



*Our Newest Teammate:*  
Integrating Artificial  
Intelligence Into Family  
Medicine

Russell Kohl, MD, FAAFP

7/16/24

# Learning Objectives

Upon successful completion of this lecture, the attendee will be able to:

- Briefly discuss the history of technology in medicine
- Recognize the technological basis of current artificial intelligence systems
- Identify myths, misperceptions, and limitations regarding artificial intelligence use within healthcare
- Consider potential uses of artificial intelligence within healthcare and their implications on the practice of Family Medicine



Any sufficiently  
advanced technology  
is indistinguishable  
from magic

Arthur C Clarke

# TECHNOLOGY IN MEDICINE

**PENICILLIN (1928)**

**X-RAYS (1895)**

**GERM THEORY OF DISEASE (1861)**

**ETHER ANESTHESIA (1846)**

**STETHOSCOPE (1816)**

**SMALLPOX VACCINE (1796)**

**MICROSCOPE (1590)**

**PRINTING PRESS (1440)**

**AI IN HEALTHCARE (2023)**

**CRISPR-CAS9 GENE EDITING (2012)**

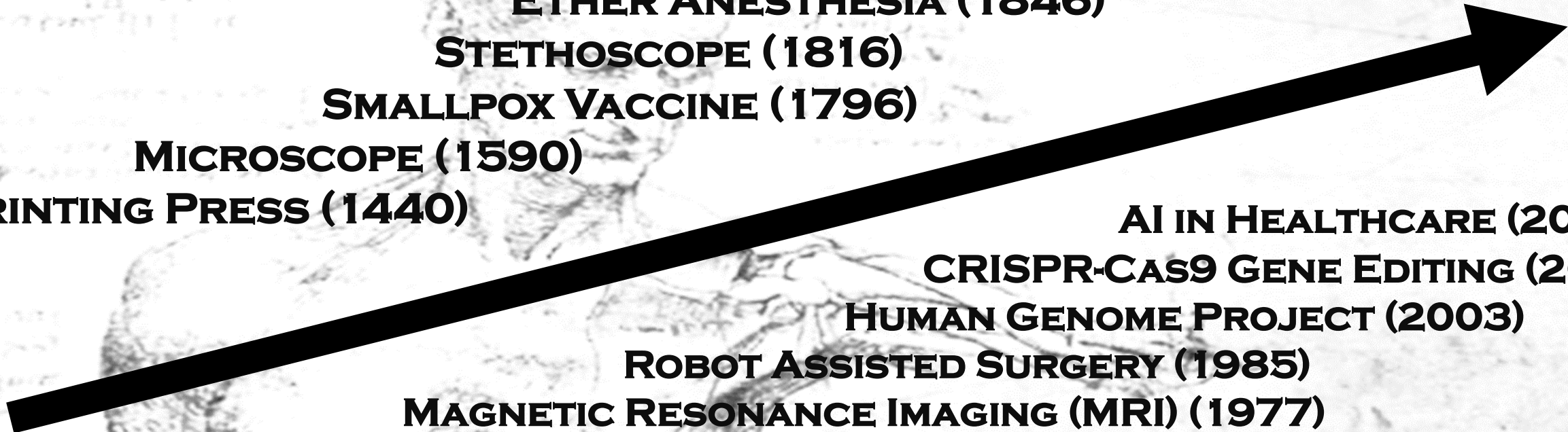
**HUMAN GENOME PROJECT (2003)**

**ROBOT ASSISTED SURGERY (1985)**

**MAGNETIC RESONANCE IMAGING (MRI) (1977)**

**KIDNEY TRANSPLANT SURGERY (1954)**

**DNA DOUBLE HELIX (1953)**



# LONDON MEDICAL AND PHYSICAL JOURNAL, 1821

“... I have no doubt whatever, from my own experience of its value, that it will be acknowledged to be one of the greatest discoveries in medicine by all those who are of a temper, and in circumstances, that will enable them to give it a fair trial. That it will ever come into general use, notwithstanding its value, I am extremely doubtful; because its beneficial application requires much time, and gives a good deal of trouble both to the patient and the practitioner; and because its whole hue and character is foreign, and opposed to all our habits and associations.

It must be confessed that there is something even ludicrous in the picture of a grave physician formally listening through a long tube applied to the patient's thorax, as if the disease within were a living being that could communicate its condition to the sense without.”

-John Forbes M.D.

