

# An Overview of Commercial Virtual Reality, Application and Social Consequences

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# Definitions

- Virtual Reality (VR)
  - technologies that bring virtual things into real world
- 3 major types of VR
  - \* Not well-defined

Type	Features	Example
Complete VR	Fully immersive, Replaces real world	Oculus Rift, HTC Vive, Sony PS VR
Augmented Reality (AR)	Interface on top of real world	Google Glass
Mixed Reality (MR)	Real and virtual objects coexist and cooperate	Microsoft HoloLens

# Recent Progress

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MILESTONE PRODUCTS

# Google Glass



- AR
- Announced in 2012
- Advanced technologies integrated
  - prism projector for display
  - bone-conduction transducer
  - voice recognition
  - others
- Publicly available starting from May 2014 with a price of 1500 dollars
- Suspended in Jan 15, 2015
- Future daily life

# Oculus Rift & HTC Vive



- Complete VR solutions
  - Both released in first half of 2016
  - Similar hardware
  - Provides fully immersive experience
  - Large amount of VR resources
  - Generally positive feedback
- 
- First mass produced, publicly available VR headsets



# Microsoft HoloLens



- Mixed Reality
- Virtual and real objects coexist and cooperate with each other
- Announced in 2015
- See through
- Developer Edition and Business Suite available in China in May 2017 with over 20000 RMB
- First implementation of MR



# Smartphone VR



- Simplified version of complete VR
- Accessibility
  - Only Requires for a smartphone
- Low price
  - \$79 for Google Daydream View
  - ¥ 299 for Xiaomi VR Glass
- Lower Quality
- A chance for most people to experience VR





# Application

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CURRENT AND FUTURE

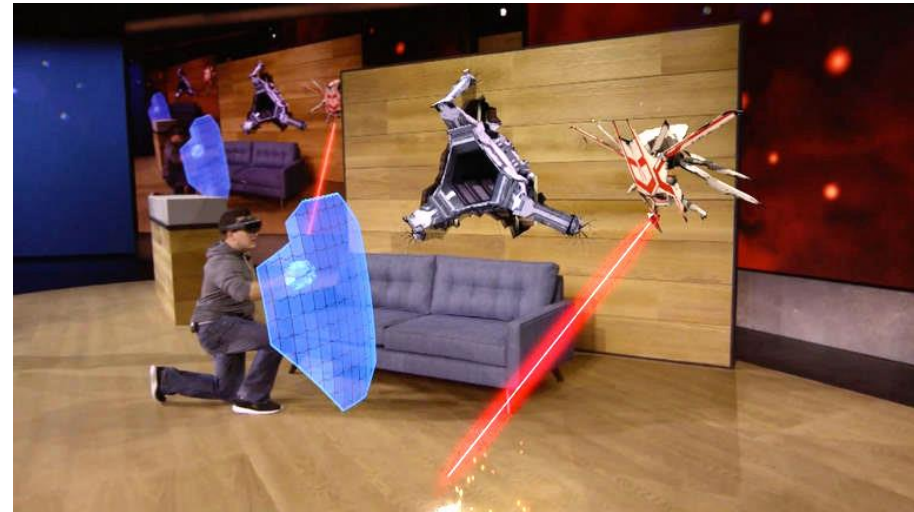
# Games

More Immersion  
and Excitement



Oculus Rift Horror Game *Doors of Silence*

New types of games  
Real & Virtual World Interactivity



Project X-Ray on HoloLens

# Movies

**Improvement can be more substantial.**

Abundant Time and Computing Resource

Our scale...

**30,000** Core Renderfarm  
**60M** Render Hours on Frozen  
**1.5MW** Data Center  
**6PB** Raw Storage  
**1000** Linux Workstations  
**800** Macs

Walt Disney Animation Studios' hardware scale

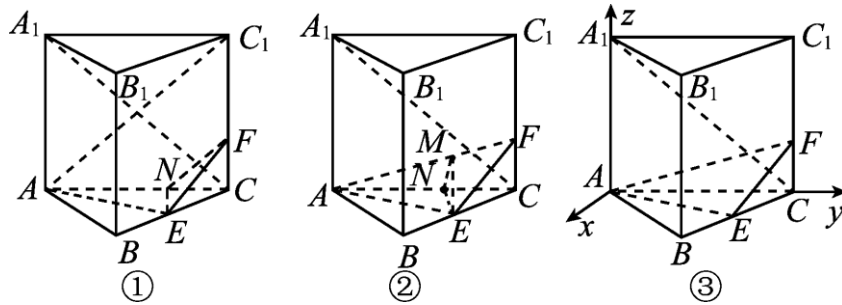
Enhanced Sense of Immersion and Presence  
based on existing technologies



