

Artificial Intelligence, Projection Mapping, Augmented Reality....oh my

An introduction to the terms that
will drive us into the next decade.

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Keyence

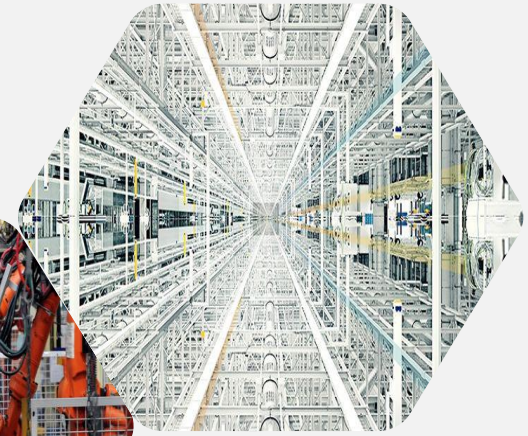
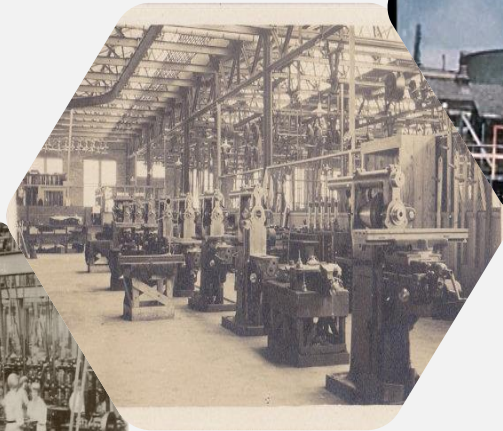
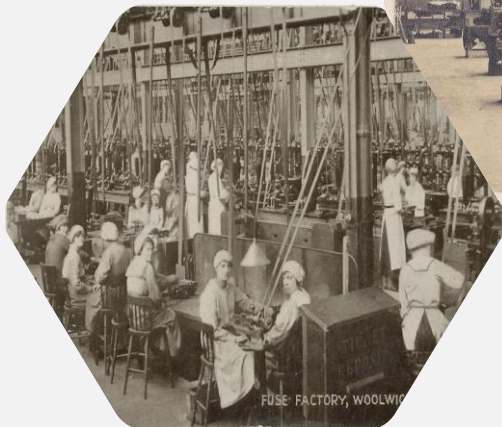


Why are we here?

No...that's a different lecture

Any time a new age comes to humanity, it impacts manufacturing first.

- Bronze Age
- Iron Age
- Middle Age
- Renaissance
- Industrial Age
- Space Age
- Information Age



We are now firmly in the Information Age. Are you ready?

- How can you prepare?
- What is there to learn?
- Where do I get started?

Technology can be scary

The number one reason that people fail to adopt new technology is a lack of understanding

Let's get you caught up

- **Artificial Intelligence** – Rise of the machines
- **Projection Mapping** – Holograms 1.0
 - **Structured Light** – Ripples in a pond
- **Augmented Reality** – A whole new world inside your own
 - **Virtual Reality** – Now you see me
- **Industry 4.0** – The ever connected factory
- **Cloud Computing** – Making it rain data





Artificial Intelligence

The Rise of the Machines

Artificial Intelligence (AI)

When will my toaster assault me?

What is it?

- “AI” is a buzzy word for smart computers. But today we do use Machine learning.
- This is the process of using software to find patterns in large sets of data.

Scenario

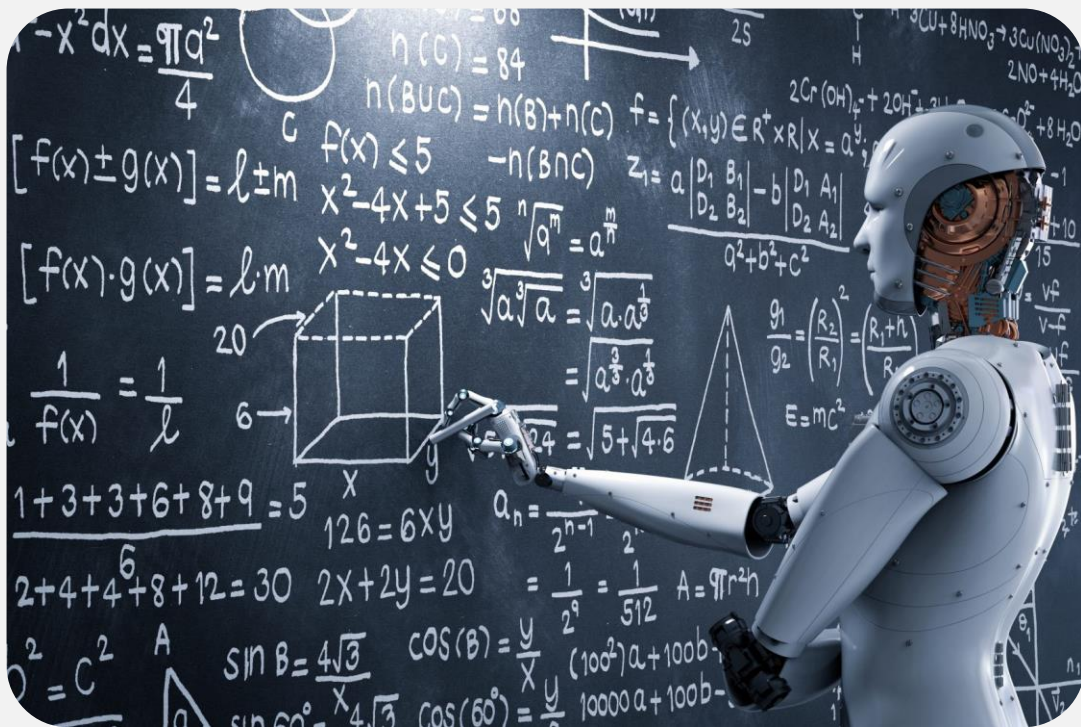
- There are 3,035 Stop lights in the city of Chicago.
 - Each color light lasts roughly 10,000 hours
 - Red is the most frequently ‘on’ color
 - The avg red light is 120 seconds
 - Could you predict when one of these stop lights will need it’s bulb changed?



