Part zero: Introduction

1. Background

Outline

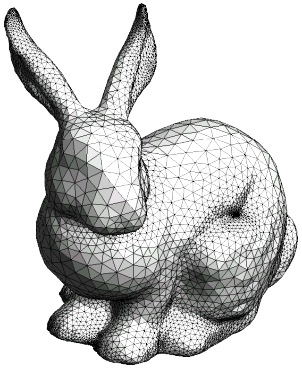
I. Graphic, 영상처리, AR
II. 영상처리
    A. 디지털 영상 획득
    B. 디지털 영상
    C. 디지털 영상 처리
    D. Display
III. Graphics
    A. 획득
    B. 렌더링
    C. Processing - GPU
    D. Output Hardware
    E. Interaction
    F. Applications

o. Graphic, 영상처리, AR

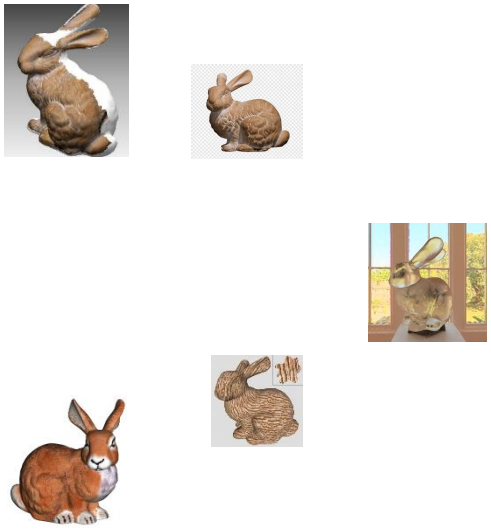
Real camera capturing

영상처리

Virtual camera



Modeling



Rendering

1. 영상 처리

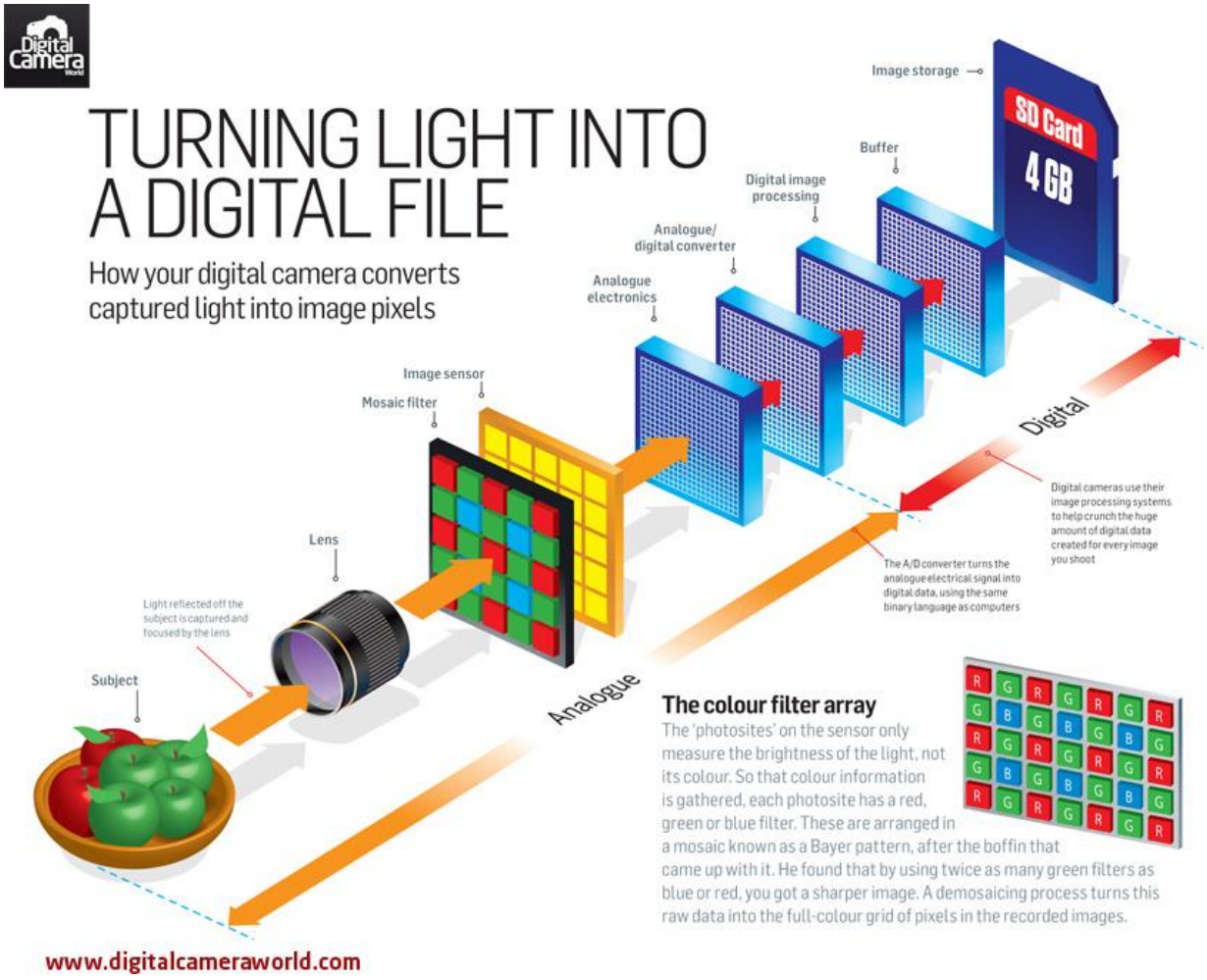
- 디지털 영상 획득

Real camera capturing

영상처리

1.1 디지털 영상 획득

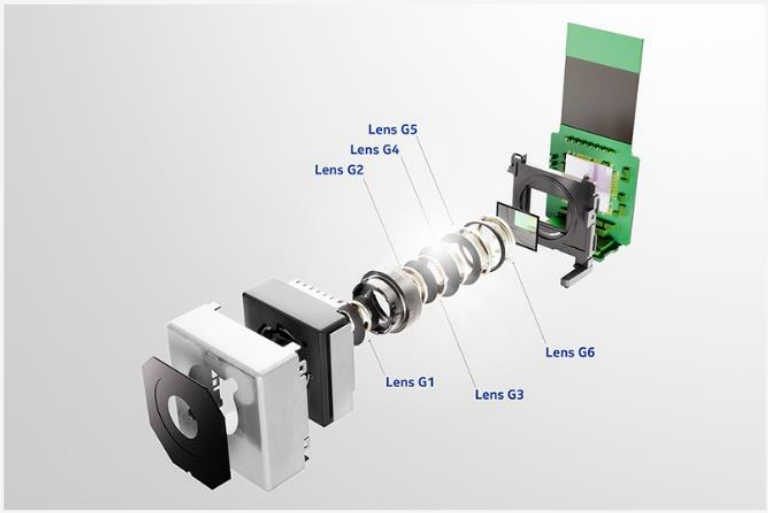
- 카메라



