



REVOLUTIONIZING
ATHLETIC TRAINING: THE
POWER OF AI

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This slide features a dark teal background with a white circuit board pattern on the left side. The title is in large, bold, white capital letters, and the presenter's name and affiliation are in smaller white capital letters below it.

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CONFLICT OF INTEREST

- I have no conflicts of interest to report

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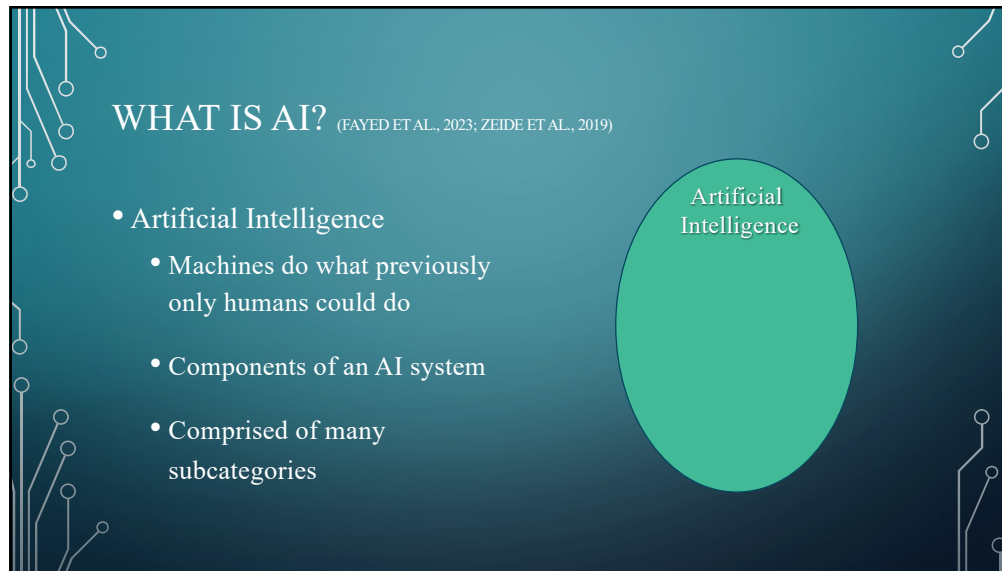
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OVERVIEW


- Introduction
- Understanding AI Fundamentals
- Exploring AI-Driven Pedagogical Tools
- Analyzing Benefits, Challenges, and Ethical Considerations
- Takeaways
- Questions

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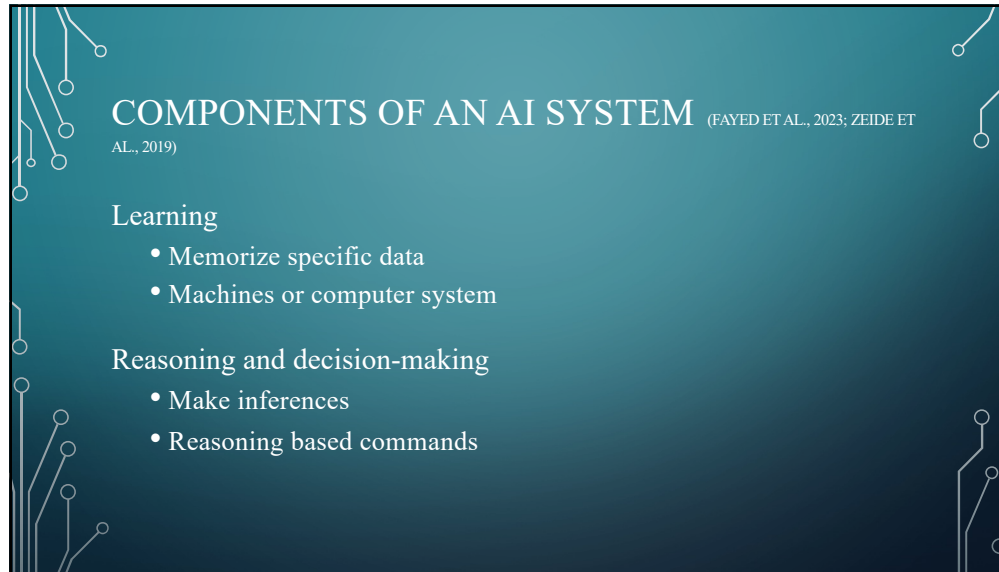


WHAT IS AI? (FAYED ET AL., 2023; ZEIDE ET AL., 2019)

- Artificial Intelligence
 - Machines do what previously only humans could do
 - Components of an AI system
 - Comprised of many subcategories



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COMPONENTS OF AN AI SYSTEM (FAYED ET AL., 2023; ZEIDE ET AL., 2019)

Learning

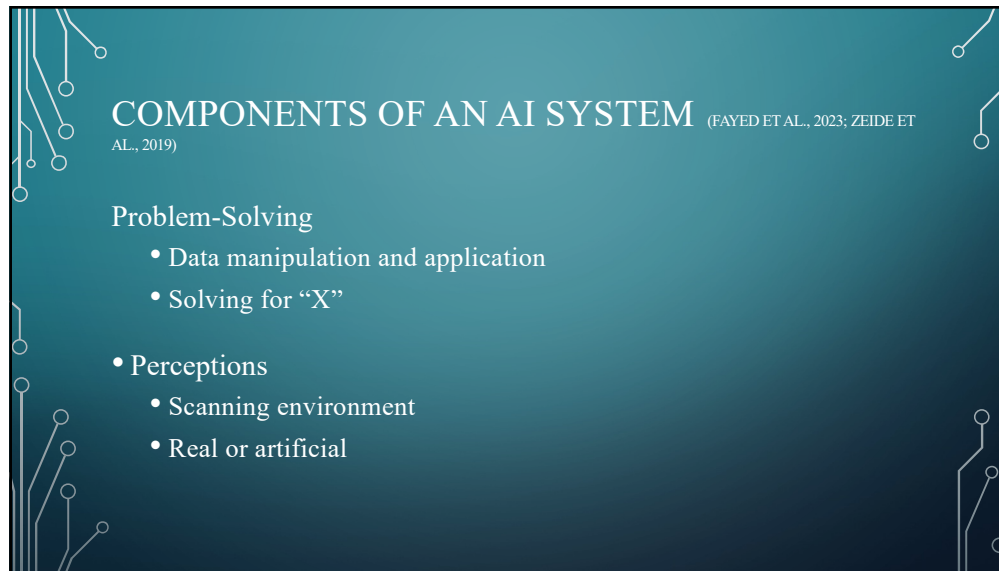
- Memorize specific data
- Machines or computer system

