

Input Device: Scanner (3D)

CSE 315

Peripherals & Interfacing

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Scanner : 3D

- A 2D scanner with **Z** dimension
- It is able to analyze a real world object in all the (X, Y, Z) dimensions
- This type of scanner is specially used in entertaining industries (movie & gaming)



3D Scanner : Functionality

- To create a **point cloud** of geometry samples
- These points are then used to redraw the object
- As like as camera, a 3D scanner can only collect information of an object that is obscured

3D Scanner : Classification

- Depending on the technology
 - Contact 3D Scanner
 - Non-contact 3D Scanner
 - Non-contact Active
 - Non-contact Passive

3D Scanner : Contact

- Scan through physical touch
- This is basically a scanner with **CNC** (**C**omputer **N**umerical **C**ontrol)
- There is a mechanical system available that holds the scan unit
- This system can move in any direction
- E.g. **C**o-ordinate **M**easuring **M**achine (**CMM**)

3D Scanner : Contact

- Contact 3D Scanner is used in manufacturing industries
- Cons: Need physical contact



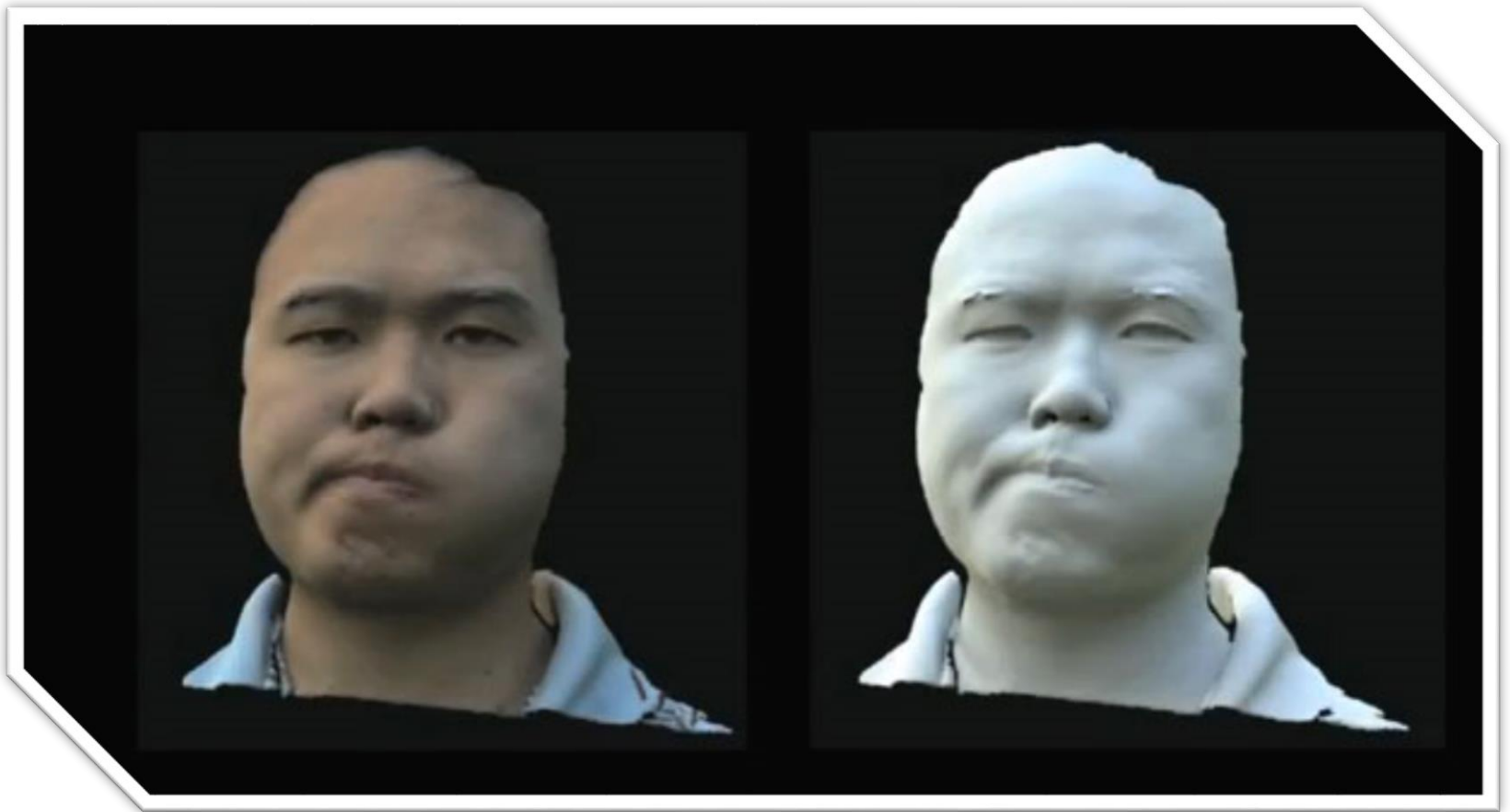
3D Scanner : Non Contact

- This type of scanner do not need any contact with the target object
- Instead of Physical contact, radiation is used
- Radiation could be LASER, IR or VR
- Depending on the radiation these are
 - Active (NCA): Uses external light resource
 - Passive (NCP): Uses the reflected light

