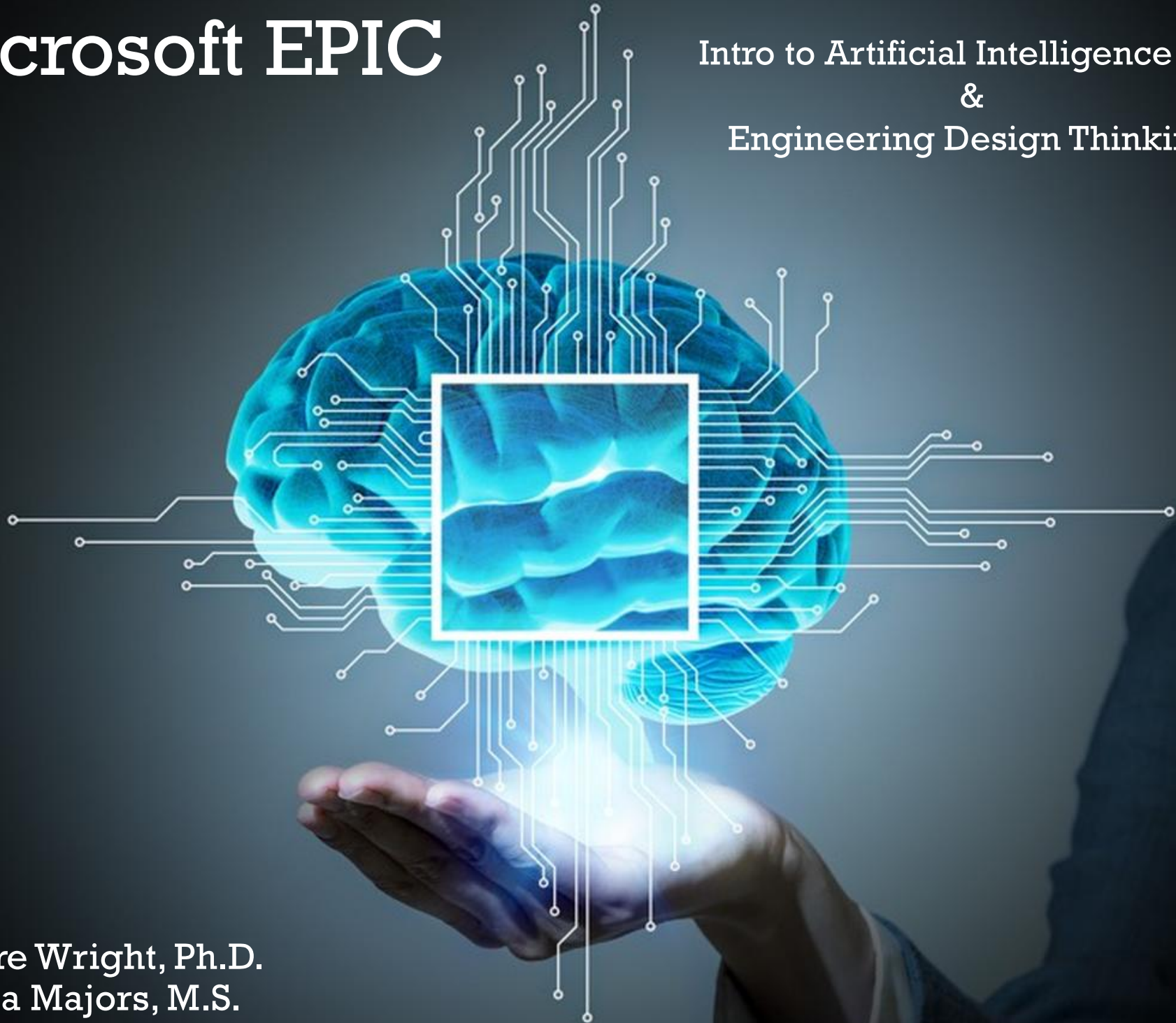


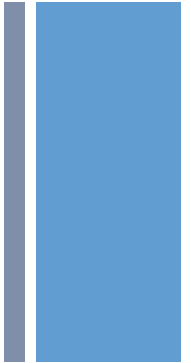
Microsoft EPIC

Intro to Artificial Intelligence (AI)
&
Engineering Design Thinking



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+ What is Artificial Intelligence (AI)?



What is “intelligence”?

(1) : the ability to **learn or understand** or to deal with **new** or trying situations : REASON

also : the skilled use of reason

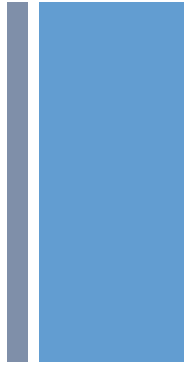
(2) : the ability to apply knowledge to manipulate one's environment or to **think abstractly** as measured by objective criteria (such as tests)

Artificial intelligence:

(1) : a branch of computer science dealing with the **simulation of intelligent behavior** in computers

(2) : the capability of a machine to **imitate intelligent human** behavior

+ Two categories: Weak AI and Strong AI



Weak AI (“**narrow AI**”) relies on algorithms and programmatic responses to **simulate** intelligence.