Reasoning and decision-making

- Make inferences
- Reasoning based commands

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COMPONENTS OF AN AI SYSTEM (FAYED ET AL., 2023; ZEIDE ET AL., 2019)

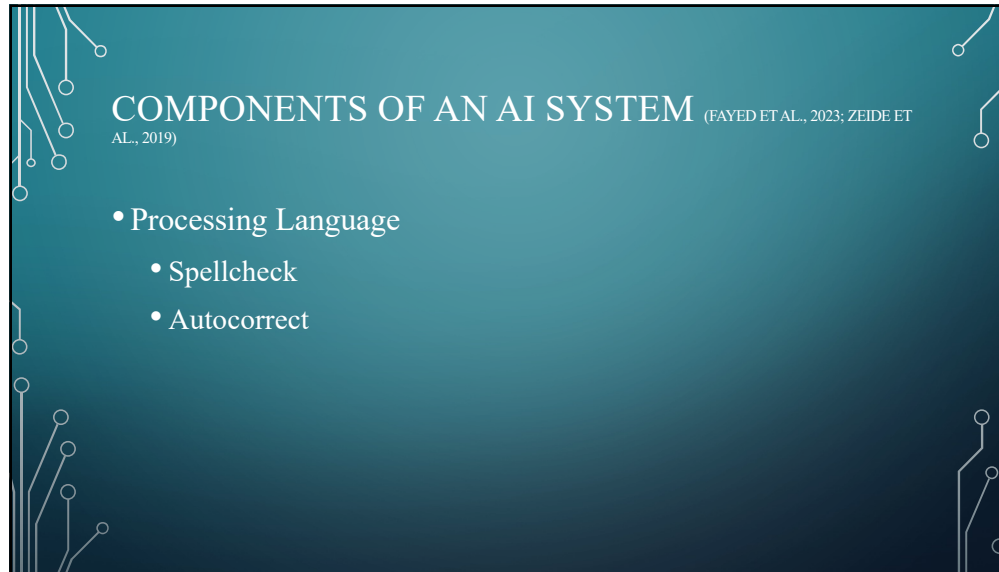
Problem-Solving

- Data manipulation and application
- Solving for “X”

- Perceptions
 - Scanning environment
 - Real or artificial

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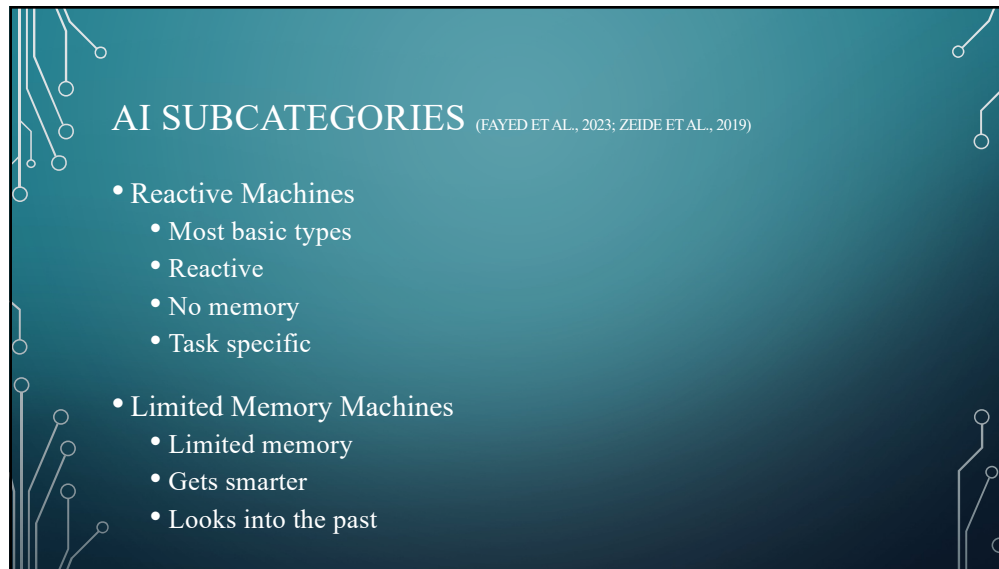
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COMPONENTS OF AN AI SYSTEM (FAYED ET AL., 2023; ZEIDE ET AL., 2019)

- Processing Language
 - Spellcheck
 - Autocorrect

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AI SUBCATEGORIES (FAYED ET AL., 2023; ZEIDE ET AL., 2019)

- Reactive Machines
 - Most basic types
 - Reactive
 - No memory
 - Task specific
- Limited Memory Machines
 - Limited memory
 - Gets smarter
 - Looks into the past

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UNDERSTANDING AI FUNDAMENTALS

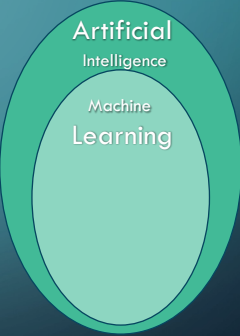
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UNDERSTANDING AI FUNDAMENTALS (FAYED, 2023; ZEIDE, 2019)

- Machine learning
 - Analyze large amounts of data, interpret relationships
 - Algorithm based
 - Predict results

3 Categories

- Supervised
- Unsupervised
- Reinforcement Learning



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MACHINE LEARNING (KHURANA ET AL., 2023)

- Natural Language Processing
 - a form of machine learning
 - ability to interpret, manipulate, and comprehend human language

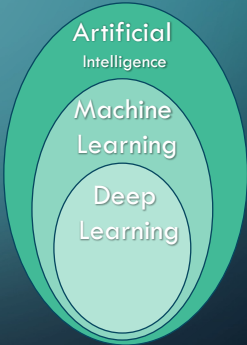
Classified into two parts

- Natural Language Understanding
- Natural Language Generation

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BACK TO THE FUNDAMENTALS (FAYED, ET AL., 2023; RAMKUMAR ET AL. 2021; ZEIDE ET AL., 2019)

- Deep Learning
 - Deep learning models can recognize complex patterns to produce accurate insights and predictions.
 - Pictures
 - Text
 - Sounds
 - Other data



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WEARABLE TECHNOLOGY

- Wearable technology (wearables) refers to devices that are worn by individuals.
 - Monitoring
 - Diagnosis.