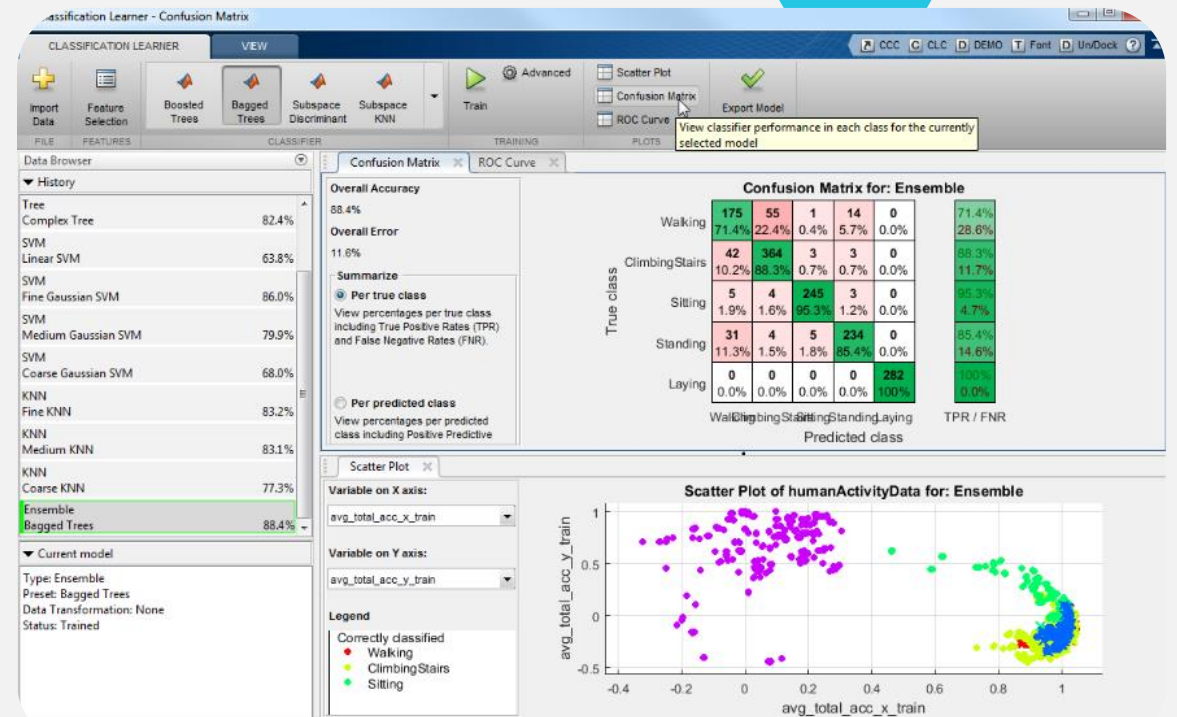
Scenario 2

- You go golfing every Saturday
- You never golf when it’s raining
- You never golf when it’s below 55 F
- What is the likelihood that you will go golfing on April 27th?
 - Now do this for the 13,000 people who go to Pebble Beach each year.

It looks less like this



And more like this...



