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ABDEL FATTAH EL-SISI
PRESIDENT OF THE ARAB REPUBLIC OF EGYPT

Immersive Technologies in Healthcare

(Nurses are Getting Future Ready)

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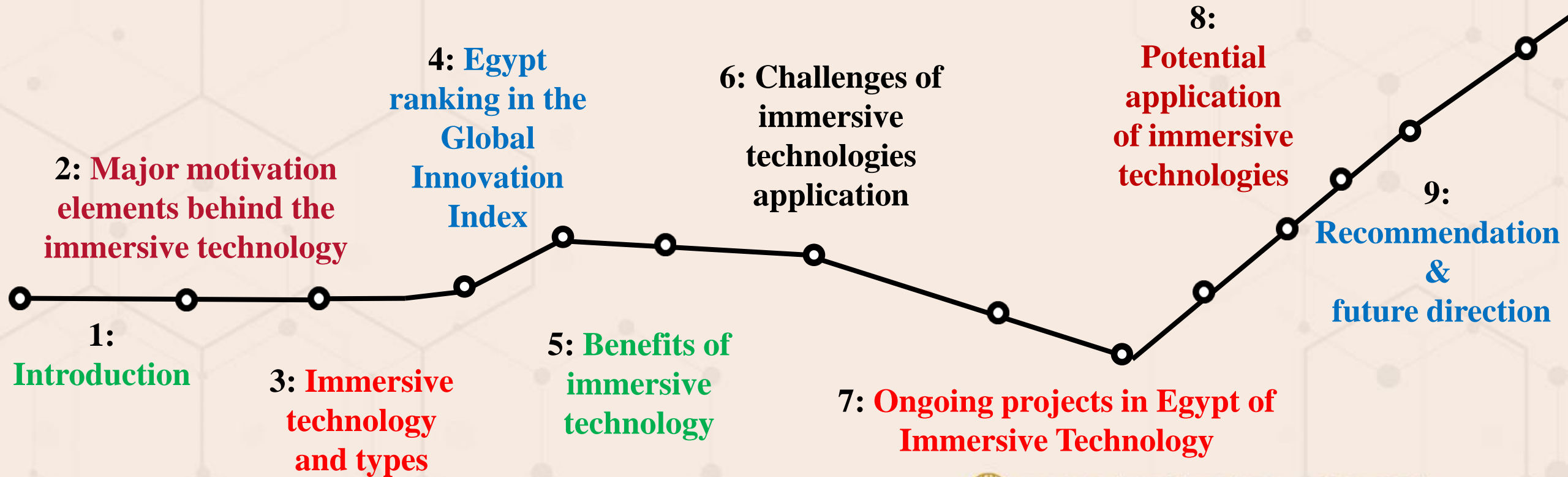
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Outlines ….

1: Introduction

2: Major motivation elements behind the immersive technology

3: Immersive technology and types

4: Egypt ranking in the Global Innovation Index

5: Benefits of immersive technology

6: Challenges of immersive technologies application

7: Ongoing projects in Egypt of Immersive Technology

8: Potential application of immersive technologies

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Introduction

Immersive technologies, such **as virtual reality (VR) and augmented reality (AR)**, are increasingly being used in healthcare across the Middle East and Africa region. These technologies **enable nurses to participate** in realistic simulations of medical procedures, practice communication and collaboration skills, and conduct virtual consultations with patients in remote or underserved areas.
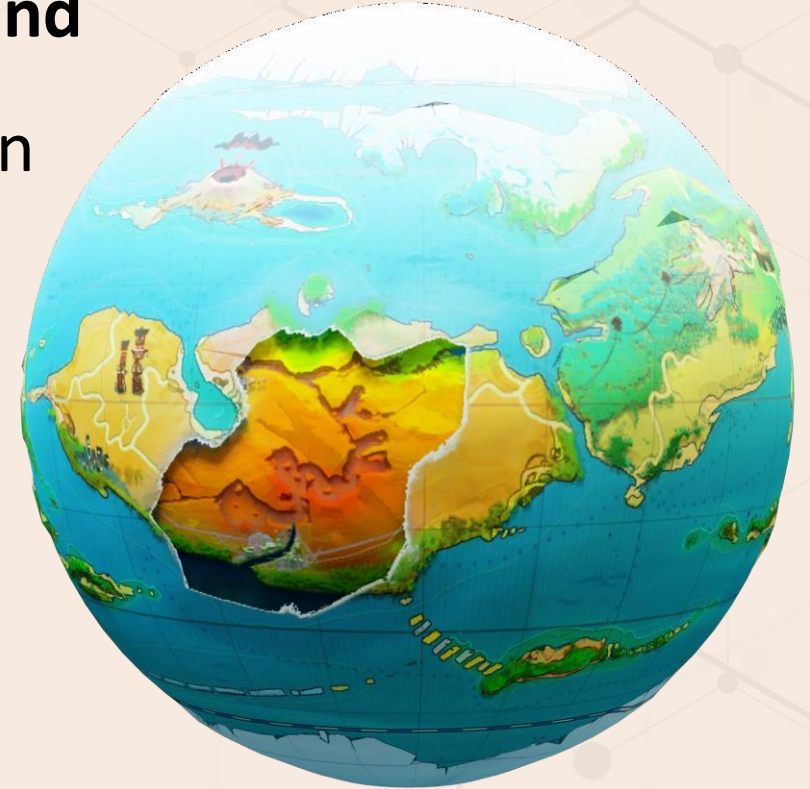
Introduction

There are **ethical considerations** that must be addressed, such as informed consent, privacy and confidentiality, and bias and stereotyping.

Providing nurses with the training and support they need to use them effectively, So can ensure that nurses are future ready and equipped with the tools they need to provide high-quality care and transform healthcare delivery.

There are two major motivating elements behind the metaverse's popularity:

1)The pandemic of COVID-19 has caused rapid change in the global healthcare sector, leading to adaptation and innovation of all technologies.