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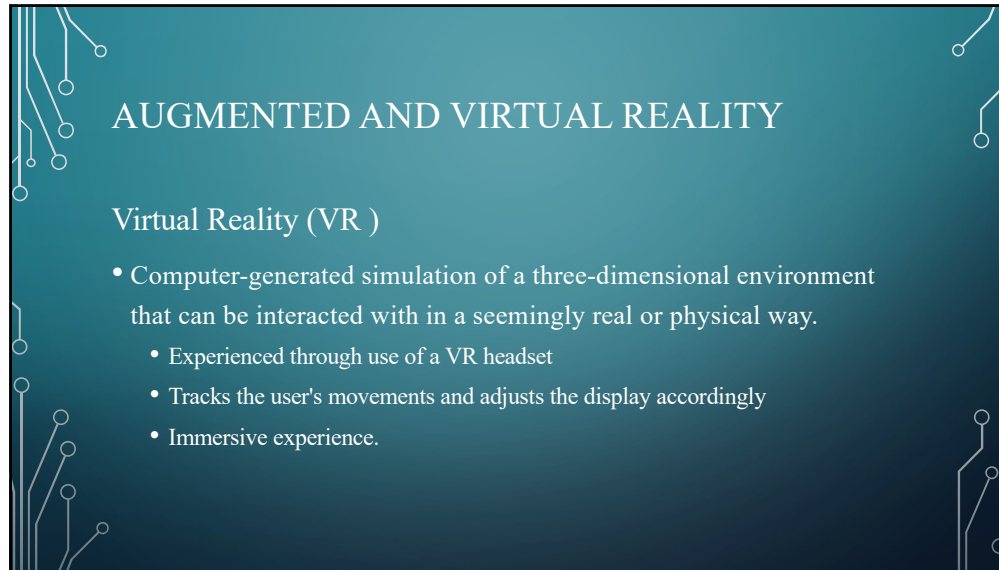
VIRTUAL AND AUGMENTED REALITY

Augmented Reality (AR)

- Technology that overlays digital information onto the real world.
 - Smartphone/tablet camera
 - Captures surroundings
 - Adds digital elements in real-time.



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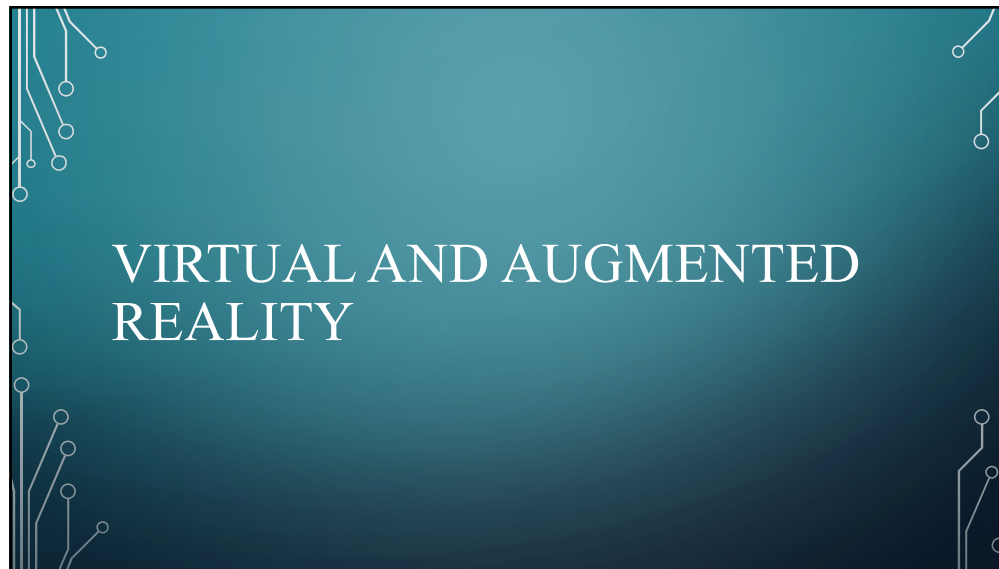
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AUGMENTED AND VIRTUAL REALITY

Virtual Reality (VR)

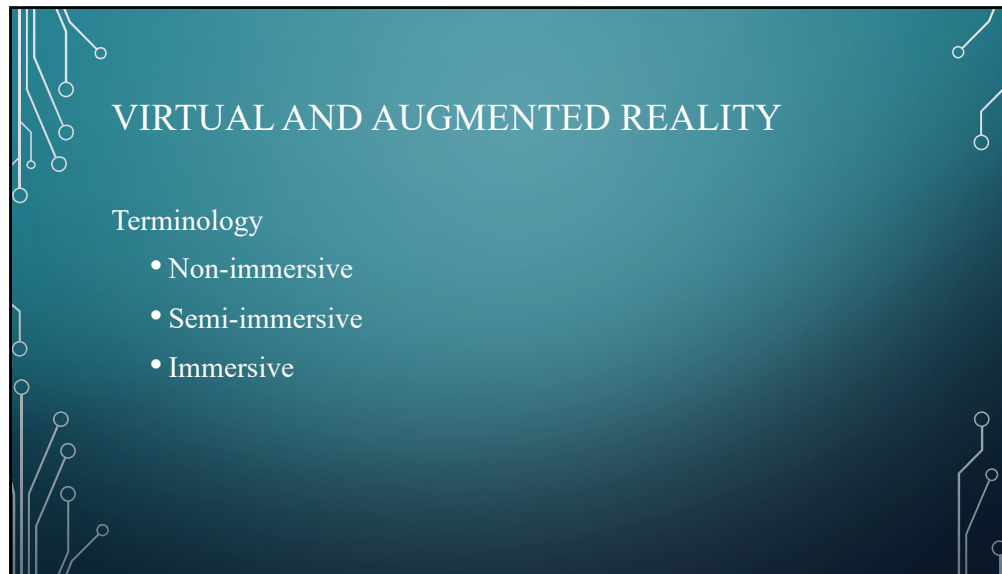
- Computer-generated simulation of a three-dimensional environment that can be interacted with in a seemingly real or physical way.
 - Experienced through use of a VR headset
 - Tracks the user's movements and adjusts the display accordingly
 - Immersive experience.