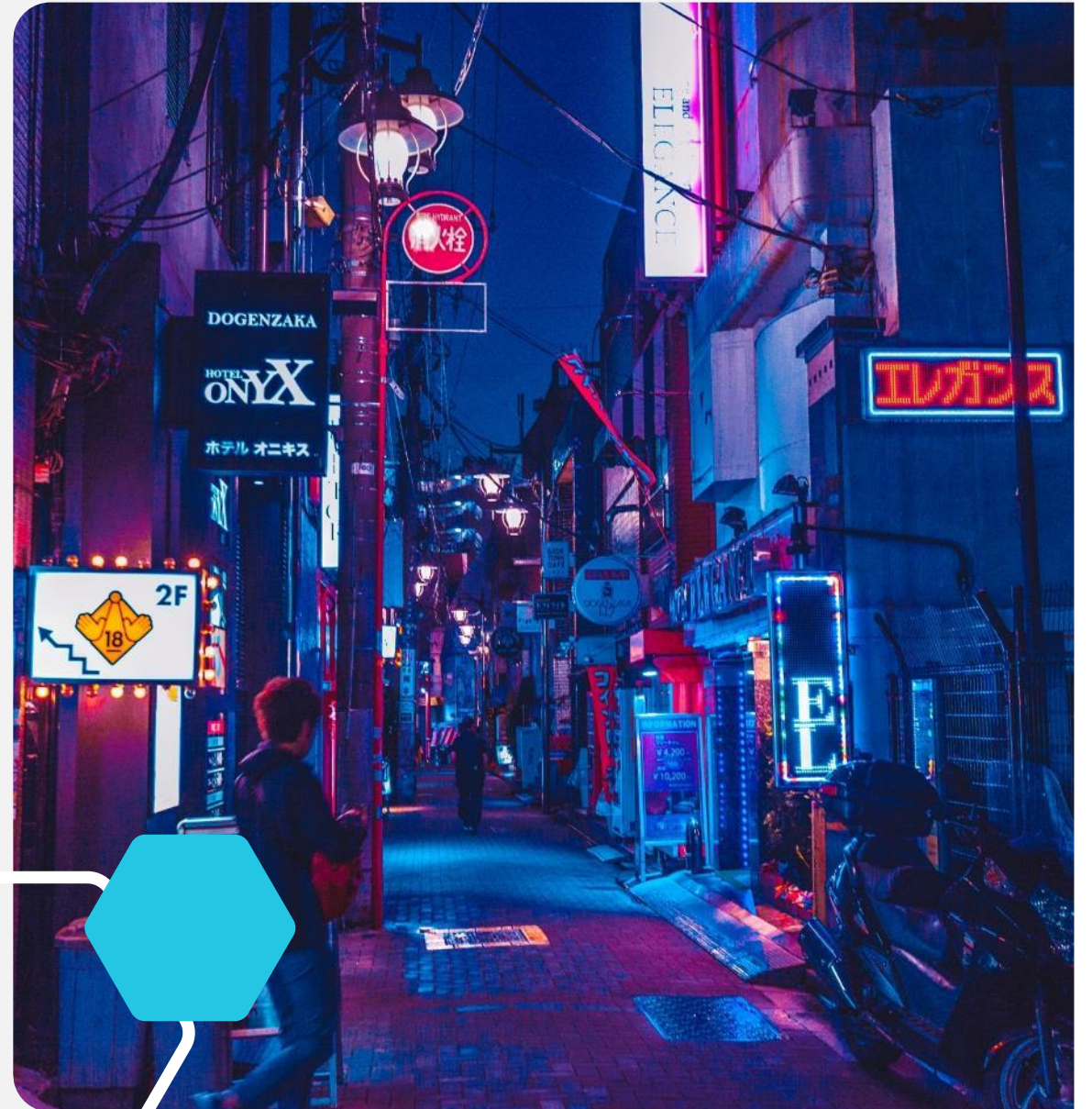
So how do I use it?

- You want to program a vision camera to accept good parts and fail bad parts.
- Instead of needing someone to program it, simply present it 30 good parts.
- The software will find the patterns between them that makes them 'good'.

Or

- Imagine feeding the results of your CNC machines to a software.
- After watching your machine long enough it can predict the failure time of a cutting bit.

In the past we have needed data scientists to do this work. Now it can be done with a simple software package.





Projection Mapping

Holograms 1.0

Projection mapping concepts

Use of cameras and projectors together to put an image where you want it.

