AI In Healthcare

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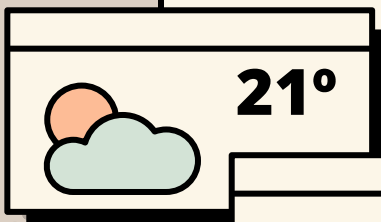
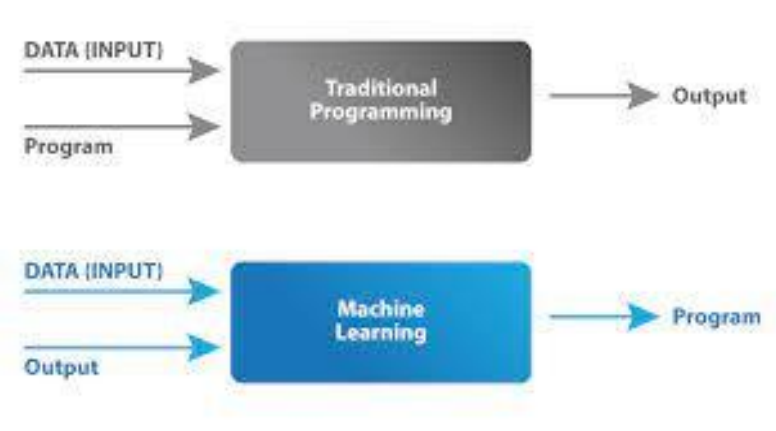


What Is AI?

- AI (Artificial Intelligence) is a method of technology that mirrors human intelligence through statistics, if-then rules, and decision trees, etc.
- There are many subsets of AI such as:
  - Expert Systems
  - **Language Processing**
  - **Machine Learning**
  - Narrow AI
  - Super AI

Machine Learning

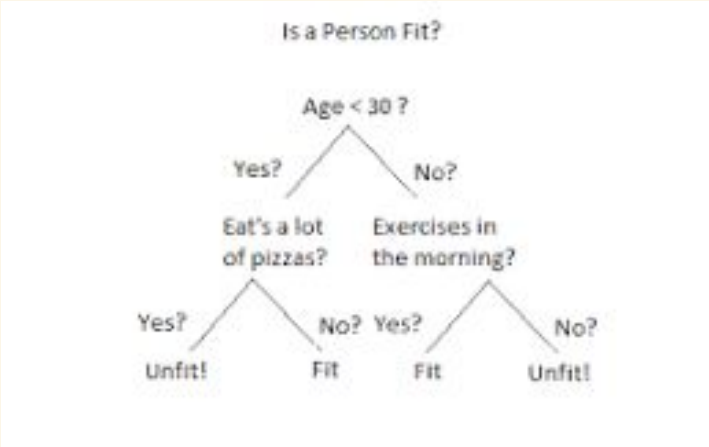


Machine Learning is a subset of Artificial Intelligence and Computer Science that uses computer algorithms to imitate the way a human learns and as mistakes are made its accuracy improves as well

If-Then rules & Decision Trees

- If-then rules use the logic of a condition statement and statistics to give a prediction

- Decision Trees: visually and effectively showing decisions when making them



Natural Language Processing (NLP)

- What is it?
  - Enables computers to comprehend, generate, manipulate human language
- Extract key insights from clinical documentation
- Provide targeted treatments with greater accuracy than manual data processing

The difference between NLP and LLM is that NLP can understand and interpret language while LLM is used to communicate with the language possessed

How Can AI be Implemented in Healthcare?

AI implementation

- Accuracy in Diagnosis
- Accuracy in Data Organization
- Streamlining Tasks/Improving Patient Care
- Drug Development
- Robot Assisted Surgery
- Disease Recognition