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A decorative graphic of a circuit board with white lines and circles on a dark teal background, framing the text.

VIRTUAL AND AUGMENTED REALITY

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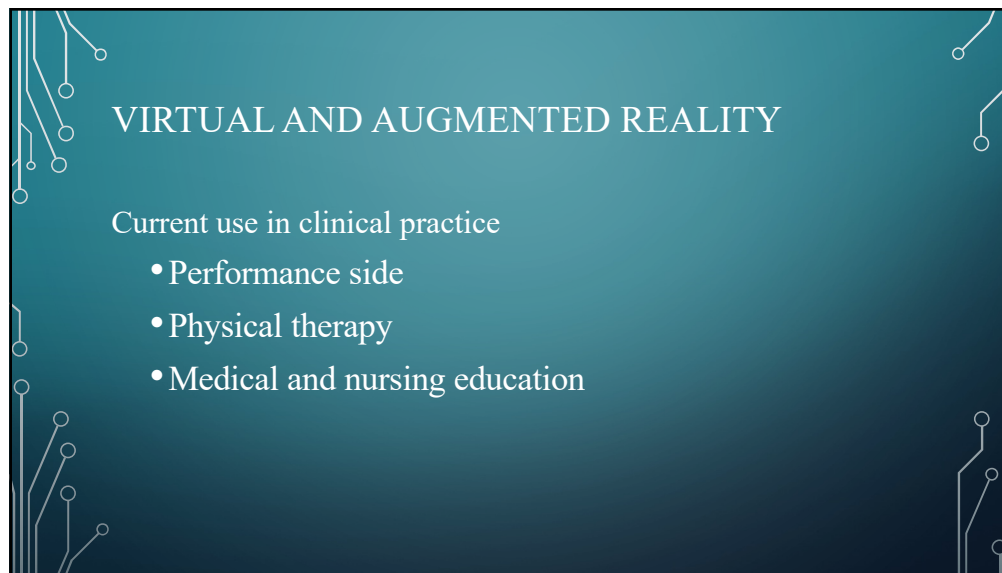
VIRTUAL AND AUGMENTED REALITY

Terminology

- Non-immersive
- Semi-immersive
- Immersive

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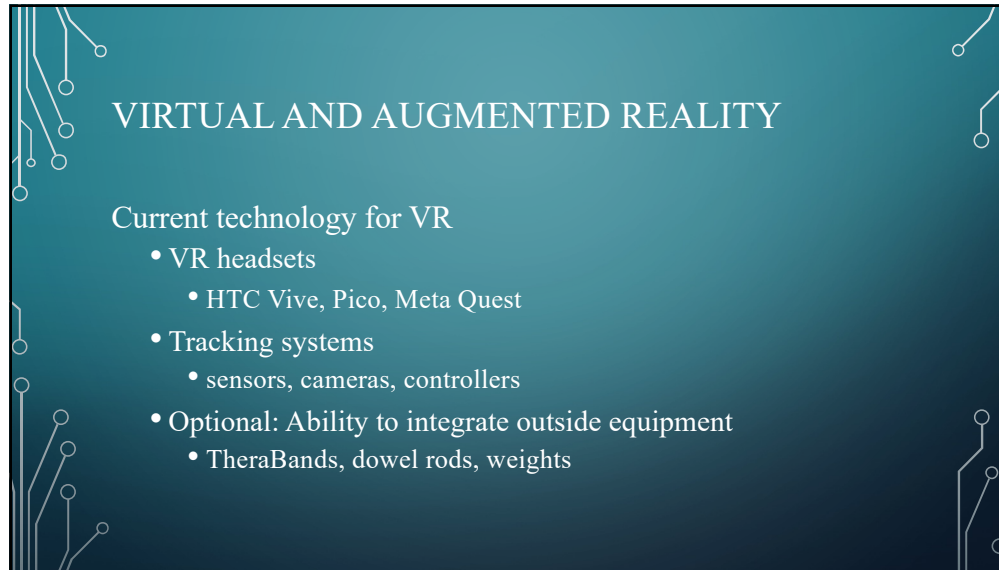
VIRTUAL AND AUGMENTED REALITY

Current use in clinical practice

- Performance side
- Physical therapy
- Medical and nursing education

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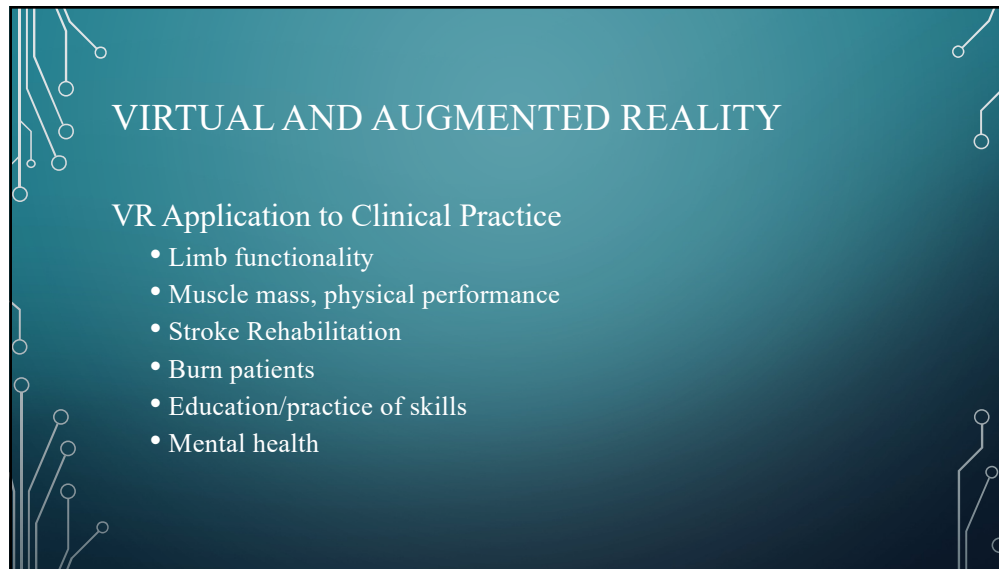