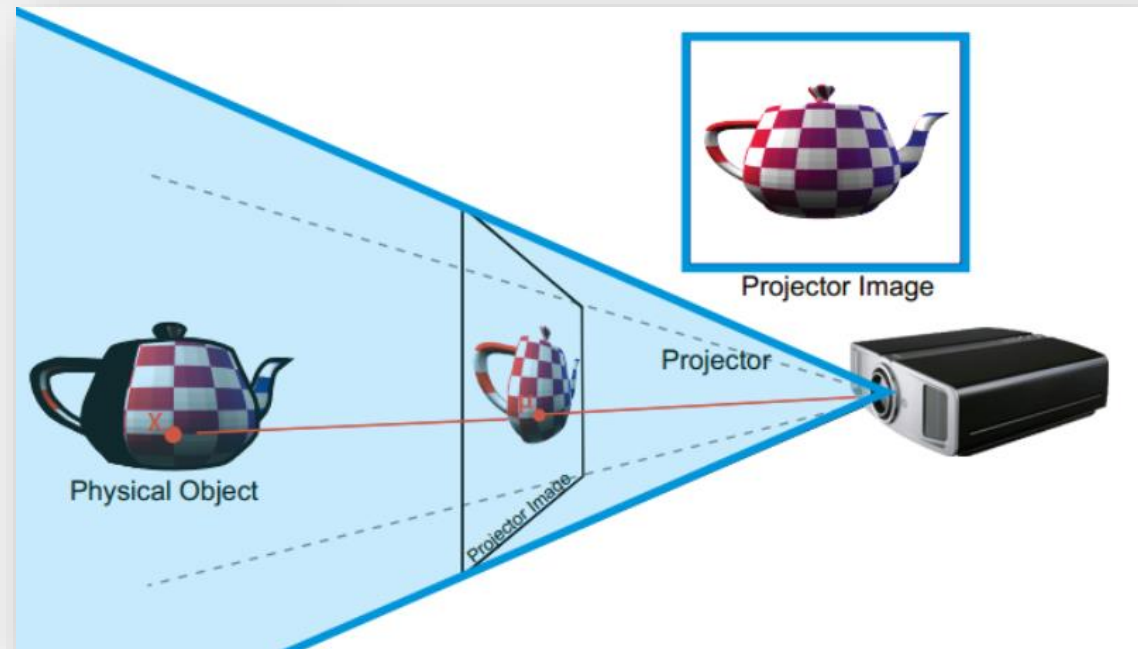
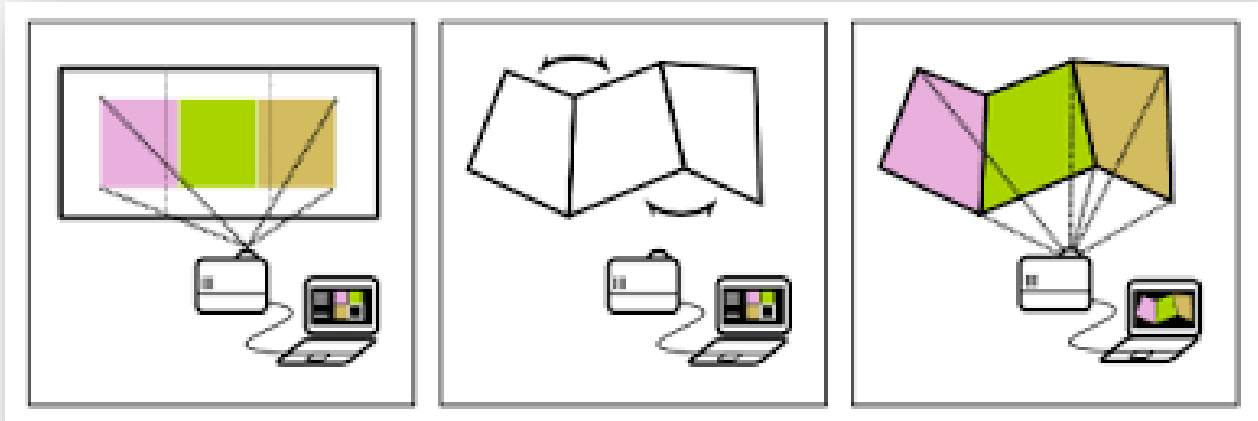
Carrie Underwood @ 2013 Grammys



Holoteq BMW Technology Demo



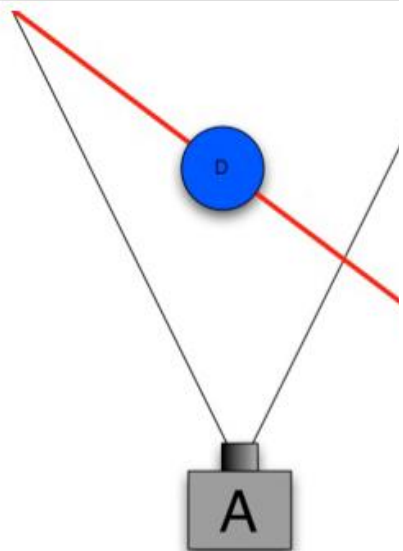
How does it work?