Harnessing the Power of Artificial Intelligence for Better Patient Care

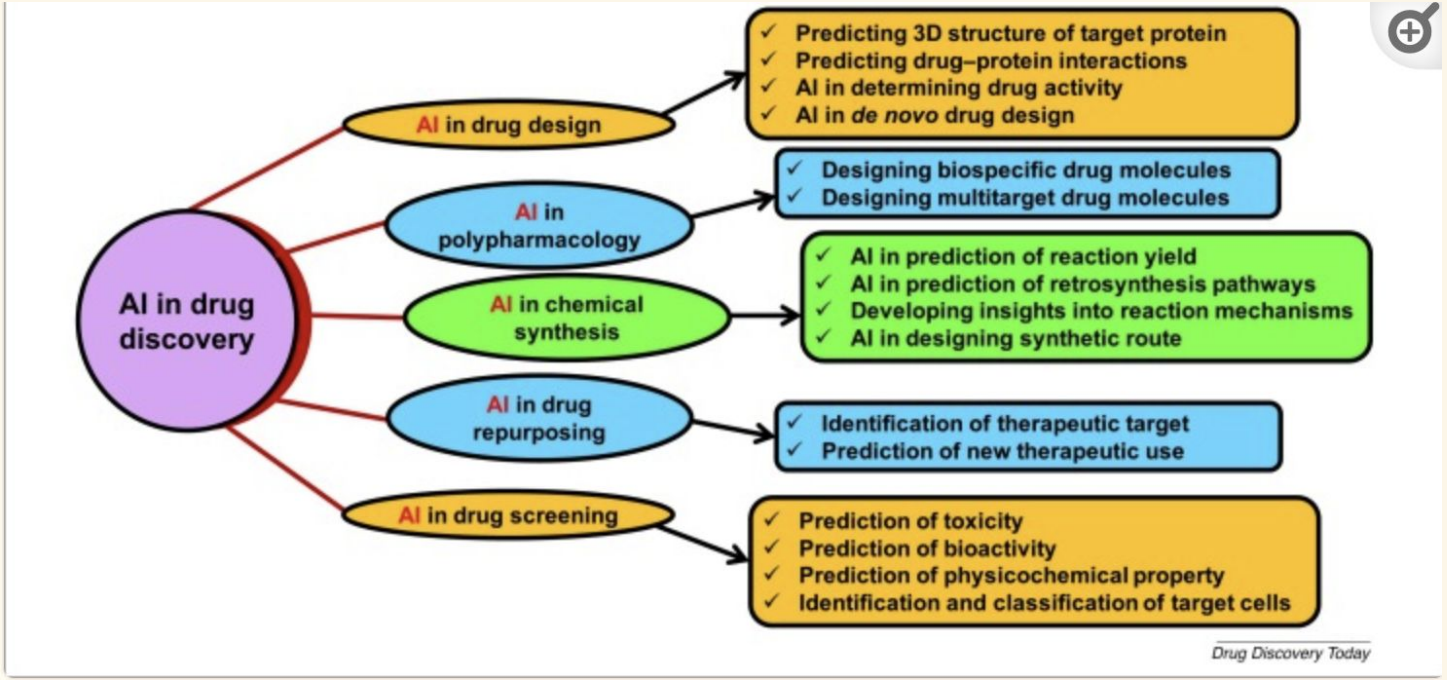
- In certain forms of healthcare, AI is used in many applications
- AI technologies have the ability to enhance clinical decision making, streamline administrative processes, and help with facilitating the development of personalized treatment plans to individual patient needs
- AI can result in a more sustainable healthcare system

Streamlining Tasks

- Reduces stress of managerial tasks
- Reduces administrative burdens
- Improves operational efficiency
- How does this help healthcare?
- Streamlining physician tasks
    - NLP can convert written data into stored data → leaves medical professionals with more time

Drug Discovery and Development

- Before the presence of AI, drug development was viewed as a time-consuming and expensive task with many chances of failure.
- AI comes in this process to help by using the data generated from these large molecular screening profiles and all the analysis from the public health organizations and help speed up and prevent failures or mistakes in drug discovery.
- Applications of AI use various data to help determine and predict all the drug's likely properties.


AI in drug discovery
AI in drug design
AI in polypharmacology
AI in chemical synthesis
AI in drug repurposing
AI in drug screening
✓ Predicting 3D structure of target protein
✓ Predicting drug–protein interactions
✓ AI in determining drug activity
✓ AI in *de novo* drug design
✓ Designing biospecific drug molecules
✓ Designing multitarget drug molecules
✓ AI in prediction of reaction yield
✓ AI in prediction of retrosynthesis pathways
✓ Developing insights into reaction mechanisms
✓ AI in designing synthetic route
✓ Identification of therapeutic target
✓ Prediction of new therapeutic use
✓ Prediction of toxicity
✓ Prediction of bioactivity
✓ Prediction of physicochemical property
✓ Identification and classification of target cells
Drug Discovery Today

QUESTION

Would you trust a robot to operate on you?