- Computer **follows a program** or action, based on input
- Exp. Alexa can recognize key sounds and word **patterns** to trigger basic tasks (e.g. “turn on the lights”), but the system **does not** recognize the intent behind words
- May **appear** convincingly “intelligent” to users, but is actually a **programmatic response**
- No actual “thinking” occurs
- Most examples of current use fall into this category



Two categories:

Weak AI and Strong AI



Strong AI systems are designed to **mimic the human brain** and its higher-level capacity for thought and decision making.

- Designed to be **cognitive** – to be aware of context and nuance, not just literal intent
- Decisions are **not strictly programmatic**, but based on **reasoned analysis**
- Capable of **making decisions with incomplete information**, by analyzing patterns, applying context, and determining a reasoned course of action
- **Learns and adapts** as it assimilates new information and repeats tasks – improves over time
- Goals of each strong AI system vary, so each iteration looks very different and is highly customized

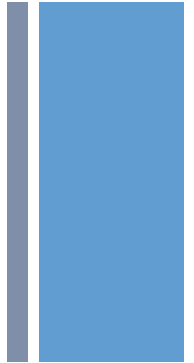
+ What is Machine Learning?

Machine learning is a type of AI process that gives the computer access to a data set and allows it to “learn” from that information.

- Makes determinations based on available data, previous historical evidence, and anticipated outcome
- Exp. Alexa does not use machine learning to turn on the lights, because it is not “learning” anything.
- Exp. The Nest Thermostat uses actual machine learning to adapt and respond to the light usage of an individual or family.
- Not only responsive to data, but also designed to search data for trends, patterns, and anomalies.
- Helps the AI improve over and become more accurate over time.

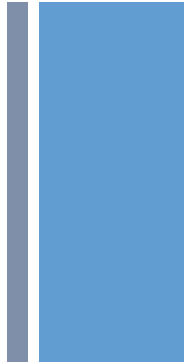
+ 5 Examples of Real World AI

- **Alexa and Siri** – Weak and Strong AI
- **Tesla** – Self-driving and predictive systems
- **Netflix** – Applies pattern recognition and millions of data points to predict viewer preferences
- **Drones** – Use data and sensors to enhance functionality and enable complex tasks
- **Nest** – Learns from living habits to predict optimal environmental controls



+ Considerations for Training the AI System

- **Quantity and quality** are both important
- AI (like people) will make mistakes more often if it **is trained with bad information**
 - Exp. If you tag all of your emails as spam, an AI email filter will mis-identify all of your future emails as spam.
- Training is not a “one and done” process. Once trained, the AI **must continue to be trained** with additional data points and feedback on how effectively it is interpreting the initial data set.
 - Exp. If the AI email filter falsely identifies something as spam, you may improve future results by providing new data points or by correcting the AI on how it responded to the previous data.
- Access to data is **CRITICAL**, but we live in a **data rich society** – social media, sensors, cloud-based data storage, etc.



+ Design Thinking

THE ENGINEERING DESIGN PROCESS

COMMUNICATE
your solution

ITERATE
to improve
your prototype

TEST
and evaluate
your prototype

DEFINE
the problem

IDENTIFY
constraints on your
solution (e.g. time, money,
materials) and criteria
for success

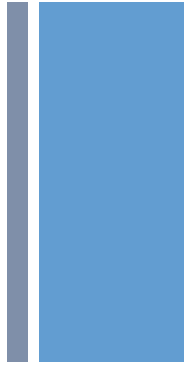
BRAINSTORM
multiple solutions
for the problem

SELECT
the most
promising solution

PROTOTYPE
your solution



+ Value Proposition



The primary job of an engineer is to make people's lives happier, safer, more productive, and/or more fulfilling.

- Engineering Design Process starts with a problem or need
- Every successful product must have a value proposition that aligns with this problem or need
- A successful pitch must focus not only on the solution, but also on communicating the value proposition of that solution

+ Brainstorm & Identify Problems



+ COVID19 Related Issues

Popular themes:

- Survival resources – food, medicine, toilet paper!!!
- Connectivity for business
- Entertainment in isolation
- Online learning
- Current/accurate info
- Laws and restrictions
- Research and prevention



+ Research and prevention

- AI that uses cloud/crowd sourced social media data to identify patterns in the spread and origination of COVID outbreaks
- Exp. AI uses data mining to identify posts that indicate illness by recognizing keywords
- Weak AI - vernacular filters to distinguish word usage
 - e.g. "I feel sick" vs. "I'm sick of eating Ramen noodles"
 - Algorithmic pattern recognition using a large data set
- Weak AI - vernacular filters to distinguish word usage
- Strong AI – adapts dynamically to new uses of language



**YOU KNOW WHO GAVE THAT TIGER AT
THE ZOO THE CORONAVIRUS?**



CAROLE BASKINS

makeameme.org

+ What problems or needs can you identify?

- Focus on problems that we might use AI to address.
- Draw from your own experience.
- Identify a prospective target market.
- Does a good solution already exist?
- Type your ideas into the chat window.
- Single words or short phrase.



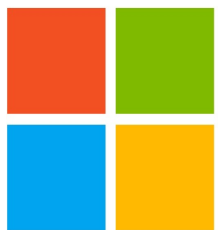


Thank you for joining us for the
Microsoft EPIC session of YouthSpark!



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