https://www.youtube.com/watch?v=XPec2EaBSSM

1.1 디지털 영상 획득

- Smart Phone



A breakout of the construction of Nokia's PureView camera

MOBILE : SOFTWARE

Google Camera Go Brings Some Google Camera Features to Low-Cost Phones

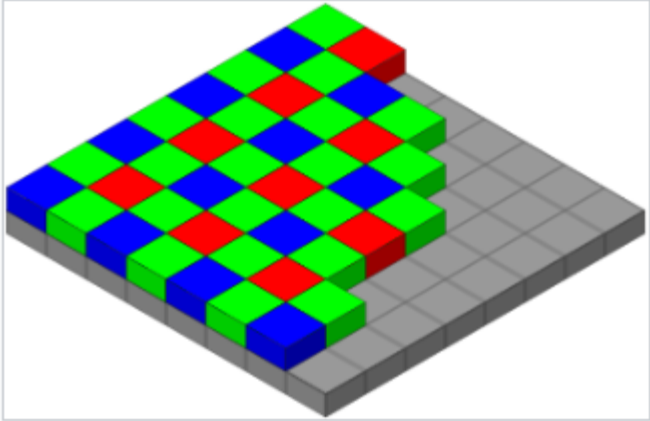
By Anil Ganti

Mar 19, 2020

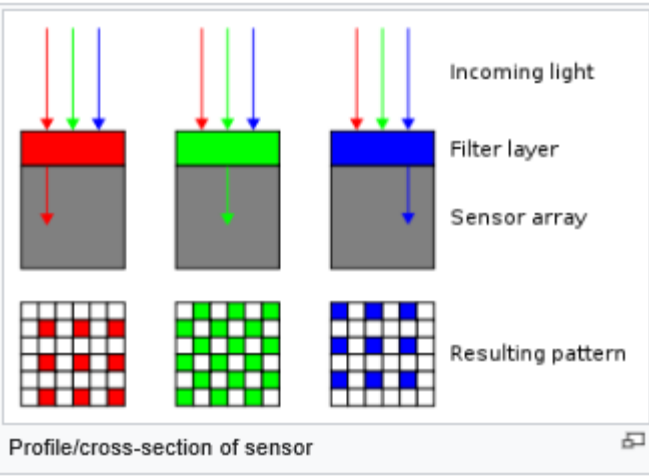
SHARE TWEET SUBMIT

1.1.1 Color 영상 획득

- Bayer filter



The Bayer arrangement of color filters on the pixel array of an image sensor



Profile/cross-section of sensor

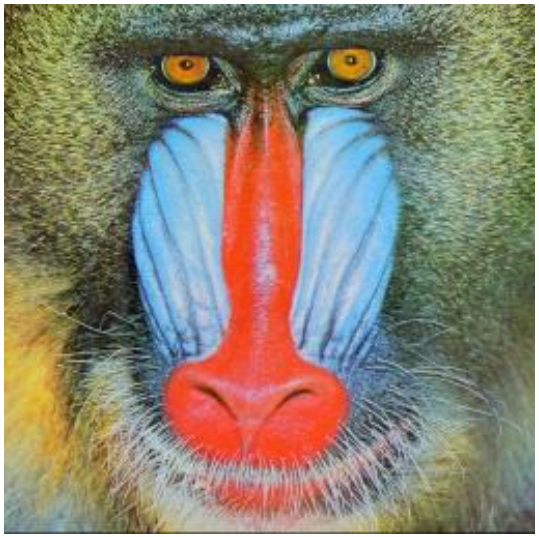
https://en.wikipedia.org/wiki/Bayer_filter