Robot-Assisted Surgery

Robot assisted surgery allows doctors to perform surgeries with more precision but as of right now robots perform less risky procedures

Benefits

- Improved 3D visuals
- More precise control
- Ideal for delicate surgeries
- less pain and blood loss
- Shorter hospital stay

Risks

- Still has a risk of infection

Intuitive Da Vinci

-Surgeons can perform intricate procedures with heightened accuracy and control.

Procedures:

- ***Prostate Surgery***
- ***Gynecological Procedures***

- **User Interface:**
  - *Intuitive Console:* Surgeons operate from a console, translating hand movements to robotic actions.
  - Da VInci utilizes image analysis, surgical planning, and real-time adjustments based on the patient's anatomy.

Excelsius GPS

- Excelsius GPS is a robotic navigation platform that combines a robotic arm and navigation capabilities for accurate alignment in spine surgery

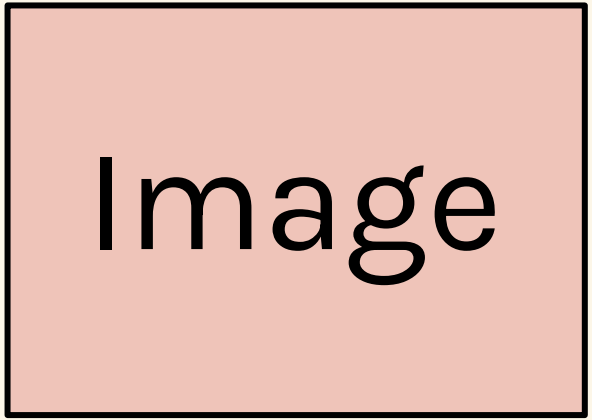
- Enhances precision in artificial disc replacement surgeries

AI Image Processing

- Image analysis uses both AI and computer vision

How?

- First the AI collects a large datasheet these images are processed which involves resizing and data augmentation to ensure consistency
- CNN's are **Convolutional Neural Networks** CNNs are a type of deep learning architecture most commonly used in image processing → they learn and extract specific features



Recognizing Disease/Treatments

- Process and analyze massive amounts of data
- Analyze medical images with greater speed
  - Detect diseases such as cancer at earlier stages
- Ex: diagnose eye disease from retinal scans

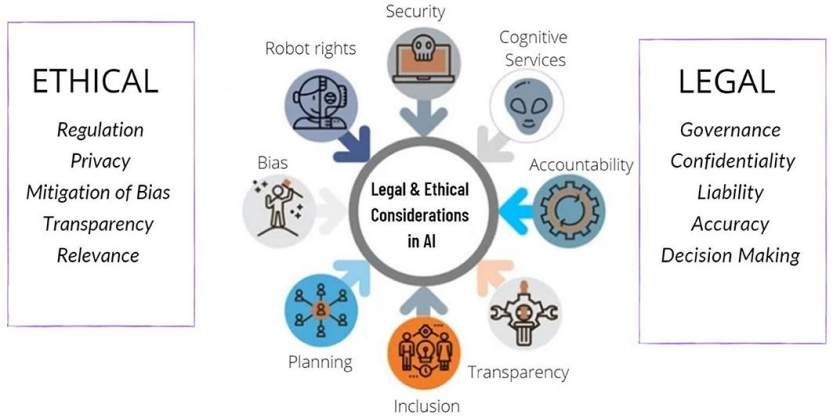

Top 7 A.I.
Examples
in Healthcare

Flaws With AI in Healthcare

- AI runs based off of information
- AI cannot detect or match any exceptions for cases
- AI does not actually learn →may false diagnose diseases
- Expensive and bulky

Ethical Considerations of AI in Healthcare

- Privacy and data protection
- Lack of empathy
- Bias in algorithms (or person making algorithms) can give wrong diagnosis worsening patient conditioning



Kahoot:)

Thanks for listening!!

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