A Scene of a planet in movie *Avatar*

# Education

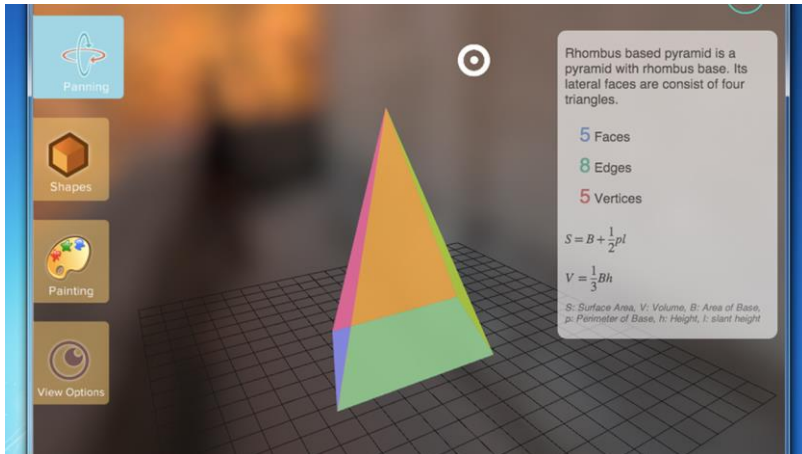
**Learning by visualization and interaction is more effective.**



× too abstract



Microsoft's demonstration  
learning human body via MR



✓ solid and interactive

# More

## Communication

- Convey personal characteristics, expressions, moods
- Visualize ideas for better efficiency



## Manufacturing

### Example: Prototyping

- Reduce cost
- More flexible
- Simplified process



Both come from HoloLens demonstrations



# Social Consequences

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WHAT'S GOOD AND WHAT SHOULD BE WORRIED



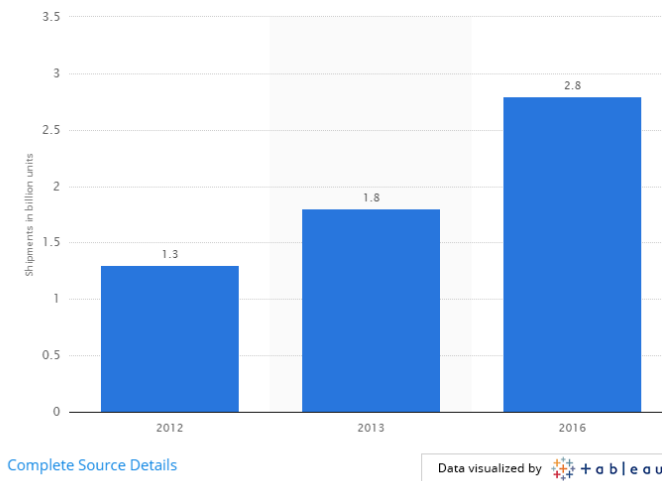
# New Huge And Promising Market

## Touch screen

Another invention  
that significantly changed  
human-machine interactivity

Global shipment forecast for touch-screen displays from 2012 to 2016 (in billion units)

PREMIUM +



### ABOUT THIS STATISTIC

In 2012, 1.3 billion touch-screen panels were shipped worldwide. This number is expected to continue growing steadily and to have doubled to a total of 2.8 billion by 2016.