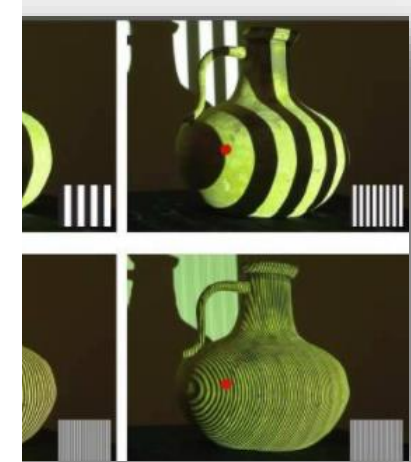
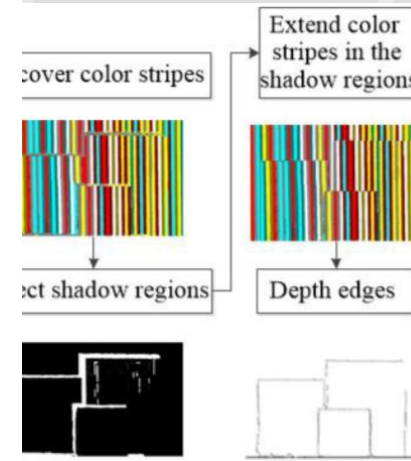
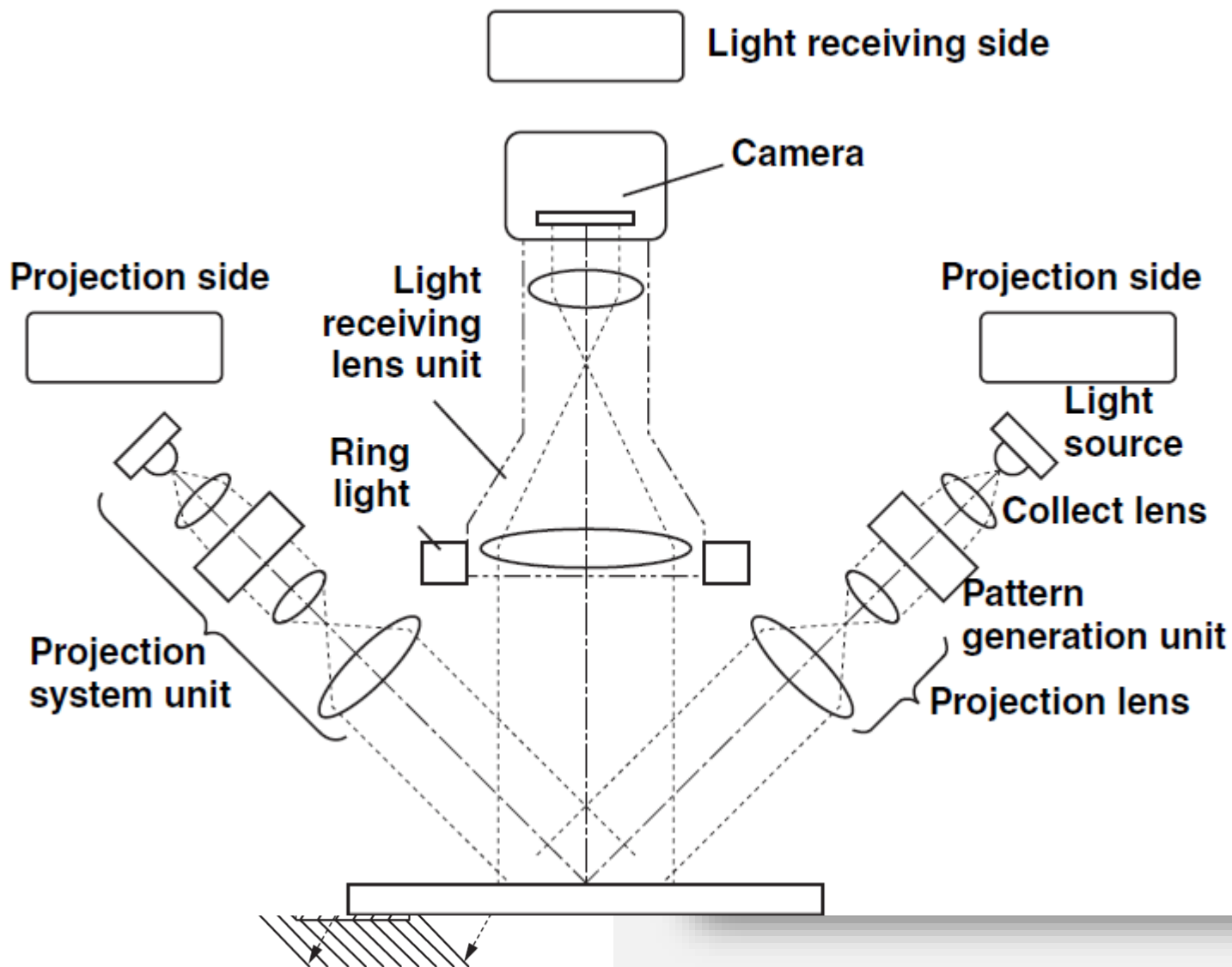
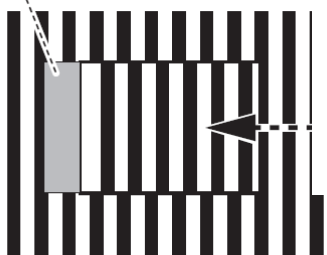
Using it not only to show, but collect data