VIRTUAL AND AUGMENTED REALITY

Current technology for VR

- VR headsets
 - HTC Vive, Pico, Meta Quest
- Tracking systems
 - sensors, cameras, controllers
- Optional: Ability to integrate outside equipment
 - TheraBands, dowel rods, weights

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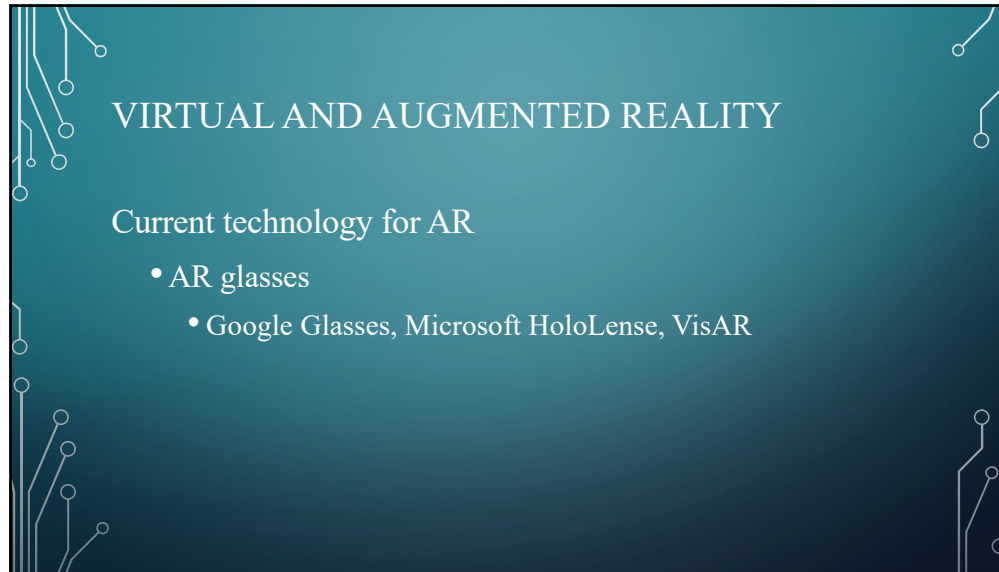


VIRTUAL AND AUGMENTED REALITY

VR Application to Clinical Practice

- Limb functionality
- Muscle mass, physical performance
- Stroke Rehabilitation
- Burn patients
- Education/practice of skills
- Mental health

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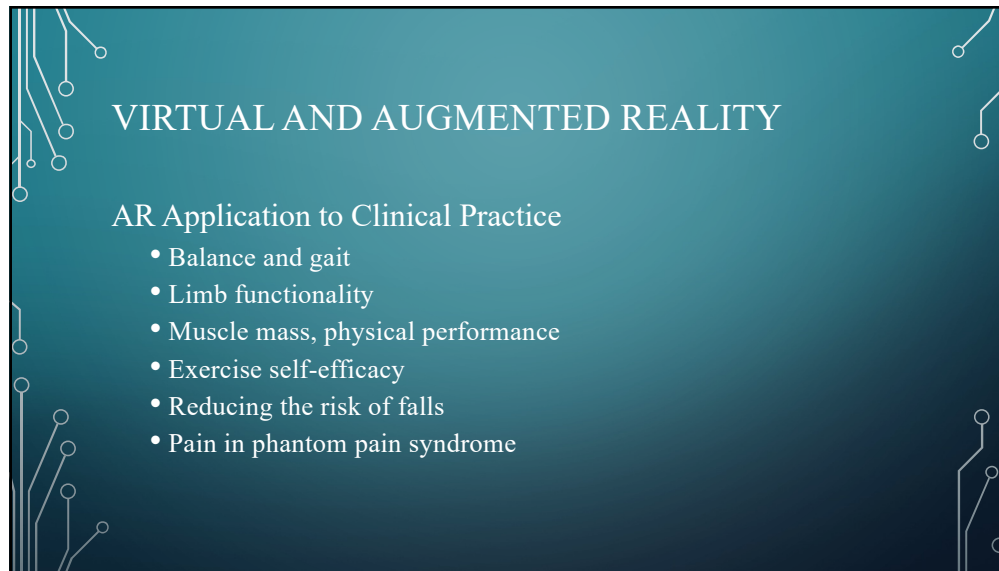


VIRTUAL AND AUGMENTED REALITY

Current technology for AR

- AR glasses
 - Google Glasses, Microsoft HoloLens, VisAR

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VIRTUAL AND AUGMENTED REALITY