### SPECIAL FUNCTIONS

#### Download as ...

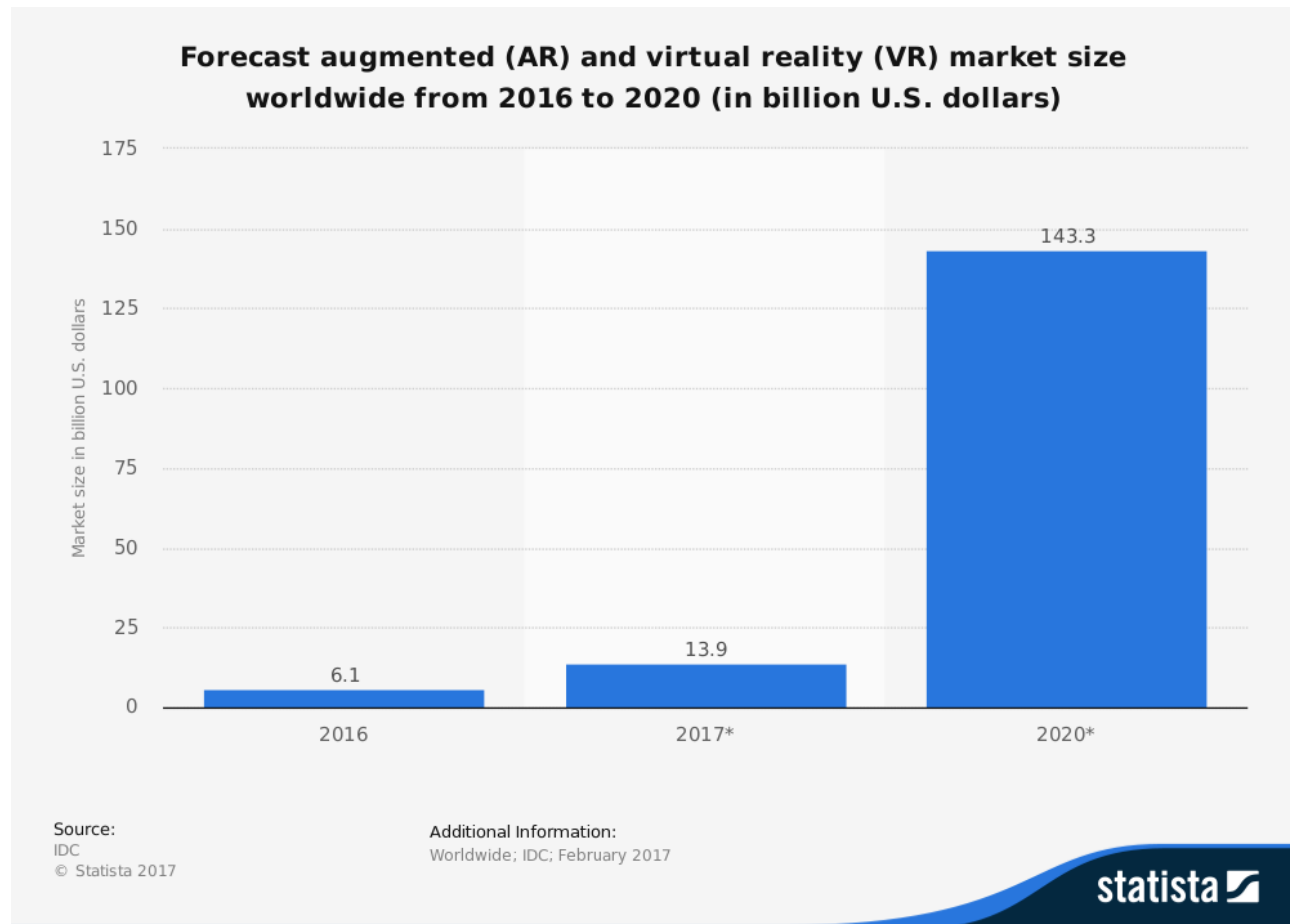
- Graphic (PNG)
- Excel (XLS)
- PowerPoint (PPT)
- PDF

#### Options

- Settings
- Print
- Research Alerts

In 2012, it was expected that the total shipment of touch screen worldwide would be doubled in 2016, from 1.3 billion units to 2.8 billion units (Statista, 2012).

# New Huge And Promising Market



Potential Exponential Increase of AR and VR Market Size



# New Huge And Promising Market

**Continuous and Huge Investments have been/will be done.**

- The Virtual Reality Venture Capital Alliance ([VRVCA](#)) is a \$12 billion fund with over 35 participating investors
- HTC announced a \$100 million investment fund, alongside its Vive X accelerator program
- Facebook will invest another \$250 million into VR content (in addition to the \$250 million investment it has already made in content)
- IMAX announced it will invest \$50 million into VR projects
- The VR Fund is an early-stage VC launched with a target amount of \$50 million to invest
- COLOPL, a mobile gaming company, launched a \$50 million fund for VR game projects

**Proves viability and future of VR.**

# Productivity Boost

- Distraction-free environment
  - No visual aural distraction
  - Focus and concentrate on work
  - Personalize to meet personal needs
- Efficient collaboration
  - Convey personal characteristics
  - Visualize ideas
  - Ignore physical distance
- Adequate Equipment
  - Example: Multiple monitors
    - Help in efficiency for specific jobs
    - Real life: Costs too much; limited space
    - Virtual world: As many as he/she wants



HoloLens demonstration in Build 2015

# Addiction

- A person is obsessed in virtual world to an extent that normal life is negatively influenced.
- Factors that cause current video game addiction remain and even are more powerful.
  - Example: World of Warcraft
    - Players work to finish infinite tasks to get rewarded
    - Exists a group of people spending 63 hours per week and showing negative symptoms.
  - Principal factors, like reward mechanism, remain the same.
  - Addiction will continue to exist.