2)Emerging technical enablers have increased the likelihood of the metaverse, with 5G/6G communication systems enabling users to be visually and physically engaged in a virtual environment while using AR/VR and artificial intelligence.
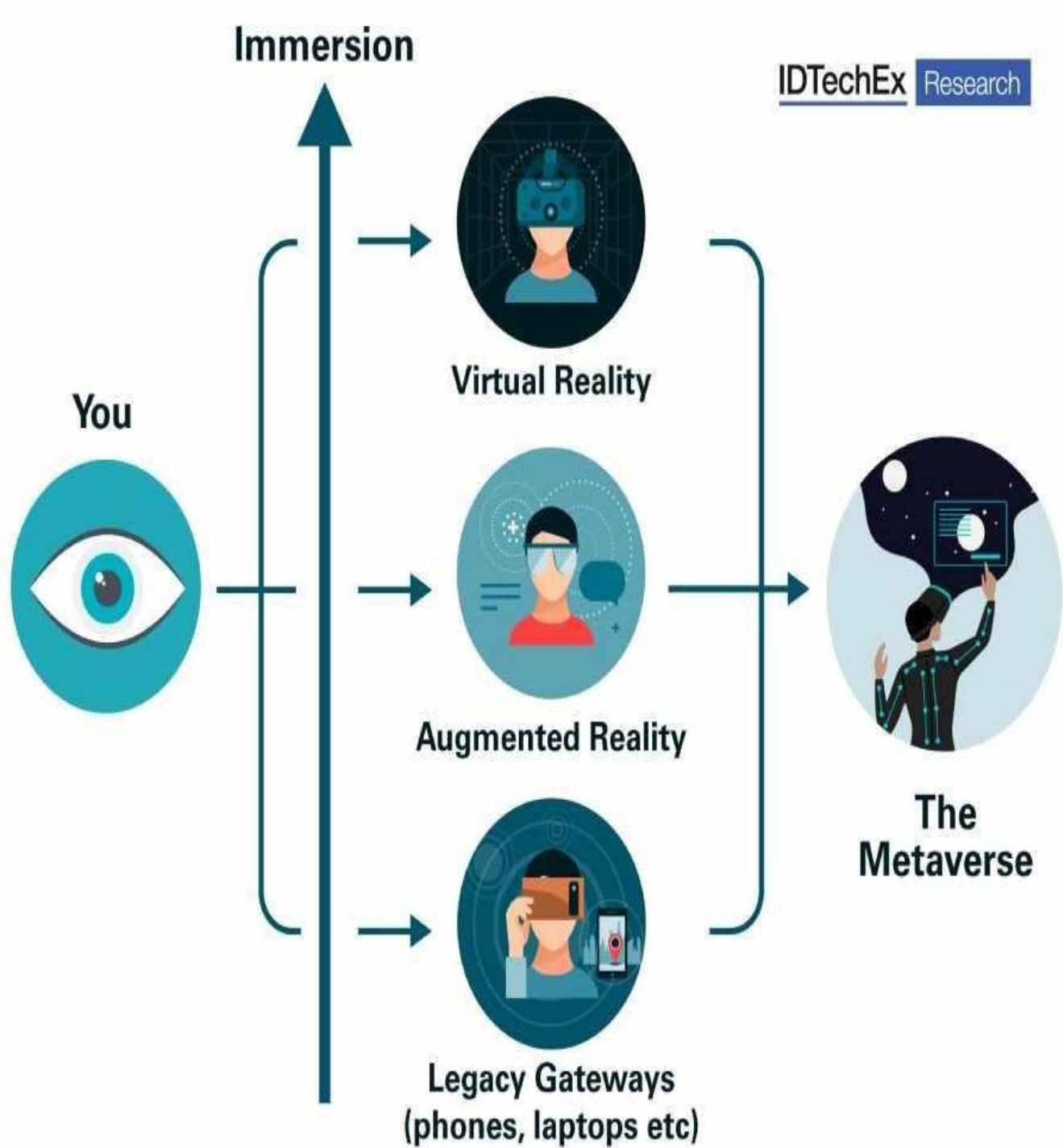
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Introduction

The metaverse is a virtual space where users can interact with 3D digital objects and 3D virtual avatars in a complex manner.

Artificial Intelligence is an emerging technology that uses computers to simulate human intelligence and perform tasks such as decision-making, problem-solving, and learning.
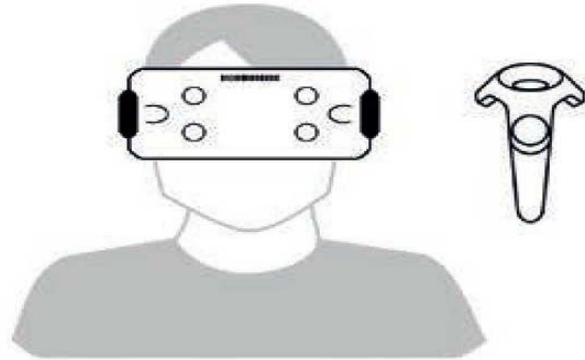
**The combination** of the two unlocks a new degree of verisimilitude.

Immersion

You

Virtual Reality

Augmented Reality

The Metaverse

Legacy Gateways (phones, laptops etc)

IDTechEx Research

Virtual Reality

Augmented Reality

Mixed Reality

Metaverse (combination of AR, VR and MR technologies)

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VIRTUAL REALITY (VR)

Fully immersive environment with only virtual elements involved. A separate experience from the real world. Controllers are used as reference and button interaction.

AUGMENTED REALITY (AR)
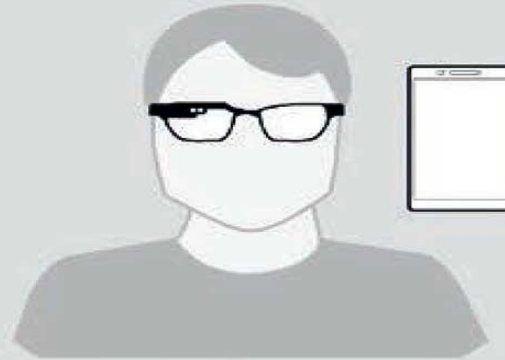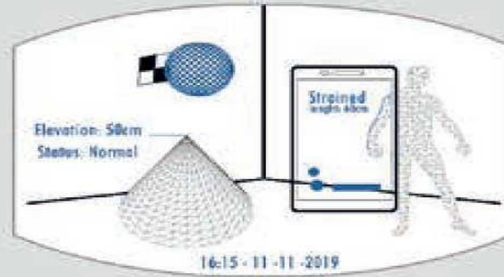
Augmented real-world environment with information and data represented by a device that uses references such as trackers, location, time, etc.