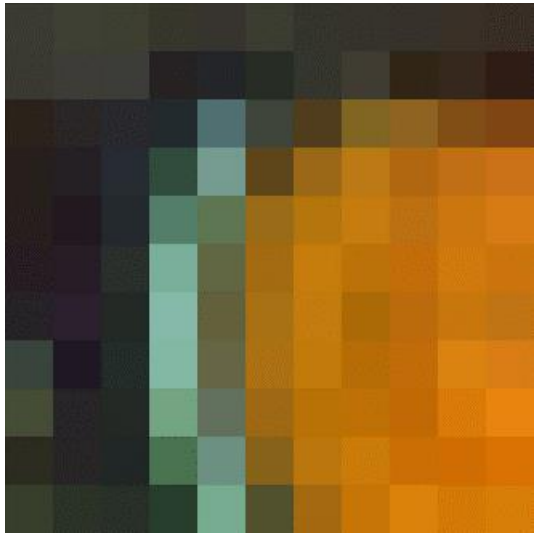
1.1.2 해상도

- Camera Resolution

https://photographylife.com/camera-resolution-explained

1.2 디지털 영상





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59	62	61	38	36	39	52	65	49	55	47
42	43	42	35	79	64	79	129	143	129	127
38	36	39	49	118	94	154	187	177	193	203
40	34	36	83	95	154	181	199	189	203	215
39	39	42	122	97	164	198	188	194	208	204
39	44	35	134	98	168	196	172	187	200	193
57	31	36	130	102	172	194	184	193	219	217
70	40	36	115	98	158	185	191	193	219	233
44	39	33	73	108	135	187	203	204	207	217
55	43	41	38	120	82	164	200	218	212	214

51	52	50	44	47	49	44	45	44	40	40
50	55	56	35	41	37	45	50	22	30	21
27	39	46	45	113	60	29	35	33	21	20
28	36	50	60	145	26	23	21	15	20	24
30	32	45	105	83	23	14	16	18	15	20
34	39	44	156	67	18	12	9	10	14	14
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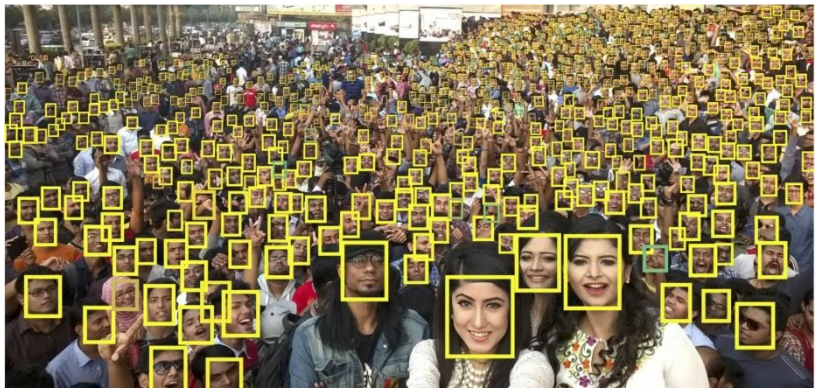
43	39	42	43	144	45	17	8	10	5	6