What happens when

It turns into

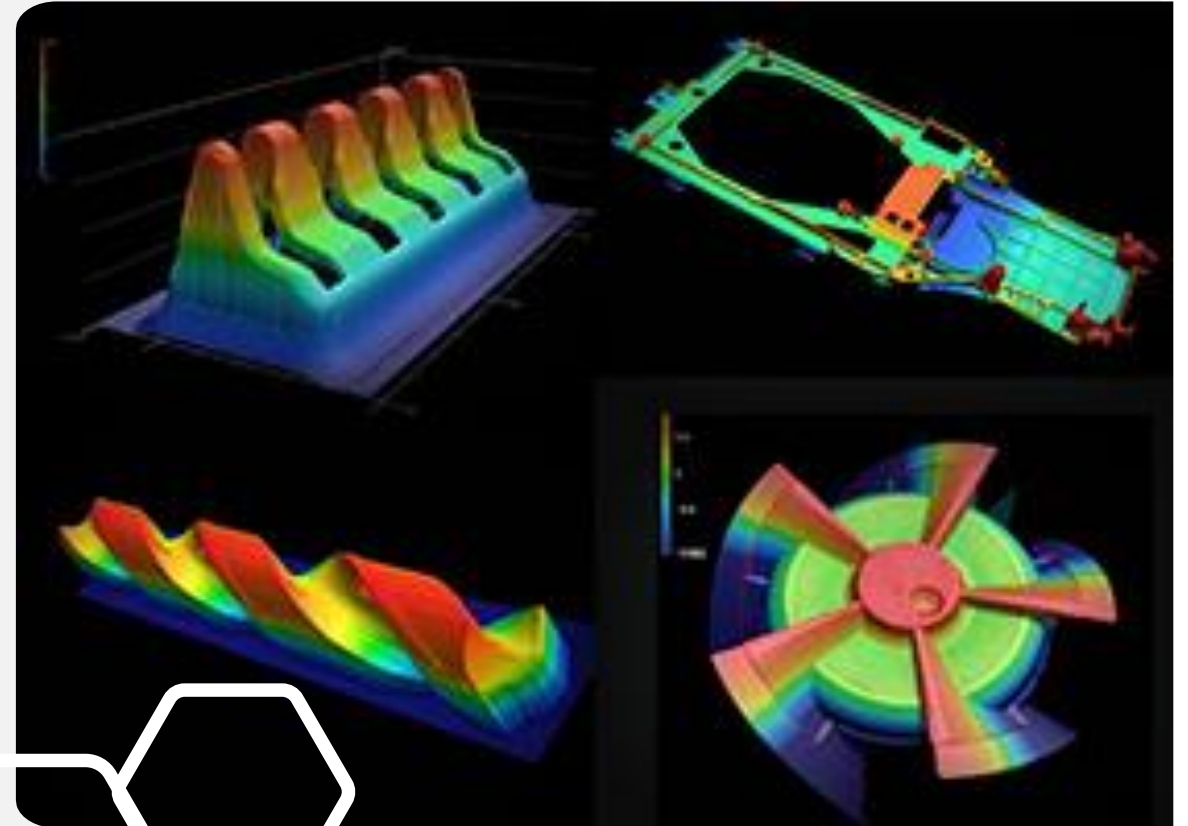


Shadow



So how do I use it?

- As the known light pattern shifts around the part deviations in height and size will stretch that known pattern.
- Once the location, shape, and orientation of a part is determined it becomes easy to recreate it in 3D space.
- This allows for fast, high detailed, non contact 3D models



Now imagine hooking this up to a 3D printer.