MIXED REALITY (MR)
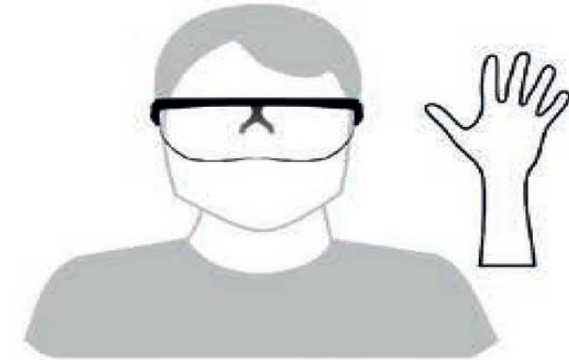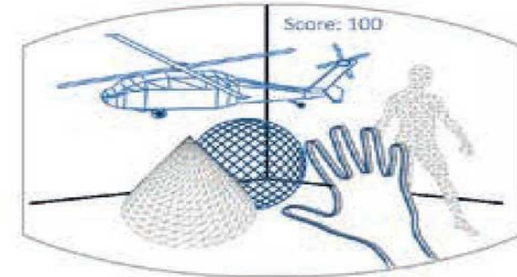
A combination of both AR and VR. Virtual objects that react to the real environment. Glasses allow seeing the real environment and device might allow interaction with both real and virtual objects.

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Reshaping the Workforce Technologies

40% of the tasks performed by health care are **"support occupations"** can be automated, as can **33%** of the tasks performed by health care **"practitioners and technical occupations."**
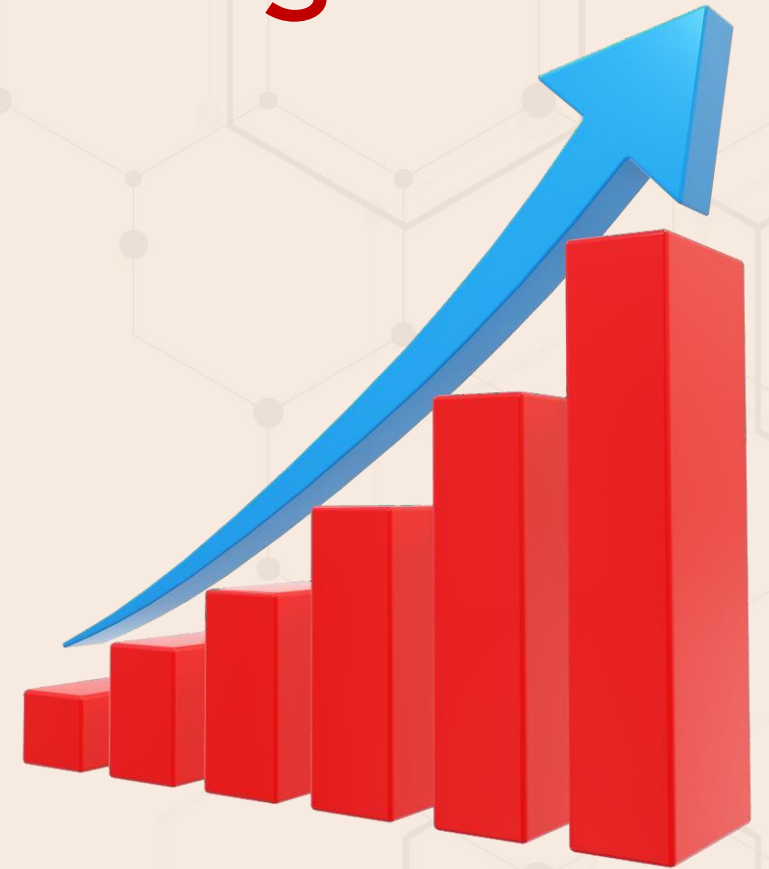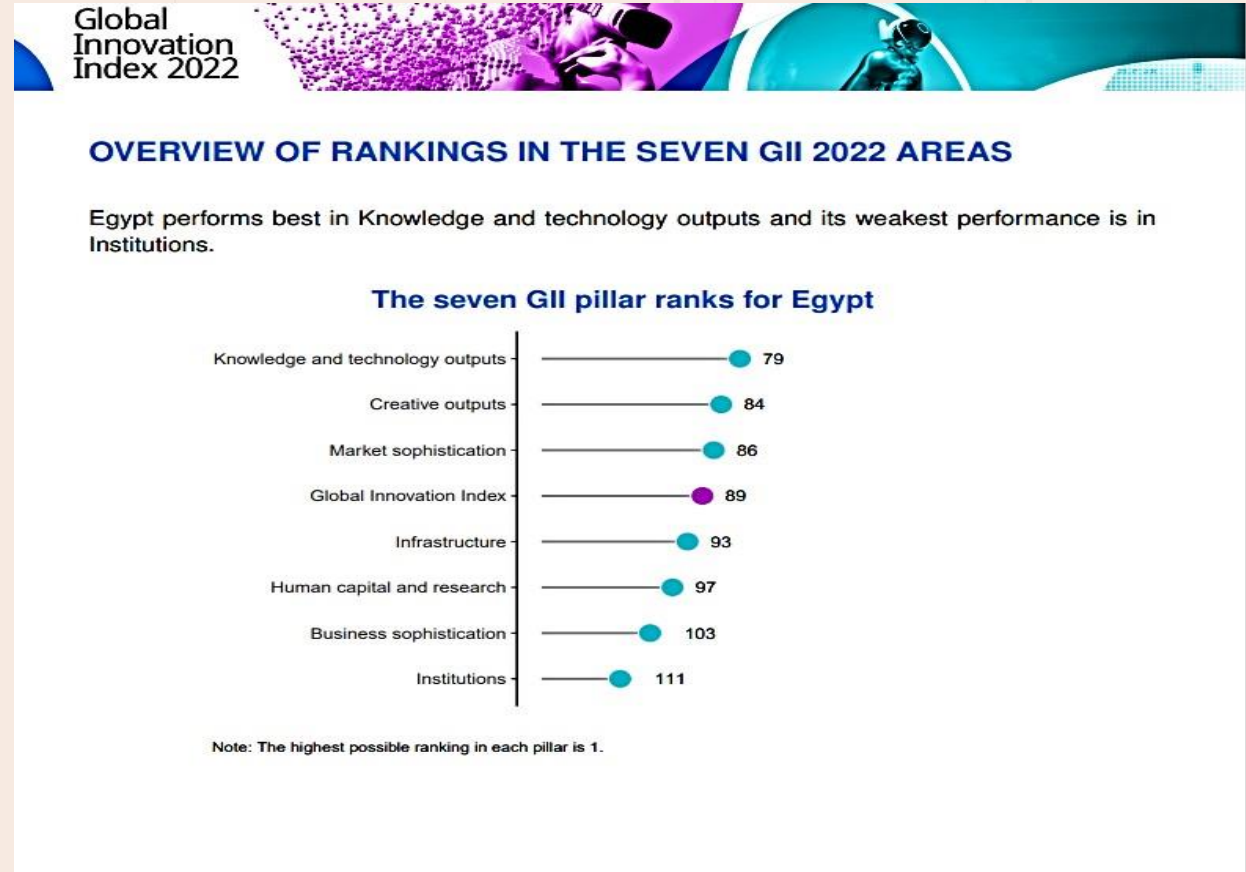
Egypt Ranking 2022