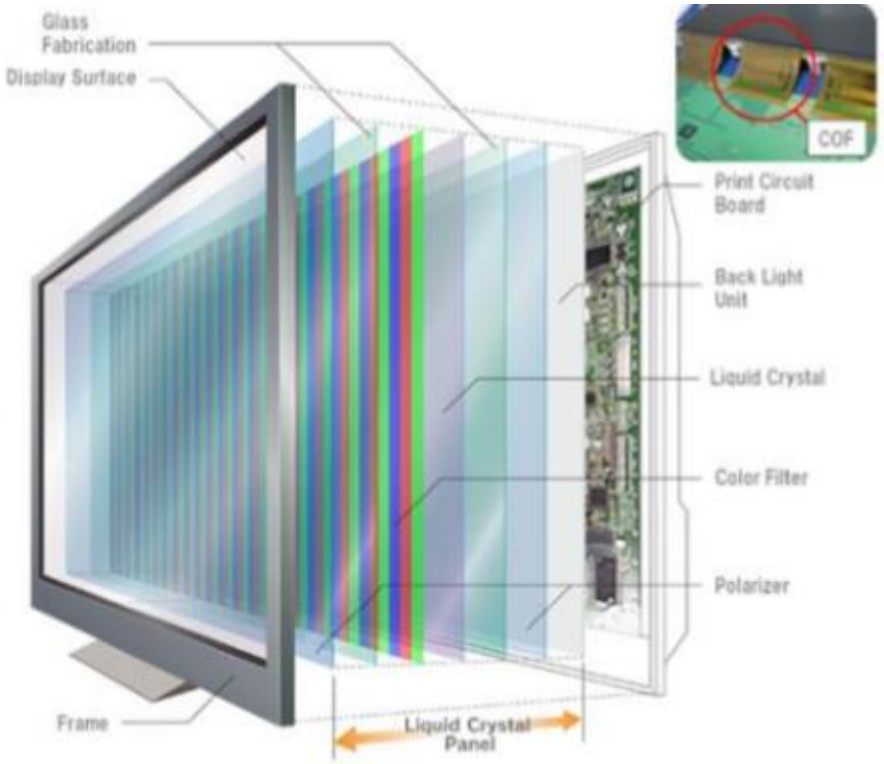
59	64	63	55	52	61	53	51	50	48	46
58	61	61	34	38	44	54	60	37	40	29
35	38	41	42	111	69	61	101	99	78	70
31	32	44	76	155	69	104	122	103	111	113
31	24	41	126	118	108	118	124	112	118	123
29	29	48	175	102	107	125	114	109	122	116
35	32	41	185	97	113	124	106	106	119	116
69	23	45	184	101	113	122	109	108	131	125
77	37	41	165	112	105	114	113	105	123	133
44	38	39	115	144	98	118	124	111	109	113
62	51	48	62	172	81	105	117	130	121	126

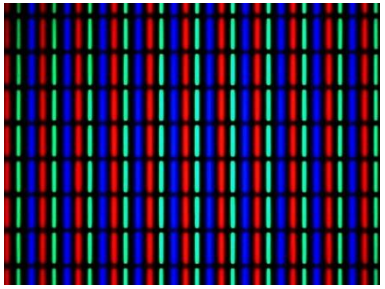
1.3 디지털 영상처리 예



1.4 디스플레이

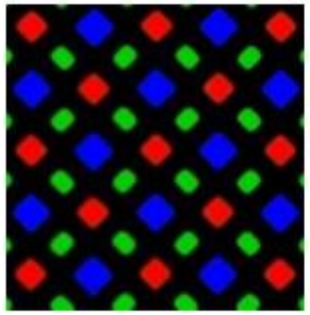
- LCD


Glass Fabrication
Display Surface
COF
Print Circuit Board
Back Light Unit
Liquid Crystal
Color Filter
Polarizer
Frame
Liquid Crystal Panel



1.4 디스플레이

- OLED

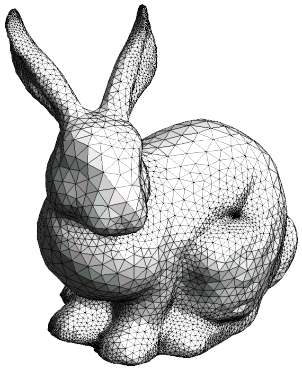


1.5 입체영상

- 스테레오 카메라-> 3D Display

2. 그래픽스

Virtual camera

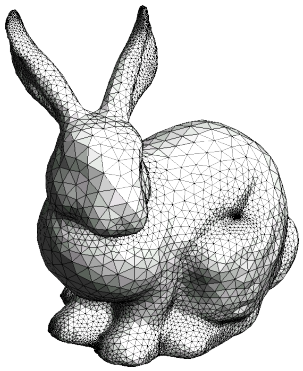


Rendering

2.1 획득

- 획득 - Model

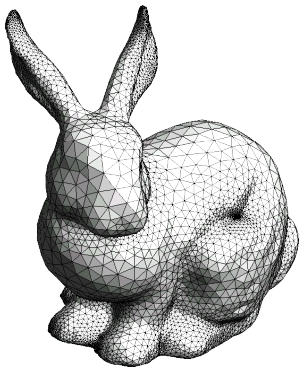
Virtual camera



Model

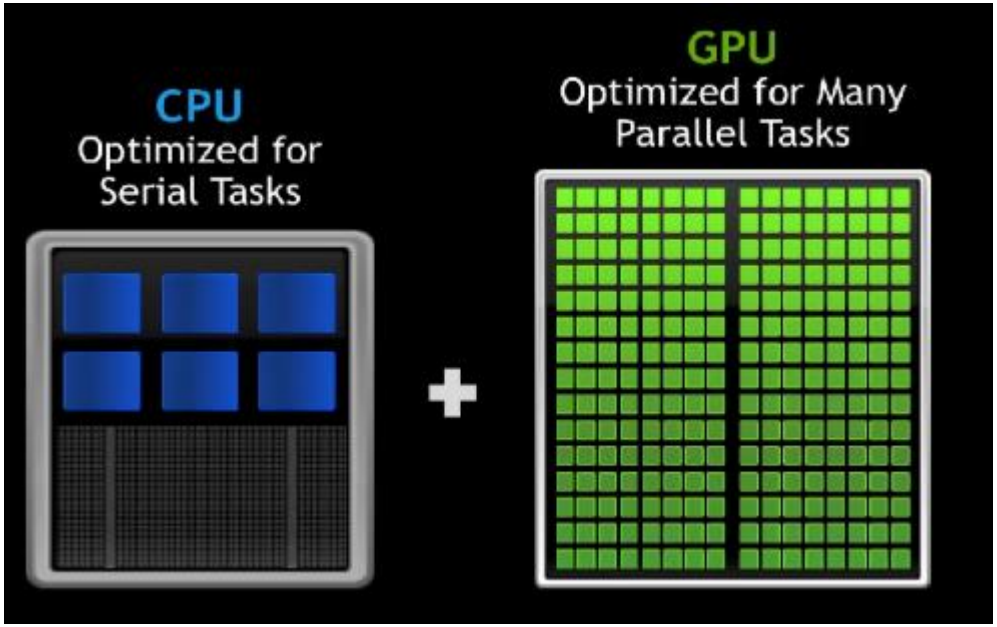
Vertex
Mesh
Curve
Spline
Coordinate
Transformation
Animation