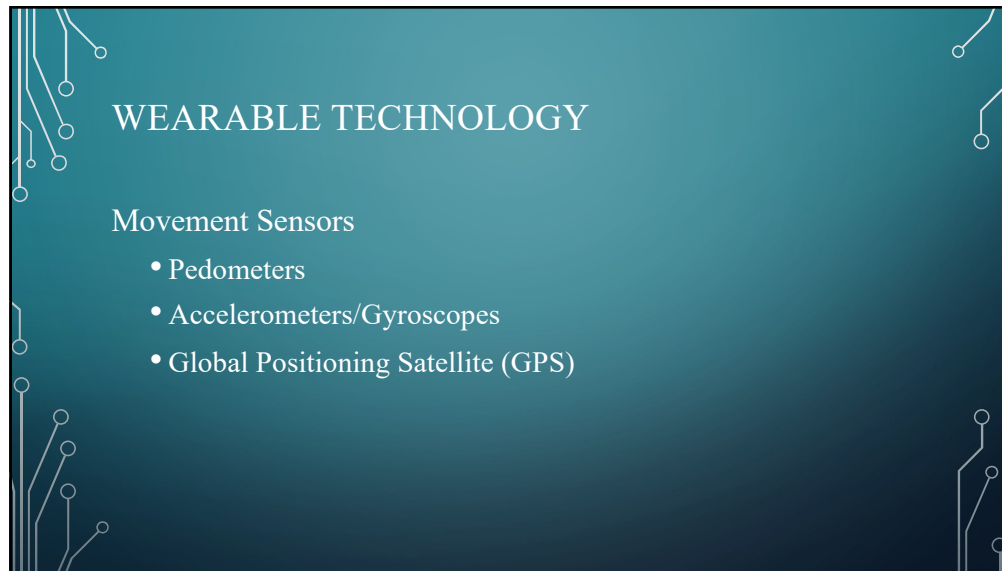
AR Application to Clinical Practice

- Balance and gait
- Limb functionality
- Muscle mass, physical performance
- Exercise self-efficacy
- Reducing the risk of falls
- Pain in phantom pain syndrome


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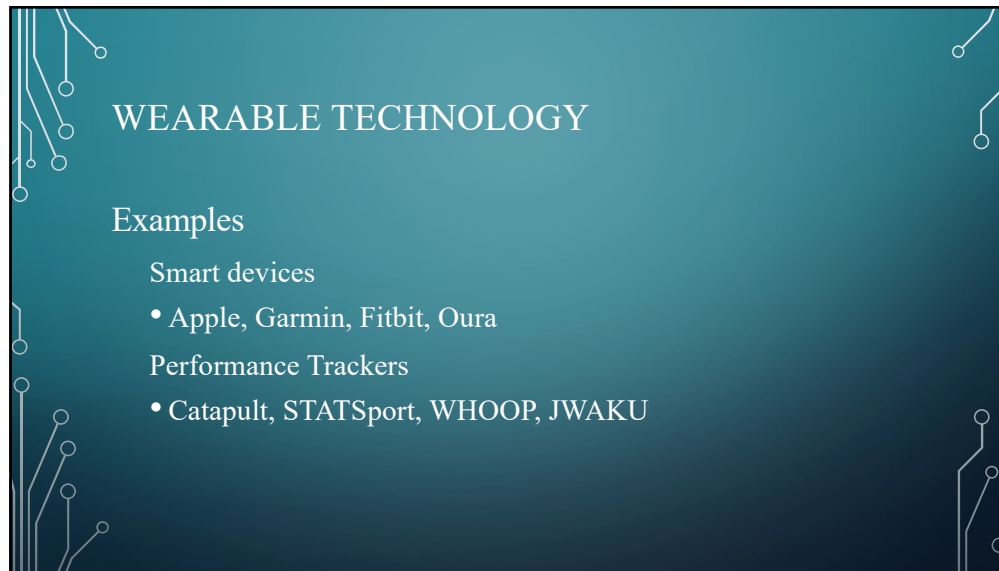
WEARABLE TECHNOLOGY

Physiologic Sensors

- Heart Rate Monitor
- Temperature
- Ovulation/Period tracking
- Oxygen level
- Diabetes (glucose levels)