89th   Egypt ranks 89th among the 132 economies featured in the GII 2022.

14th   Egypt ranks 14th among the 36 lower-middle-income group economies.

15th   Egypt ranks 15th among the 19 economies in Northern Africa and Western Asia.

Global Innovation Index 2022

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Egypt performs best in Knowledge and technology outputs and its weakest performance is in Institutions.

The seven GII pillar ranks for Egypt

Knowledge and technology outputs	79
Creative outputs	84
Market sophistication	86
Global Innovation Index	89
Infrastructure	93
Human capital and research	97
Business sophistication	103
Institutions	111

Note: The highest possible ranking in each pillar is 1.

Source : availableat Global Innovation Index 2022 What is the future of innovation driven growth?
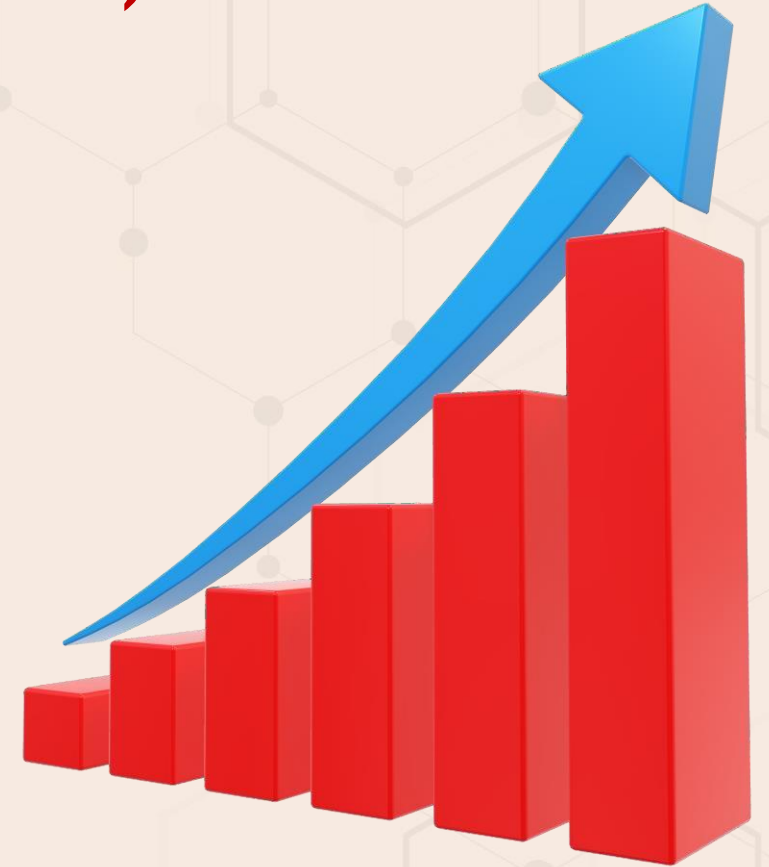
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Rankings for Egypt (2020-2022)

Rankings for Egypt (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	96	104	82
2021	94	102	86
2022	89	97	83

Egypt 2022 ranks position **is higher than** last two years

HEALTHCARE REDEFINED

Benefits of immersive technologies

1 | Improve productivity and efficiency.

2 | Expand job responsibilities.

3 | Improve performance.

4 | Simulated learning.

5 | Remote training.

6| Patient education.

7 | Telehealth.