2.2 Rendering



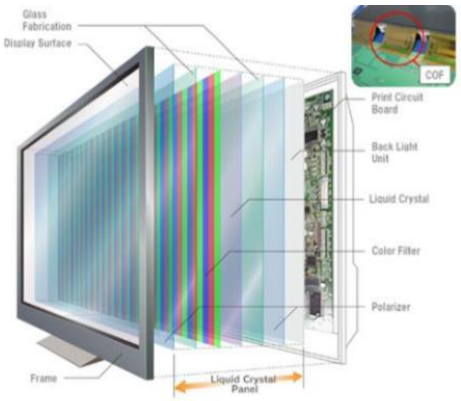
Rendering

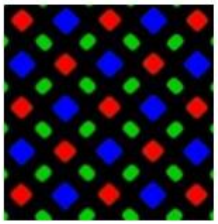
2.3 Processing - GPU



2.4 Output H/W

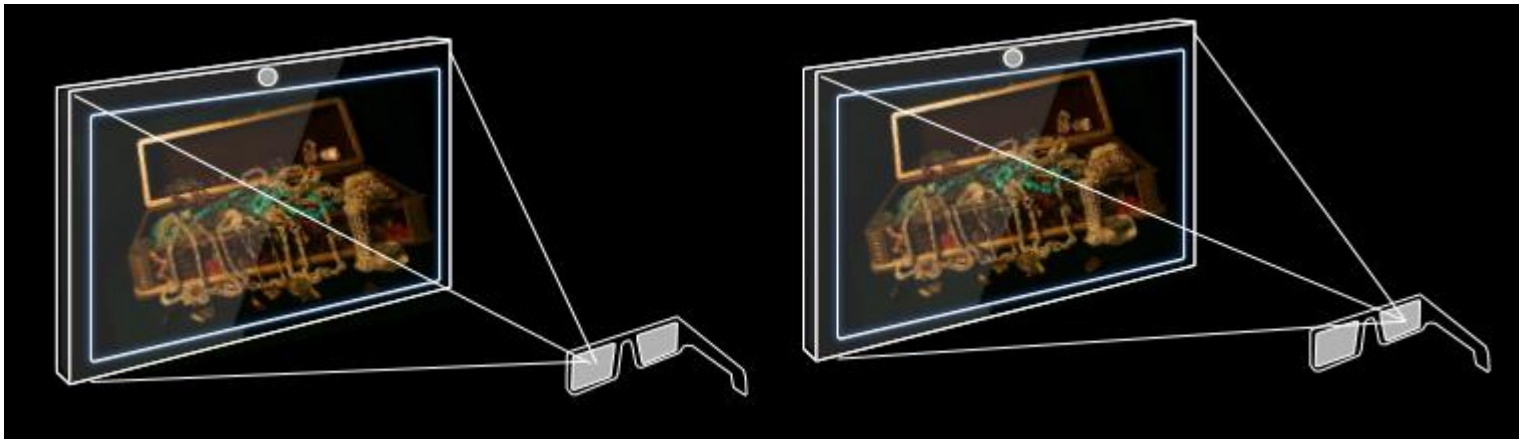
- Smart Phone, Tablet, Monitor





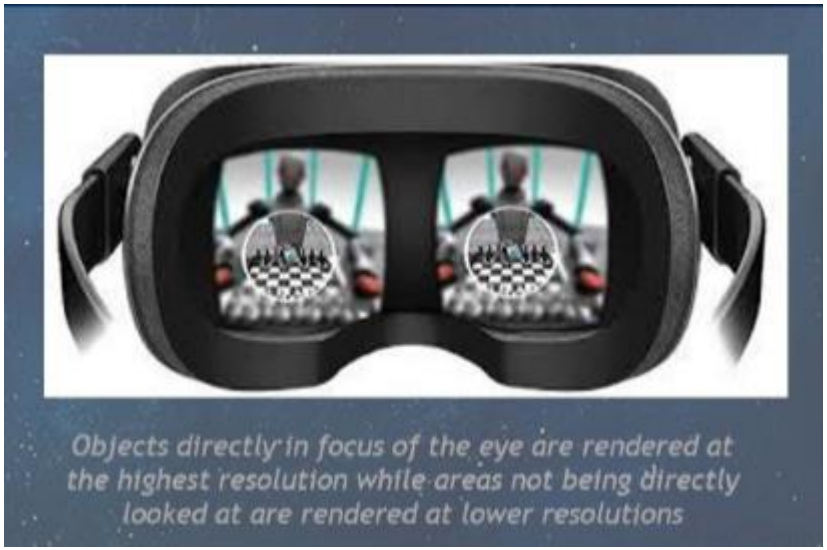
2.4 Output H/W

- 3D Display



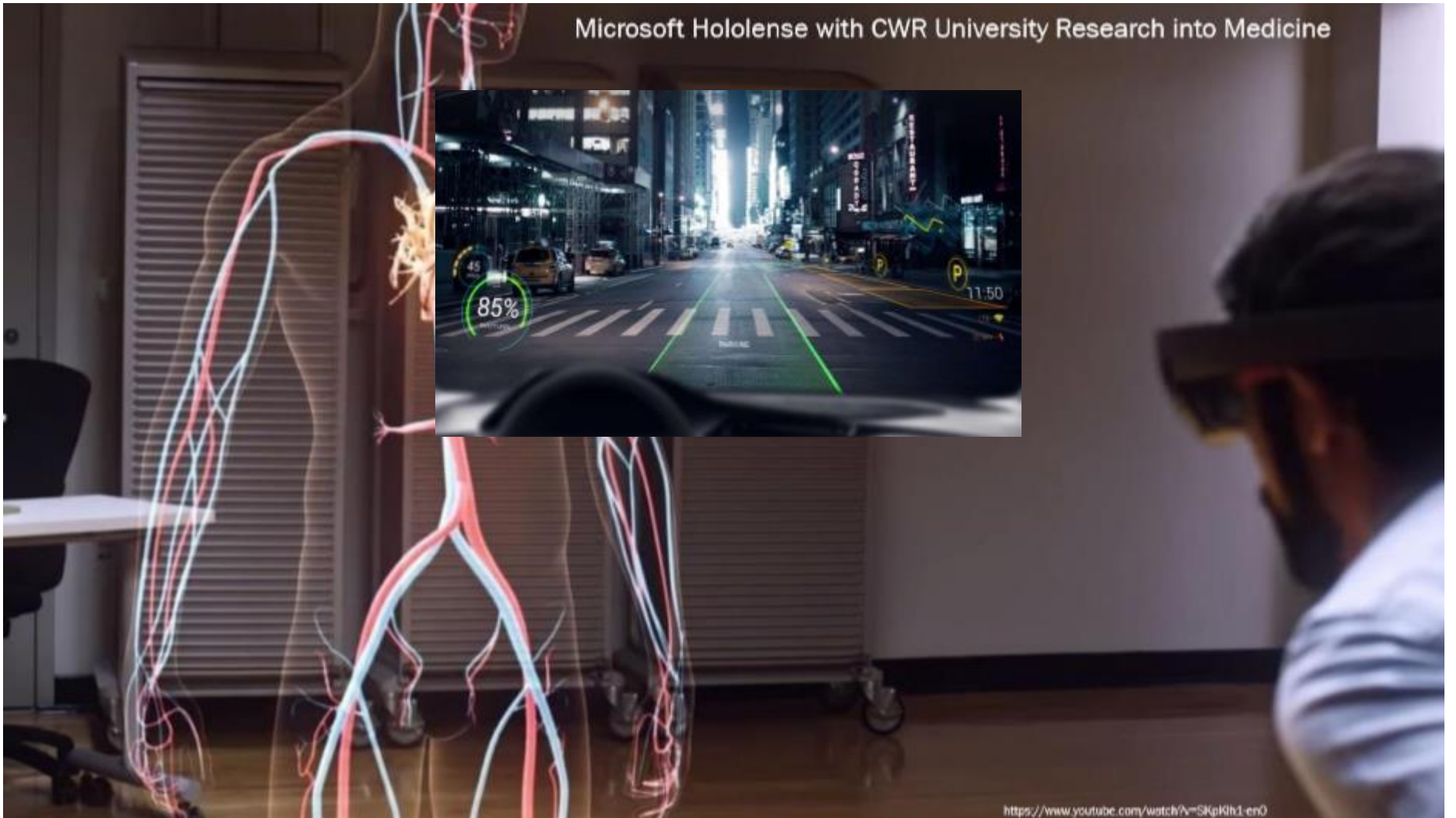
2.4 Output H/W

- Output Hardware – VR



2.4 Output H/W

- Output Hardware – AR



2.4 Output H/W

- Output Hardware – HUD