# Addiction

- The sense of immersion and involvement provided by VR will be improved.
- VR putting people right into the world can better improve attractiveness and addictiveness of game experience than other ways.
- Leads to a more serious situation



Oculus with Virtuix

# Addiction

## Possible Solutions:

- Restriction of VR usage towards specific groups of people
- Realize VR's nature as a tool
- Utilize its full potential to improve real life
- Enjoy life with its unique and magical experience

# Losing Willingness for Real World

Which one would you choose?



Fresh air, blue sky, advanced technology,  
anything you want, no work burden  
But you know it's virtual



Piles of work, stay up to late  
Lots of deadlines and presentations  
Incoming exams



# Losing Willingness for Real World

## 1. Slowdown and even backward of humanity development



- Late Qing dynasty Opium Addiction
- Weakens Chinese people and China
- Slows down the development
- Falling behind the world

# Losing Willingness for Real World

## **Fermi paradox:**

The apparent size and age of the universe suggest that many technologically advanced extraterrestrial civilizations ought to exist. However, this hypothesis seems inconsistent with the lack of observational evidence to support it.

## **Easier Version:**

We think there must be extraterrestrial life in such an universe, but we can't find them.

## **Possible Fermi paradox explanation:**

- Physical needs are satisfied
- “Social and entertainment technologies” becomes the main driver of social development
- Care only for entertainment, science and astronomical research deserted
- Restricted and “prisoned” in their home planet

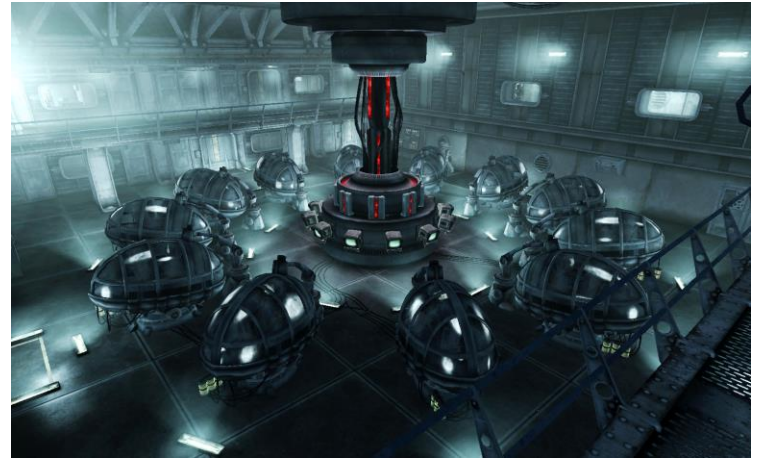


# Losing Willingness for Real World

## 2. Potential lose of ability to distinguish from real and virtual world



Hardly had anyone in *Matrix* realized that they are no longer in real world. Anyone who realized it would be hunted and finally eliminated by machines.



In *Fallout 3*, survivors in Vault 112 designed a system to immerse themselves within a virtual world to escape sufferings in real world. They designed a computer to administrate the whole system, but finally, they are slaved by the computer.

# Losing Willingness for Real World

- Severer addiction
- Controversial whether it's good or not to allow "emigration to virtual world"
- One way path
  - Losing the willingness to return to real life
  - => Losing the chance to return to real world



# Conclusion

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CONTENT OVERVIEW

# Conclusions

- Commercial VR products have been/is being developed, demonstrated and available to public
- Shows us how our life will be changed in a forecastable future
- VR
  - Will be applied in games, movies, education, communication, manufacturing etc.
  - Opens a new and promising new market
  - Boosts productivity
- Addiction
  - Must be put attention to
  - Causes significant problem to and fundamental change of humanity as a species, if not dealt with properly
- Measurements should be taken to maximize pros and minimize cons.
- A better world comes.

THANKS

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