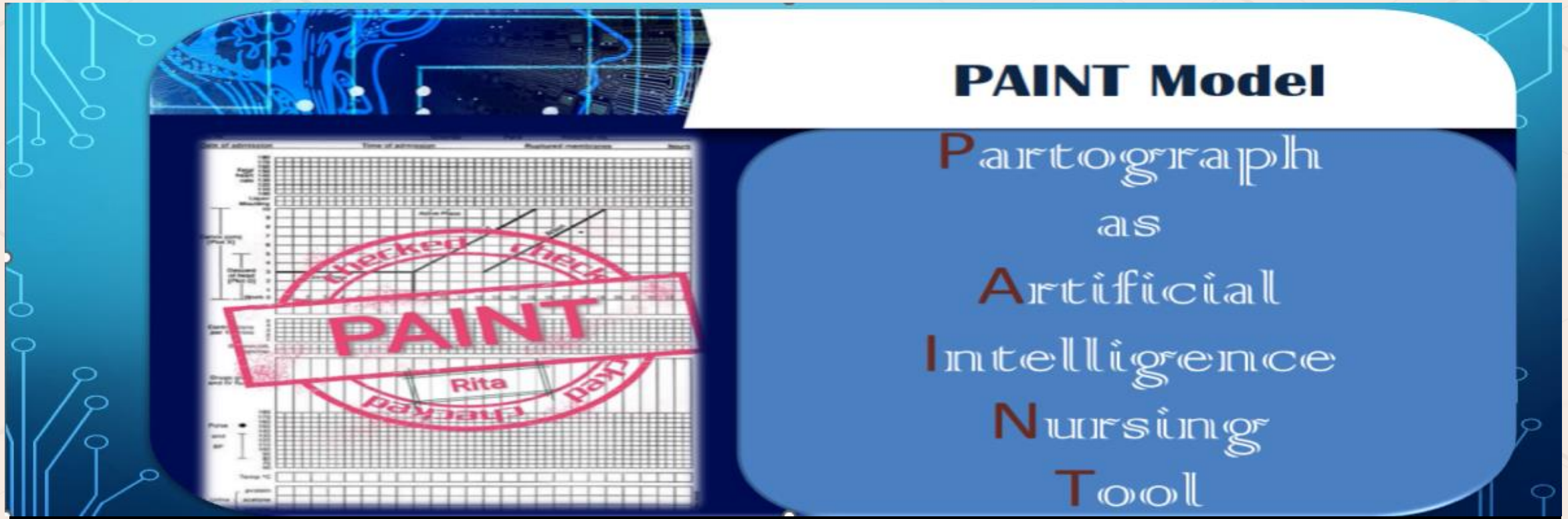**8 | Collaboration and research.**

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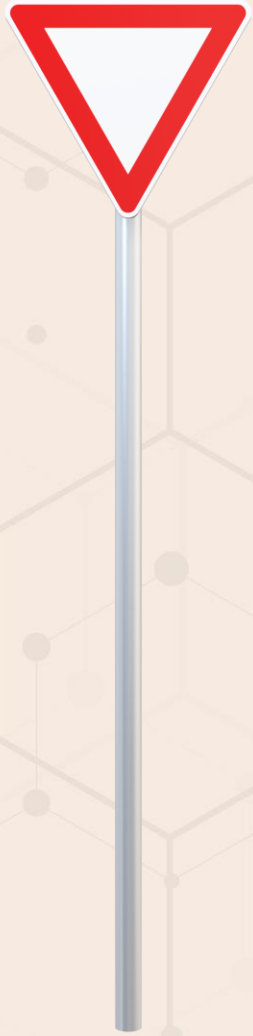
Examples of projects in Egypt

Partograph as Artificial Intelligence Nursing Tool PAINT Model

PAINT Model

Partograph
as
Artificial
Intelligence
Nursing
Tool

PAINT

Rita

Mti Student's Nursing Project for AccuVein to facilitate peripheral intravenous placement in chemotherapy department- Baheya Hospital
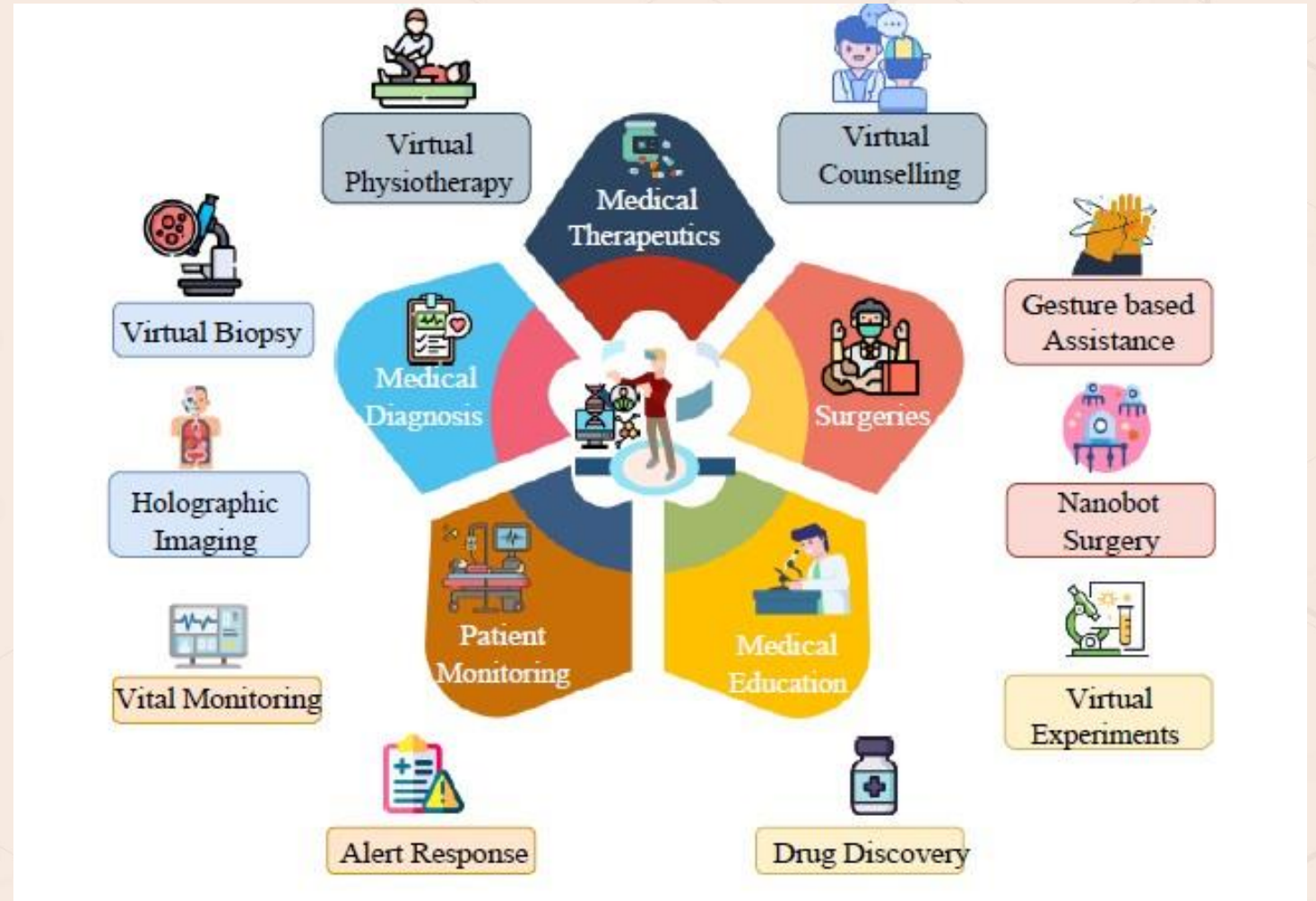
several potential applications in healthcare