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WEARABLE TECHNOLOGY

Examples

Smart devices

- Apple, Garmin, Fitbit, Oura

Performance Trackers

- Catapult, STATSport, WHOOP, JWAKU

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WEARABLE TECHNOLOGY

Examples

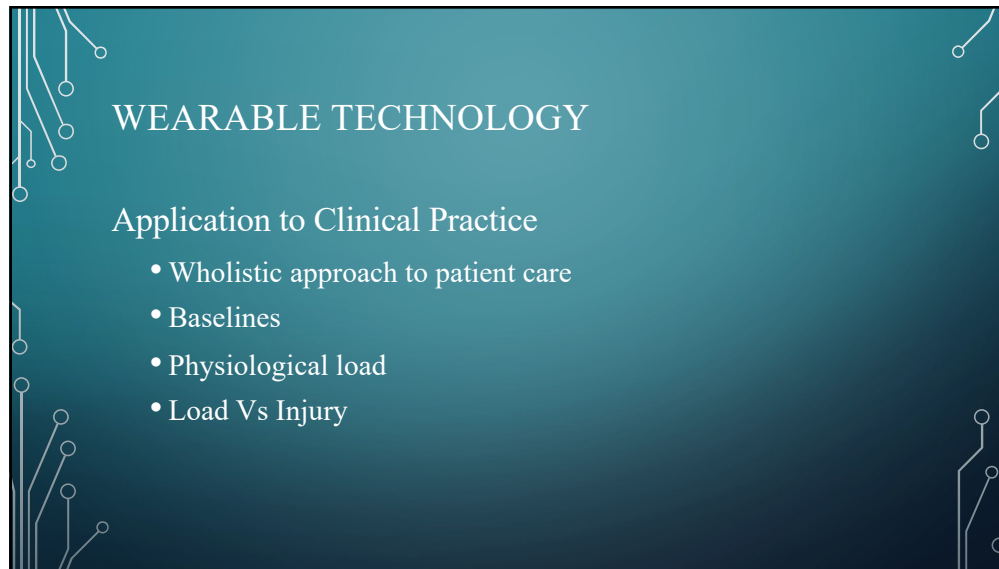
Biosensors

FreeStyle Libre, Dexcom, Owlet, Polar

Monitoring Bracelets

- Slivertree, Life Alert, Ava bracelet

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WEARABLE TECHNOLOGY

Application to Clinical Practice

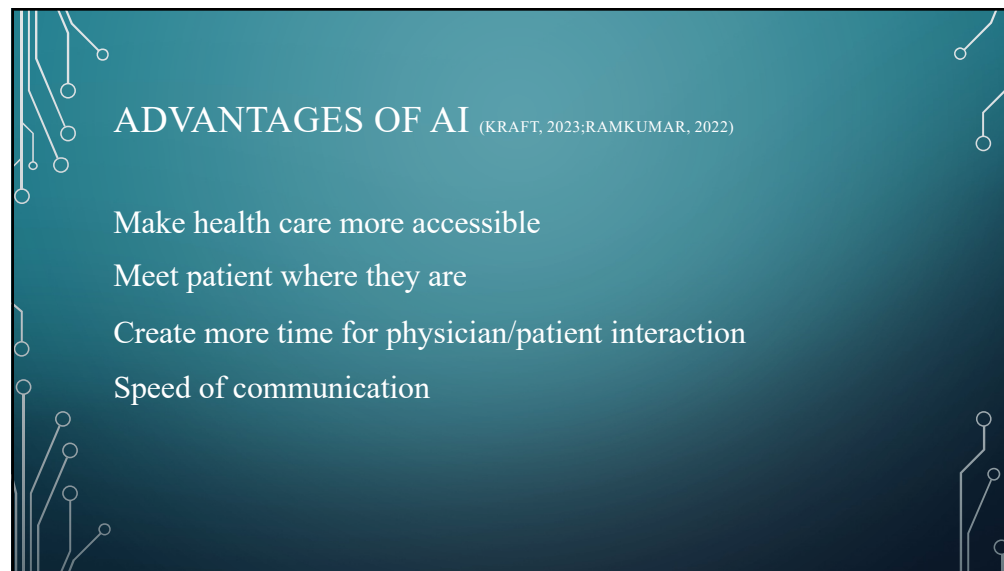
- Wholistic approach to patient care
- Baselines
- Physiological load
- Load Vs Injury

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ANALYZING BENEFITS, CHALLENGES, AND ETHICAL CONSIDERATIONS

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ADVANTAGES OF AI (KRAFT, 2023; RAMKUMAR, 2022)

- Make health care more accessible
- Meet patient where they are
- Create more time for physician/patient interaction
- Speed of communication

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CONCERNS OF AI

(FAYED, 2023;KRAFT, 2023;MATHENY, 2020;MESZAROS, 2022;MIR, 2023;RAMKUMAR, 2021)

- Perpetuating medical treatment bias
- Influence on physician/patient relationship
- Errors in data entry
 - Accuracy
- Black-box phenomenon
- Ethical considerations
 - Privacy, confidentiality
- Insurance implications

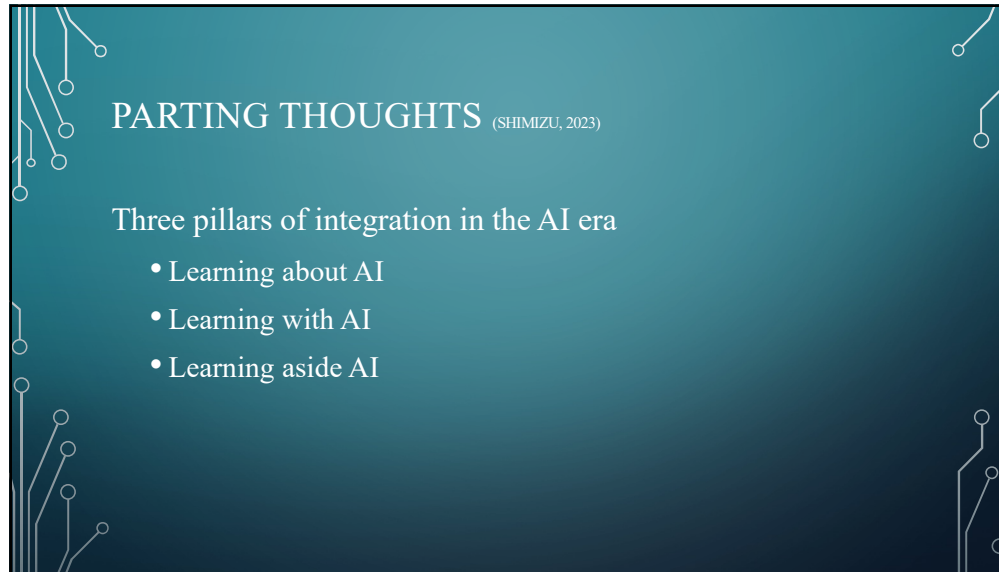
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LEGAL ASPECTS OF AI IN MEDICINE

(MATHENY, 2020;MESZAROS, 2022;MIR, 2023)

- HIPAA, confidentiality
- Lacking
- Need for creation of policies
- Prioritize ethical, validated data used
- Transparency in development of AI
- Role of regulatory agencies
 - U.S. Food and Drug Administration
 - Health Insurance Portability and Accountability Act(HIPAA)
 - Federal Trade Commission Act
 - State tort law

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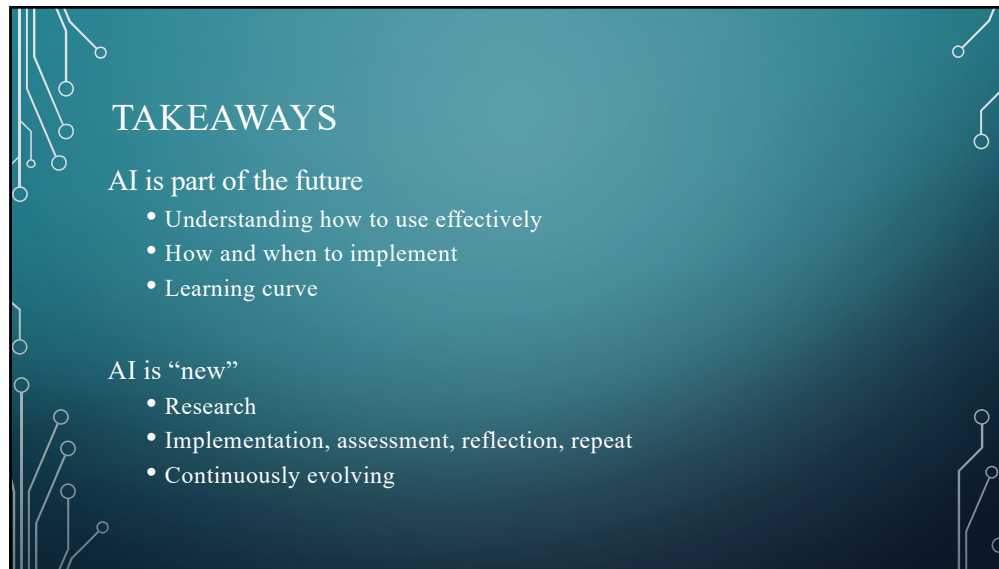


