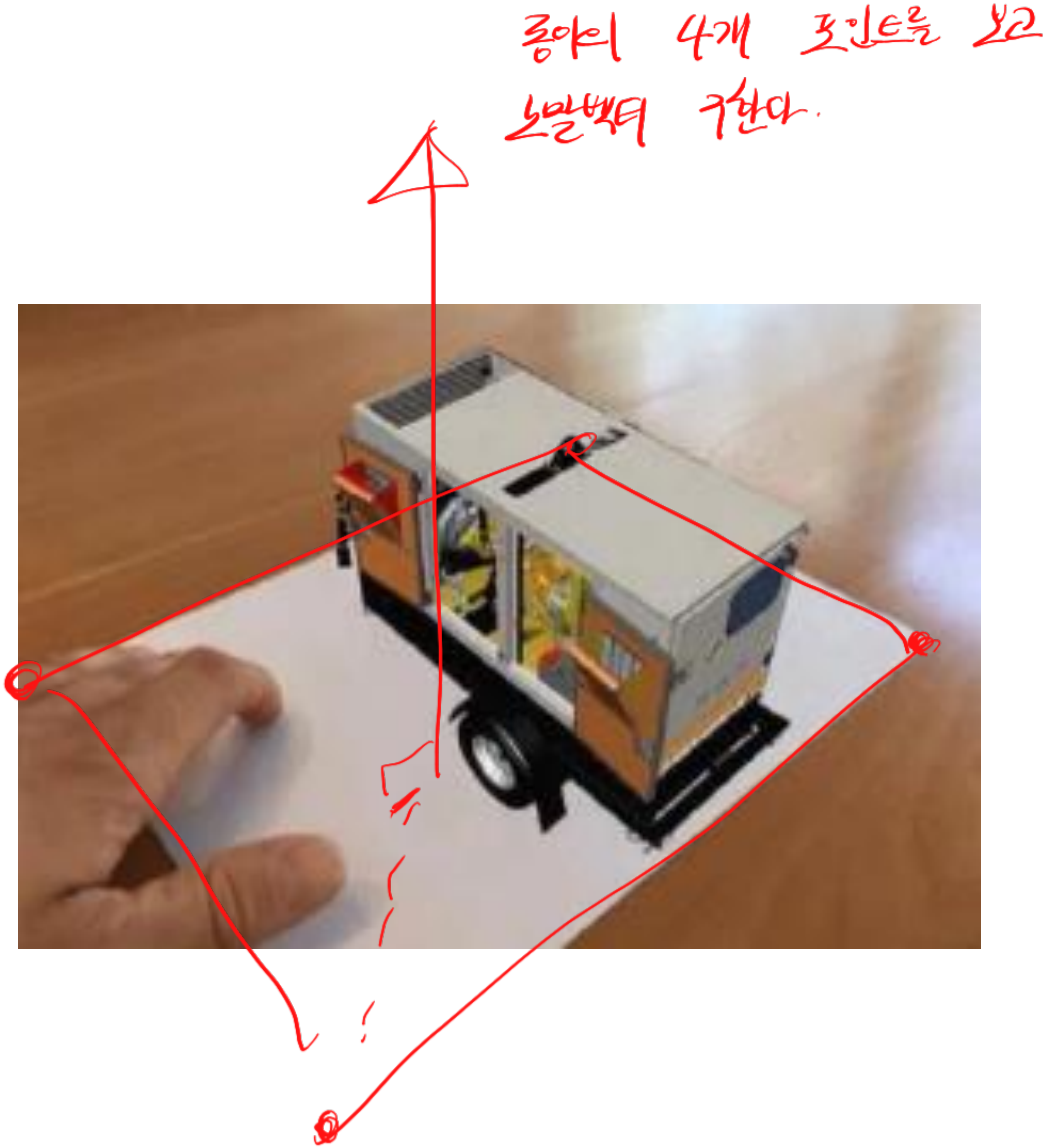
2.4 Applications

- VR Games

IEEE Conference on Virtual Reality and 3D User Interfaces

2.5 Applications

- Tablet AR



2.6 Applications

Multiple View 카메라

↓

여러 각도에서 물체 촬영 후 입체 영상으로 보관.

자동 카메라로 새로운 각도에서의 촬영 가능.

- Heritage and Tourism

- **Application Areas**

Heritage and Tourism

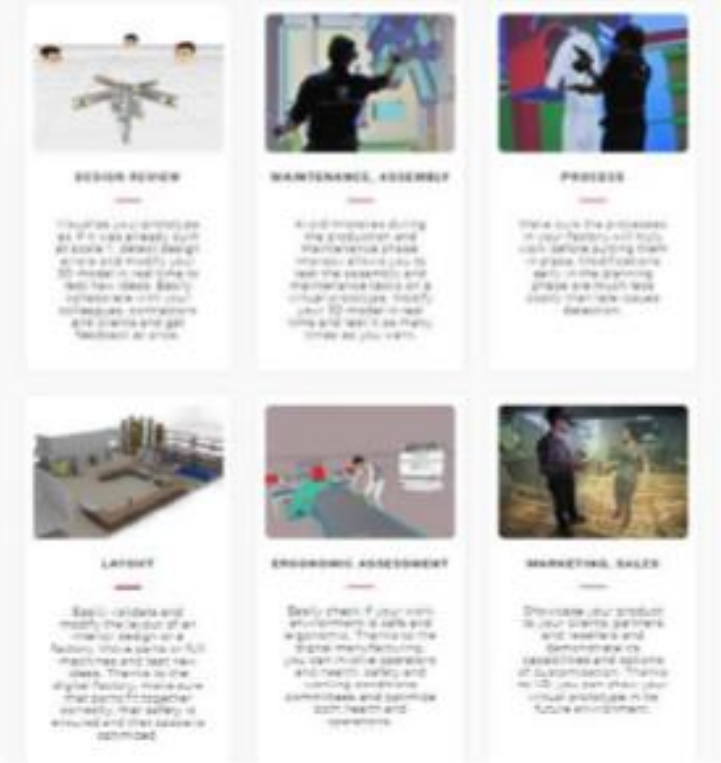
유적지 VR화.

https://artsandculture.google.com/project/openheritage

2.7 Applications

- Simulation and Training

Simulation and Training



Improov3

2.8 Applications

- Education

2.9 Applications

- Architecture and Construction