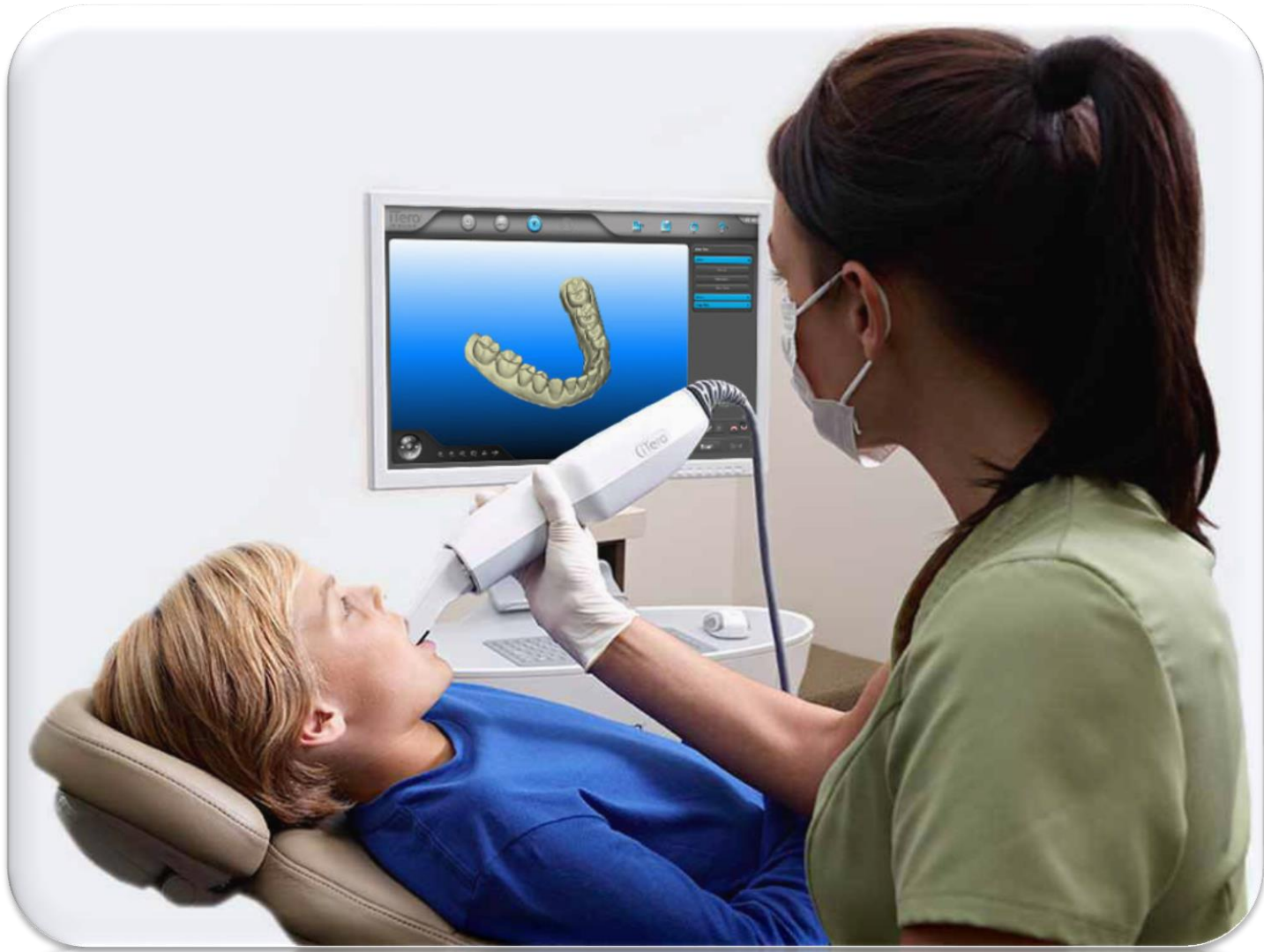
3D Scanner : NCA & NCP

- Name of some NCA
 - Time-of-flight: Uses LASER
 - Triangulation: Uses LASER
 - Conoscopic Holography: Uses LASER
 - Hand held: Uses LASER
 - Structured light: Uses VL
 - Modulated light: Uses VL
 - Volumetric: Uses X-Ray
- NCP uses reflected light from the target object

3D Scanner : Screenshot



3D Scanner : Screenshot



3D Scanner : Screenshot



3D Scanner : Applications

- Creating **CAD** (**C**omputer **A**ided **D**esign) models of real object
- Building (house) modeling
- Product quality assurance
- In dentistry
- In cancer
- In gaming

Camera Vs Scanner

Key Point	Camera	Scanner
Dimension	Creates an image from 3D to 2D	Creates an image from 2D to 2D or 3D to 3D
Portability	Portable	Non-portable
Resolution	Higher	Lower
3 rd Party software	Not Necessary	Necessary
On system monitor	Available	Not Available

Thank You