Potential Applications in Healthcare

Virtual
Counselling
Medical Diagnosis
Surgeries
Patient Monitoring
Vital Monitoring
Medical Education
Alert Response
Holographic
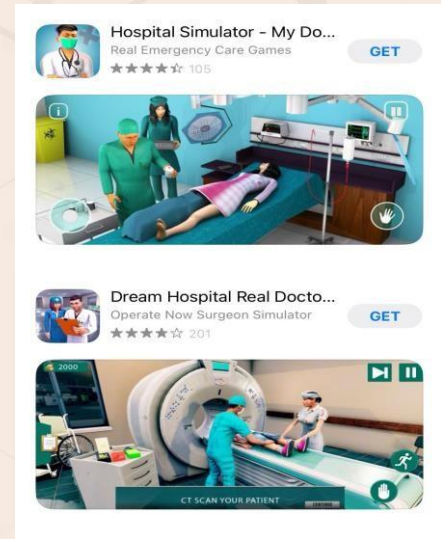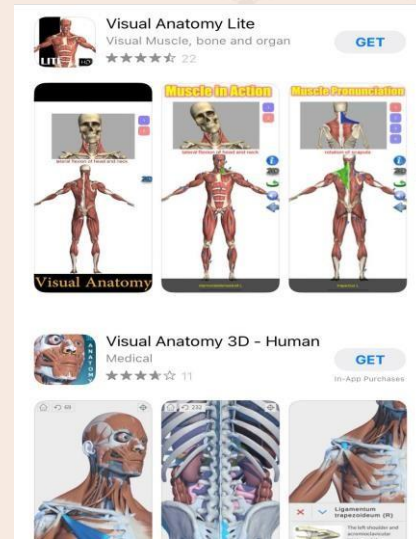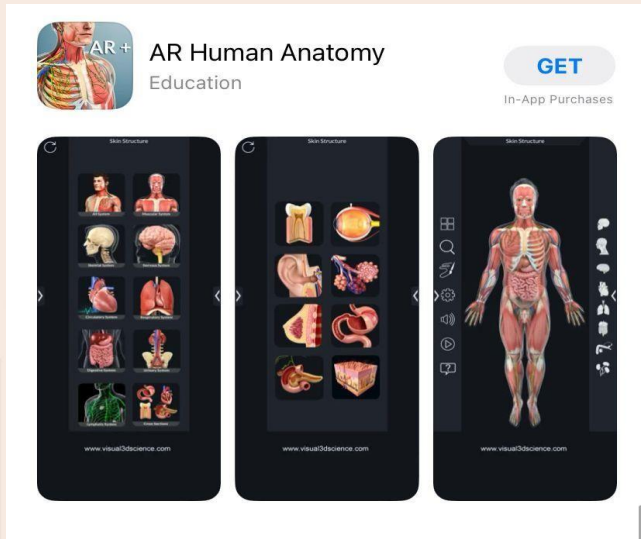Imaging Nanobot
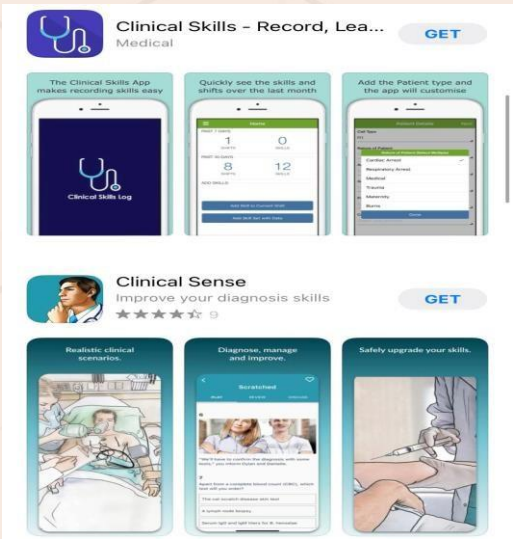Surgery Virtual
Experiments

Revolutionize the Medical Education and Training

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Examples of VR and AR tools that can be used for nursing education:

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BioMarkers - Cognitive and Emotional State

Collecting and analyzing emotional and physical responses in VR

applications

Virtual environments are used clinically to treat several important mental and behavioral health problems

- Post-Traumatic Stress Disorder
- Generalized Anxiety Disorder
- Social Anxiety Disorder
- Depression
- Mild Cognitive Impairment
- Autism Spectrum Disorder
- ADHD