2.5 Interaction

- Output Hardware – HUD

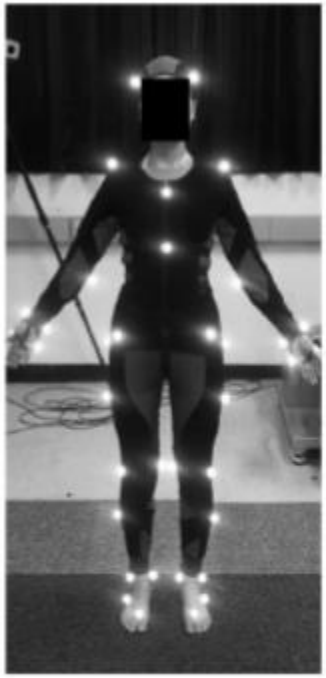
2.5.1 Body Input

- Depth

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

2.5.1 Body Input

- Body and Hand Motion

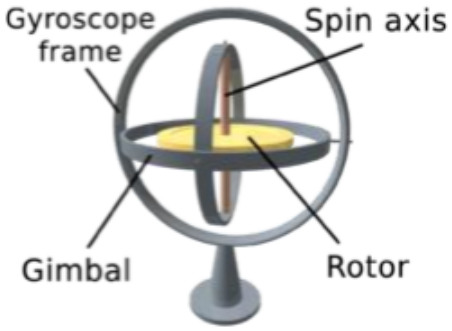


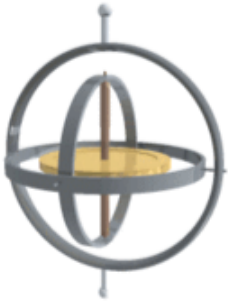
2.5.2 Motion 인식

- **Inertial Sensing**

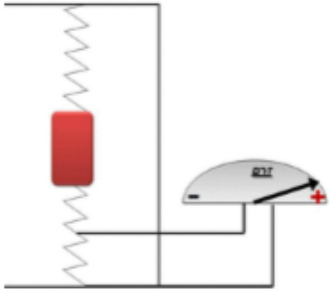
  Inertial sensors use a variety of inertial measurement devices, such as angular rate gyroscopes, linear accelerometers, and magnetometers.