SERVICE & MAINTENANCE AUGMENTED REALITY

Augmented Reality

Seeing a whole new world



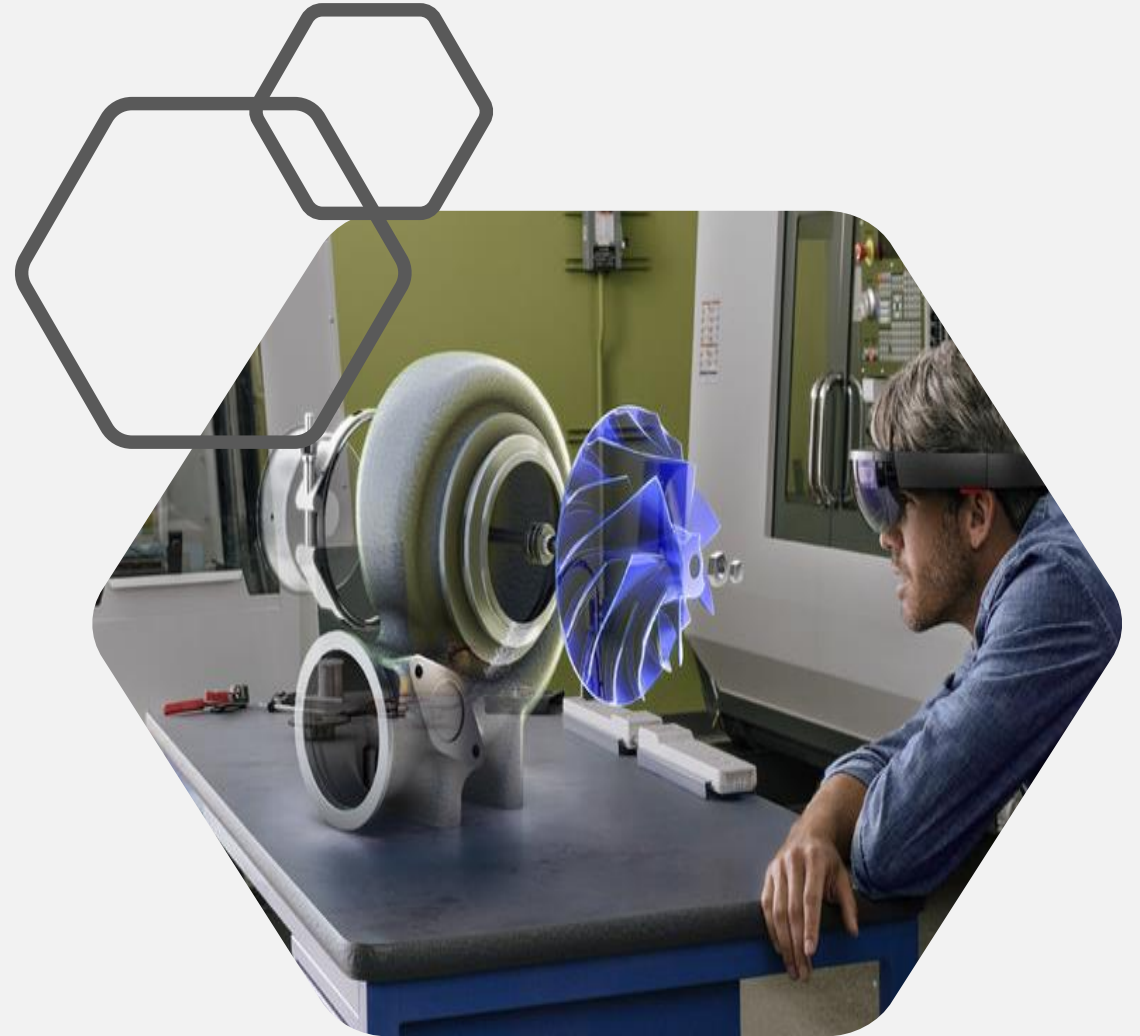
Augmented Reality

What is it?

Augmented Reality (AR) is the use of cameras and either screens or projectors to make artificial objects appear to interact with the real world.



Pokemon Go



Microsoft HoloLens

Augmented Reality

- The biggest advantage to Augmented Reality is in getting complete information to a user.
- No more need for individuals to use their imagination for where something should go, or how it should look when assembled.
- Imagine building a piece of Ikea furniture.
- Now imagine that when you turn to page 3 two boards light up to show you exactly which ones to use.



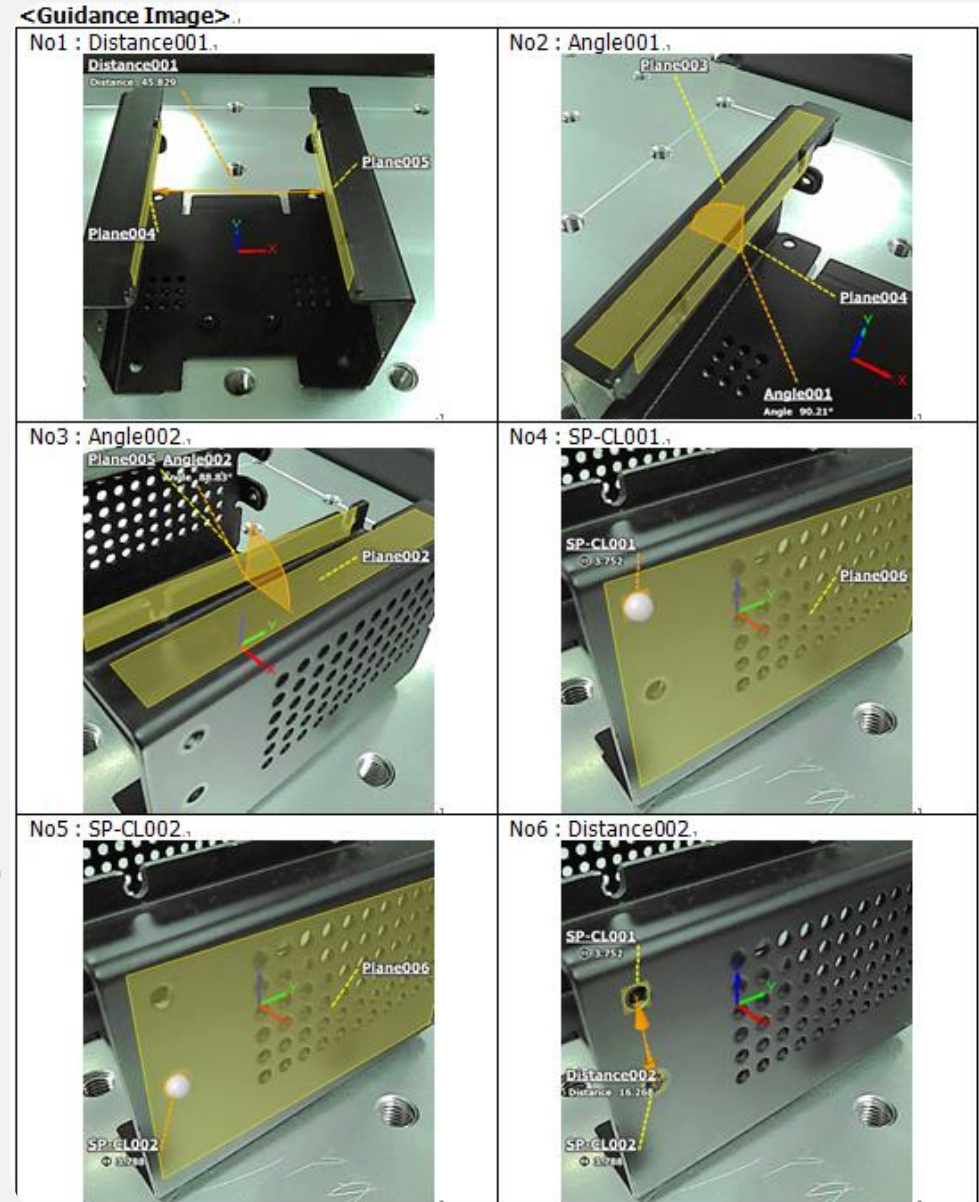
Imagine screens in your glasses to show GPS