PARTING THOUGHTS (SHIMIZU, 2023)

Three pillars of integration in the AI era

- Learning about AI
- Learning with AI
- Learning aside AI

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TAKEAWAYS

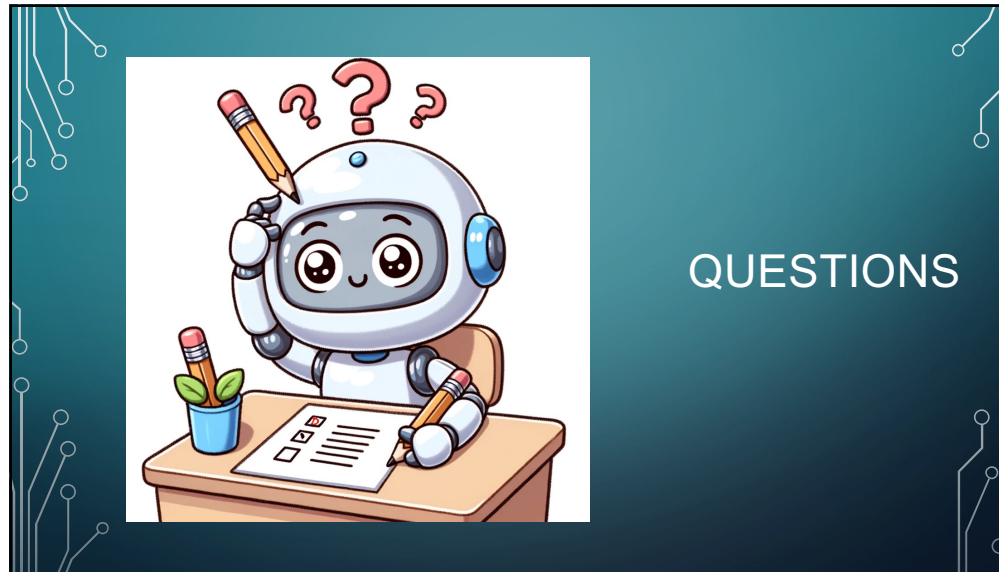
AI is part of the future

- Understanding how to use effectively
- How and when to implement
- Learning curve

AI is “new”

- Research
- Implementation, assessment, reflection, repeat
- Continuously evolving

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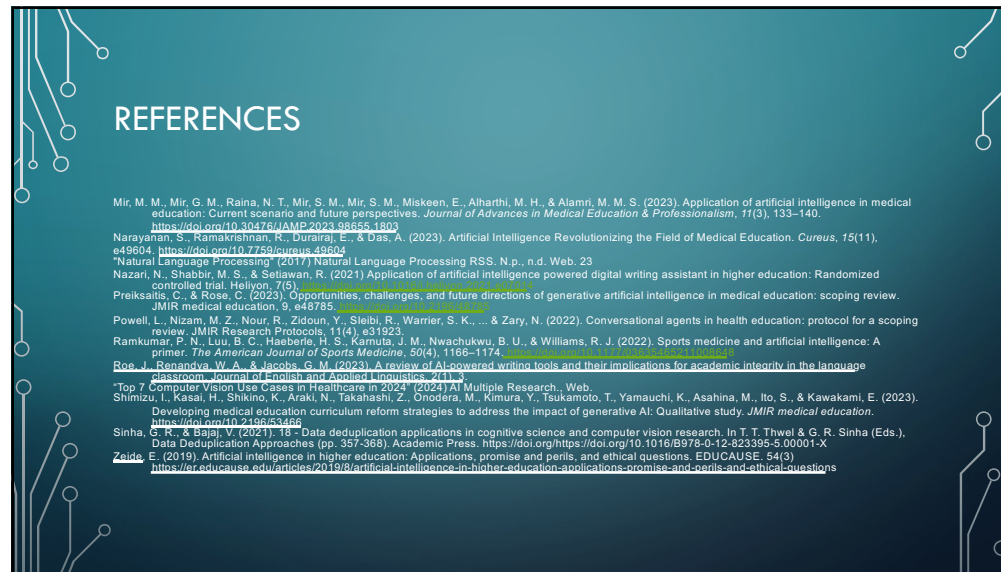


QUESTIONS

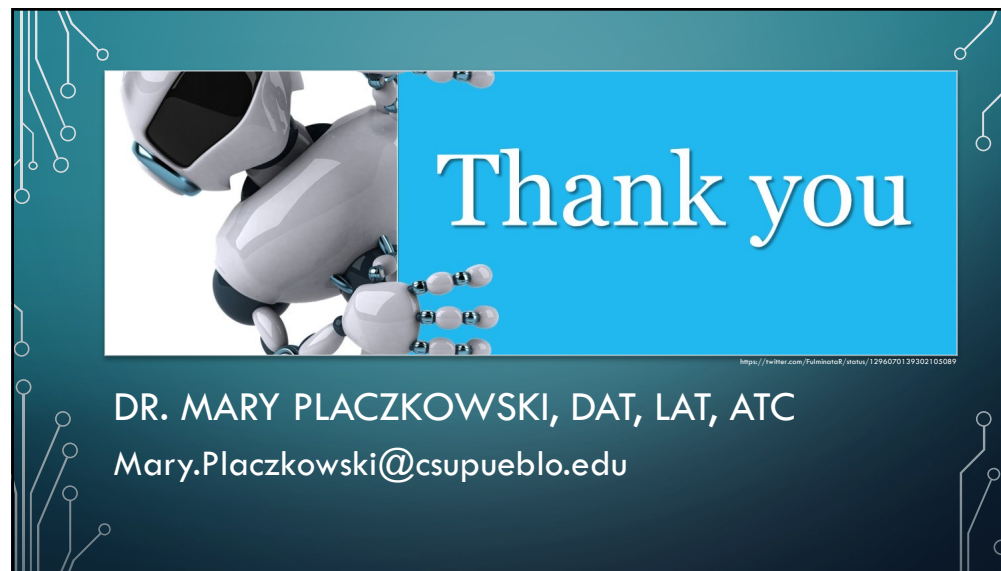
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