  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.





gyroscope



accelerometer

magnetometer

2.5.2 모션 인식

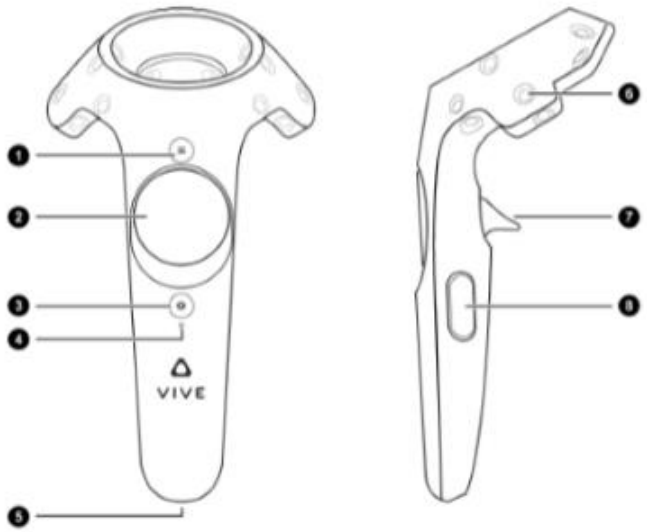
- Output Hardware – HUD
  - **Motion Tracking – Active (HTC VIVE)**

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.

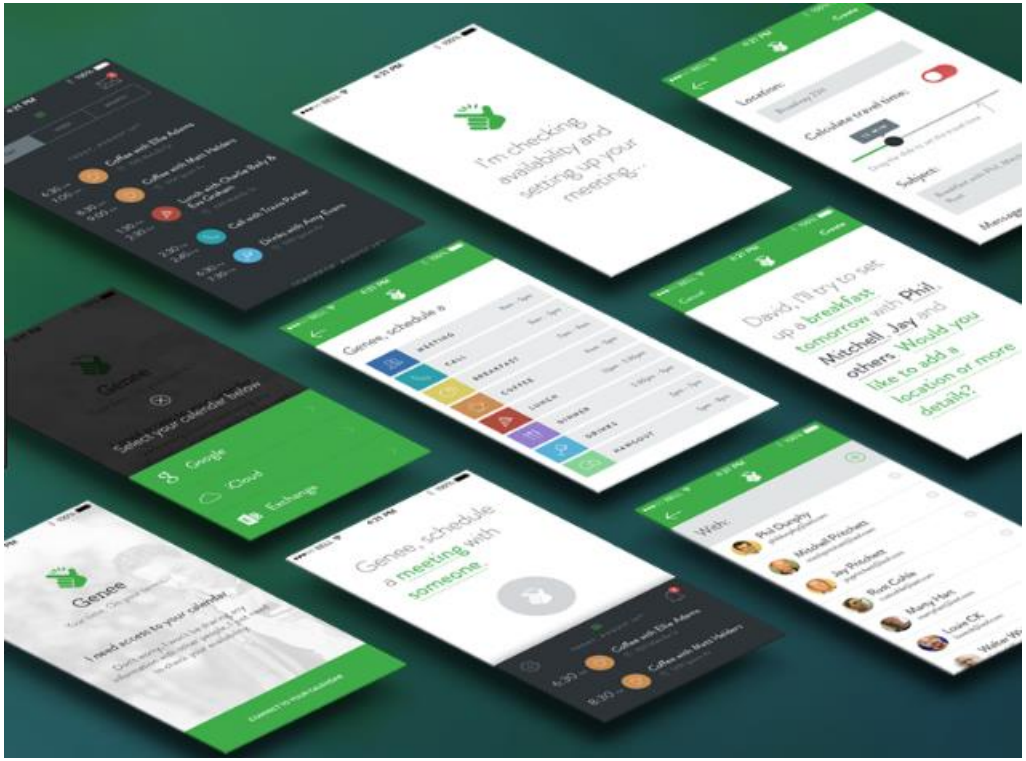
Important: The sensors on the controllers are sensitive. Do not cover or scratch the sensor lenses.