Support Mental Health

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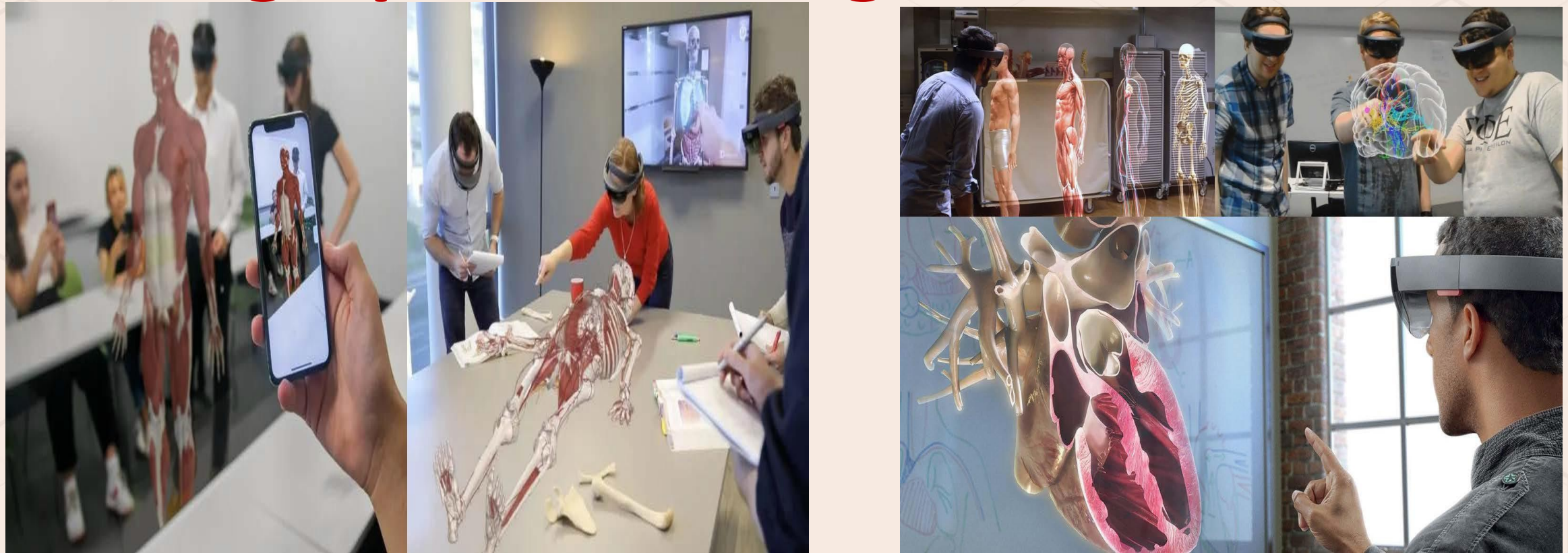# Surgeons using AR headsets to project visuals of the patient's internal anatomies
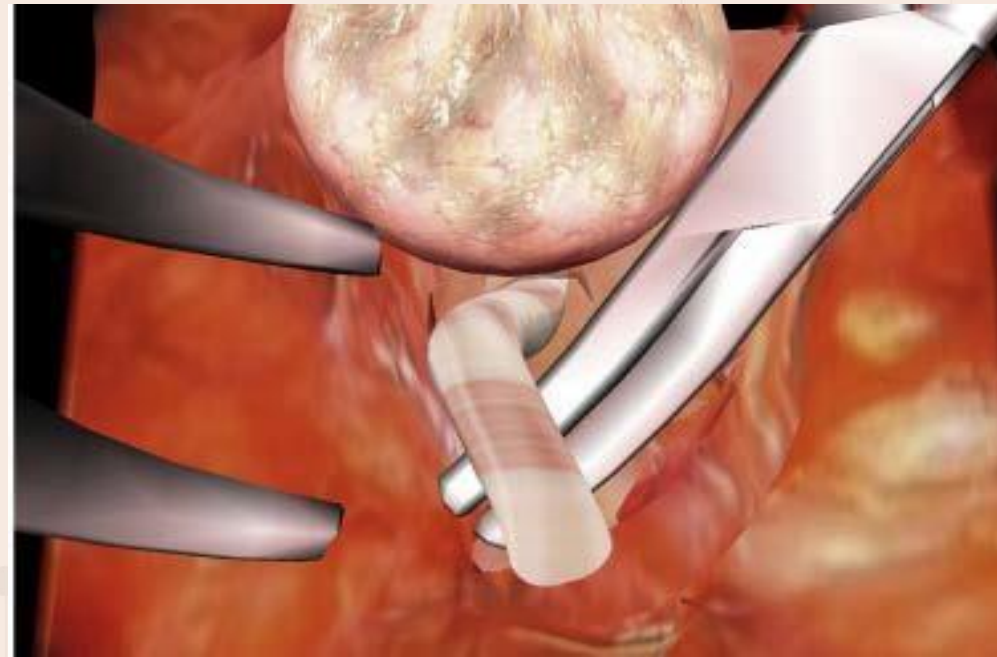
VR image of the exfoliation of the submandibular gland and vessel under the layers of connective tissue using two pean forceps

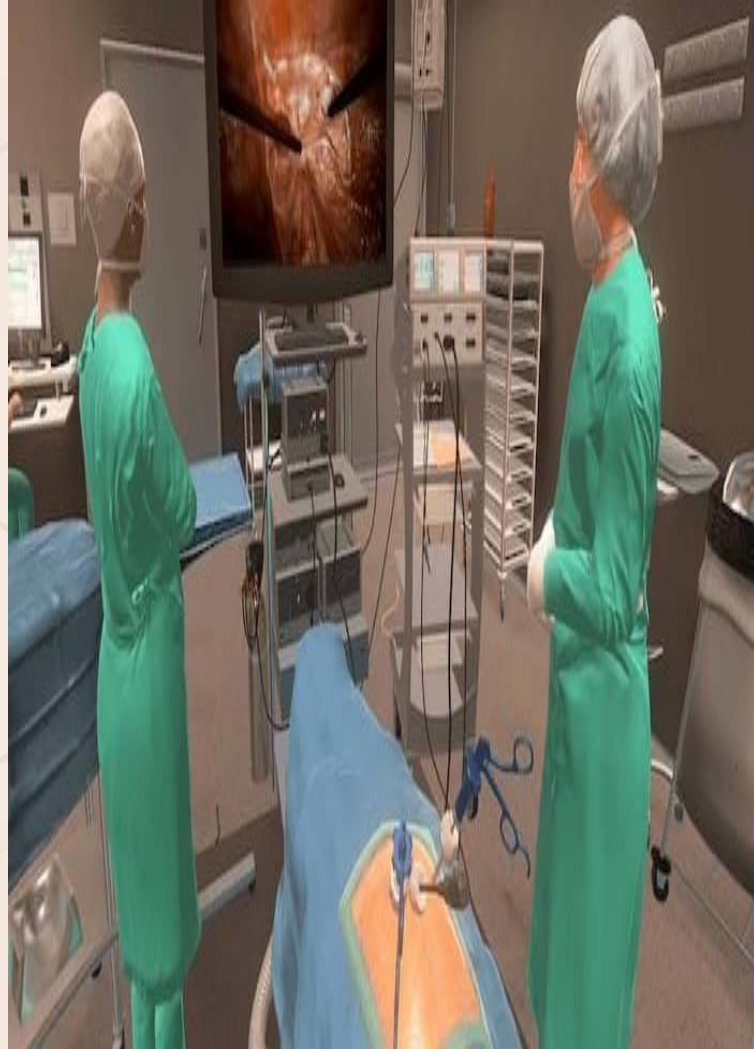# HoloHuman being used to generate 3D holographic learning environments

A. HoloAnatomy is being used to generate holographic images of different body systems.
B. Brain study being performed using HoloAnatomy.
C. Detailed anatomy of the heart is visualized using Microsoft HoloLens

Surgical Procedure Training

Surgical Training

Knee arthroscopy simulator

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Application in Plastic Surgeries

A.The HoloLens is in use during the face transplant procedure.