So how do I use it?

- The technology can be used for Assembly, Training, inspection, just about anywhere that additional information and feedback is critical to the user.
- Training Simulators
- Visualized inspection work flows



Miller Electric Welding Trainer



Keyence XM Handheld CMM

Augmented Reality vrs Virtual Reality

What is the nature of reality?



Samsung GEAR

Virtual Reality (VR) and Augmented Reality (AR) share some similarities in that both involve interacting with computer generated images.

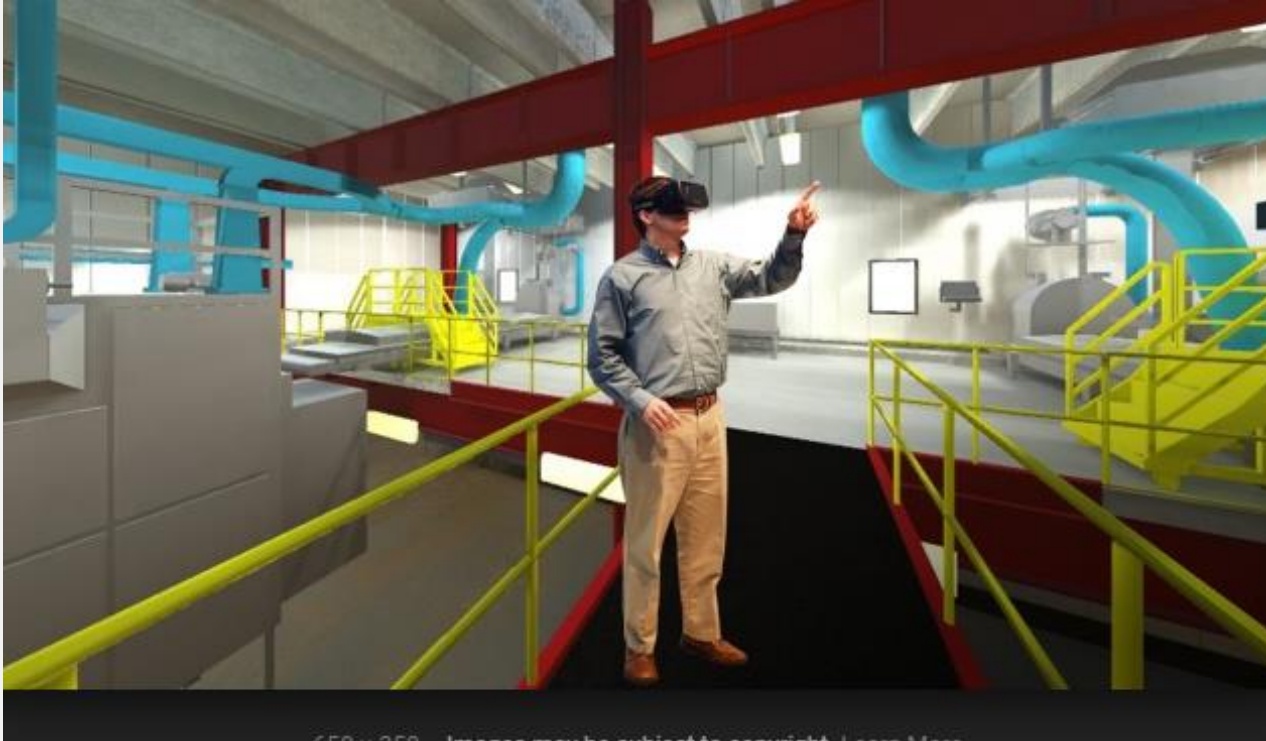
In Virtual Reality the entire image is computer generated.

In Augmented Reality computer images are overlaid on top of the real world.

The core advantages being that in VR one can be taken to any place. AR is limited to the places that you are currently.

Augmented Reality vrs Virtual Reality

What is the nature of reality?



Imagine you want to survey the construction of a new facility overseas.

Someone could send you pictures, but wouldn't it be better to walk around the facility and see it "with your own eyes"?

Use of 360 degree cameras can allow anyone to do this.



Facebook Surround 360









Failure to adapt is true failure.



Thank You

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