1	Menu button
2	Trackpad
3	System button
4	Status light
5	Micro-USB port
6	Tracking sensor
7	Trigger
8	Grip button

2.6 Application

- Mobile



2.6 Application

- Games

2.6 Applications

- VR Games

IEEE Conference on Virtual Reality and 3D User Interfaces

2.6 Applications

- Tablet AR

2.6 Applications

- Heritage and Tourism

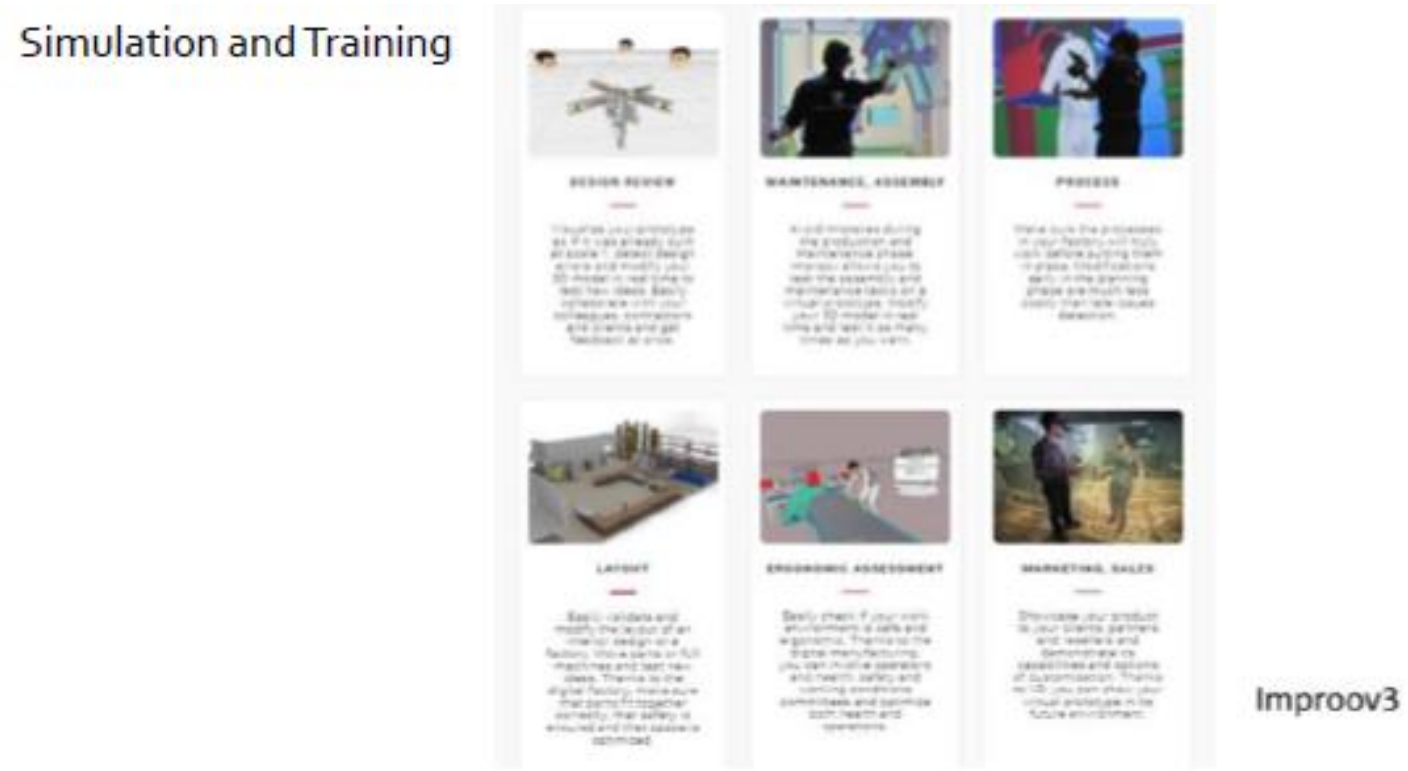
- **Application Areas**

  Heritage and Tourism

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

2.6 Applications

- Simulation and Training



2.6 Applications

- Education

2.6 Applications

- Architecture and Construction