B.Surgeons consult a 3D-printed stereolithographic model of the recipient's face during the transplantation procedure.

A. 3D representation of a patient's anatomy by Doctor while wearing the HoloLens during preoperative planning to remove a malignant tumor (tumor shown in yellow).

B. 3D holographic picture developed with Microsoft HoloLens is presented on a monitor in the operating room during a liver tumor operation.
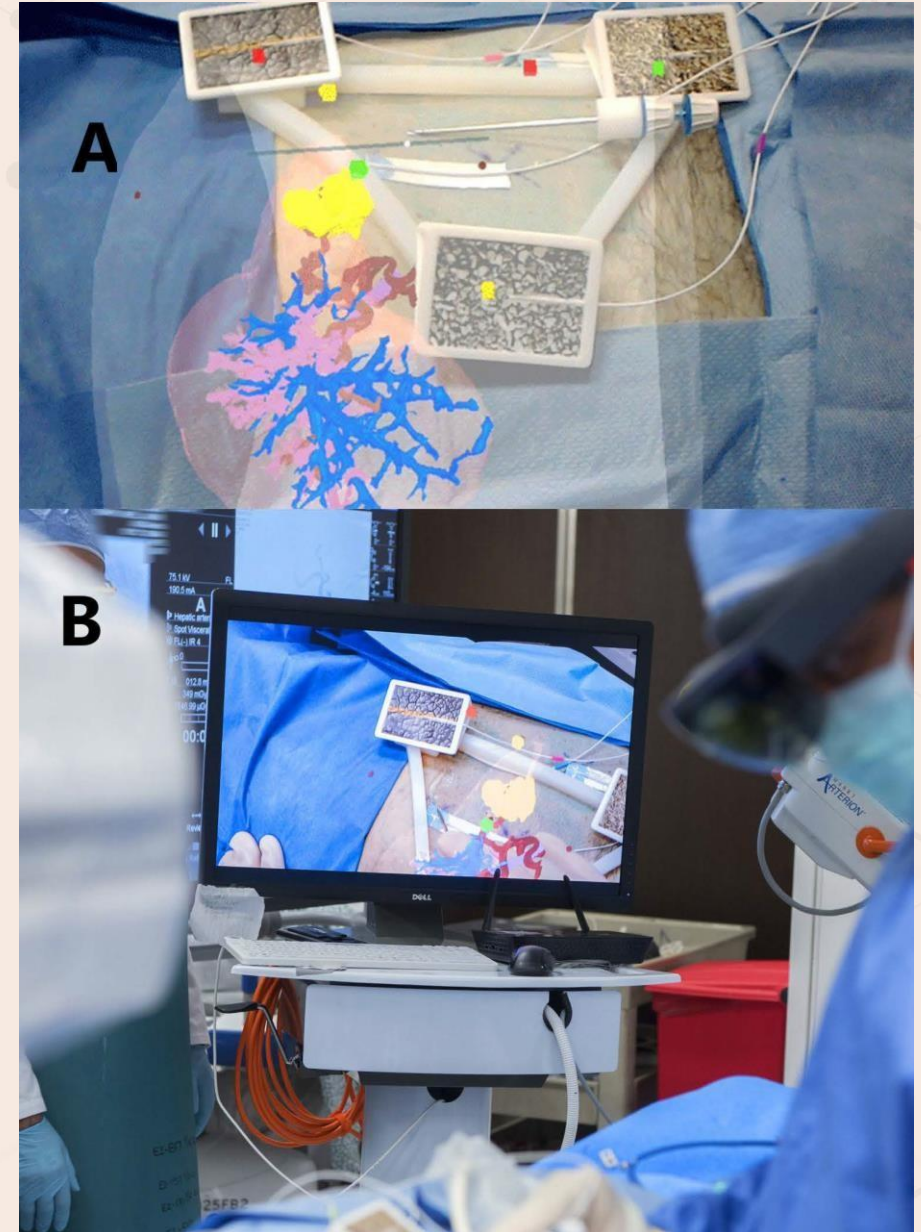
Map of the patient's veins projected onto the skin using AccuVein technology

IV Starts

Blood Draw

Cosmetic

Vascular

Kind VR develops VR therapies to assist patients in coping with pain and stress

Metaverse used in distraction therapy for effective pain management

A pregnant woman using a VR headset to view a simulated beach area alleviates discomfort during the early stages of labor

Recommendations for hospitals and healthcare systems

- **Strengthen systems** to disseminate lessons from early adoption and share examples of effective, **evidence-based technological change programs**.

- **Use validated frameworks** to implement **technological solutions** and ensure that staff are trained to use these.

- **Support collaborations** between the health system and the universities aimed at improving the skills and talent of health care staff.

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Recommendations for HOSPITALS AND HEALTH SYSTEMS

- **Work with stakeholders** across the organization to **review the regulation and compliance requirements** for new digital health care technologies, including the provision of guidance and training on cybersecurity, data privacy and data anonymization.

- **Provide access to training resources** and **educational programs in digital health care technologies** to assess and build digital readiness of health care staff.

Recommendations for HEALTH CARE LEADERS

- **Bring humanity to the machine-patient interface and focus on the essential human skills** that AI and computers cannot achieve, such as collaboration, leadership, reflection, compassion and empathy.

- **Involve staff in the co-design of transformation projects**, particularly in identifying how digital health care technologies can help to improve both patient experience and staff productivity.

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