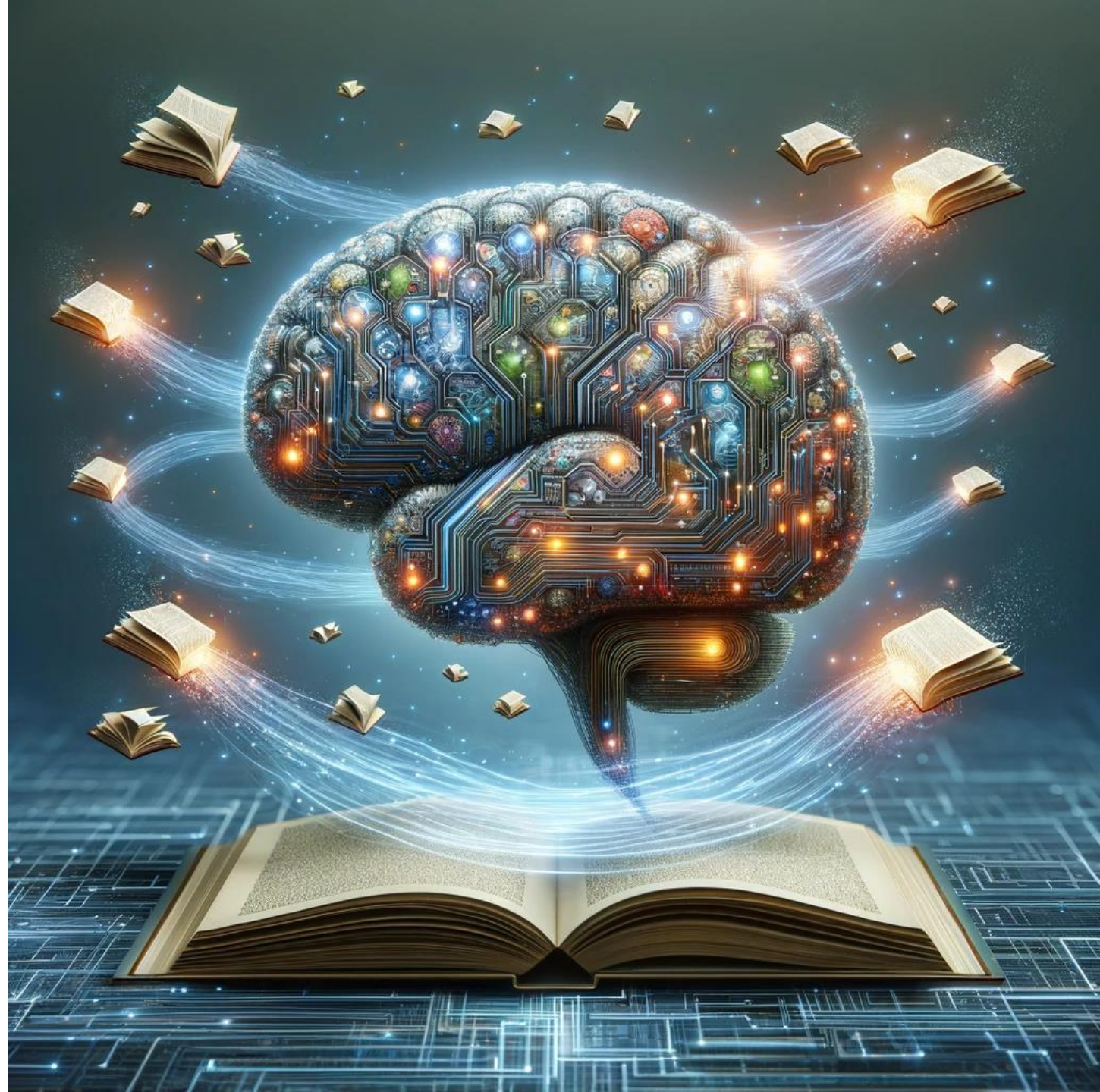
Physician to the Penzance Dispensary

# What is a “GPT”?

Generative

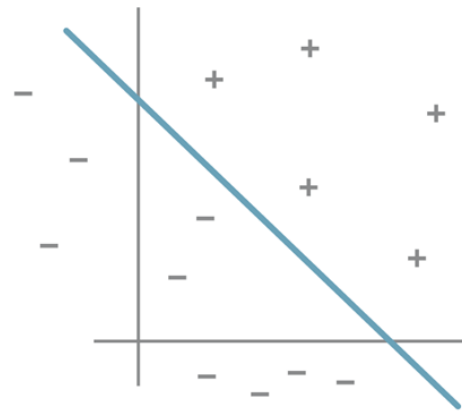
Pre-Trained

Transformer

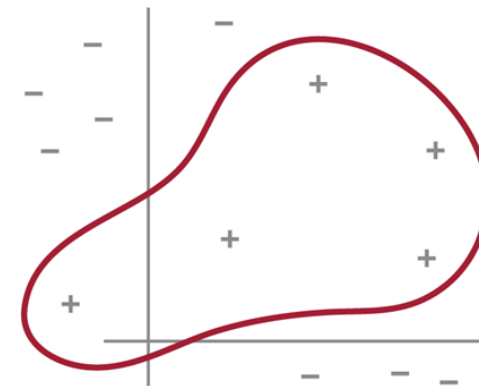


# How AI "Thinks"

Linear classifiers



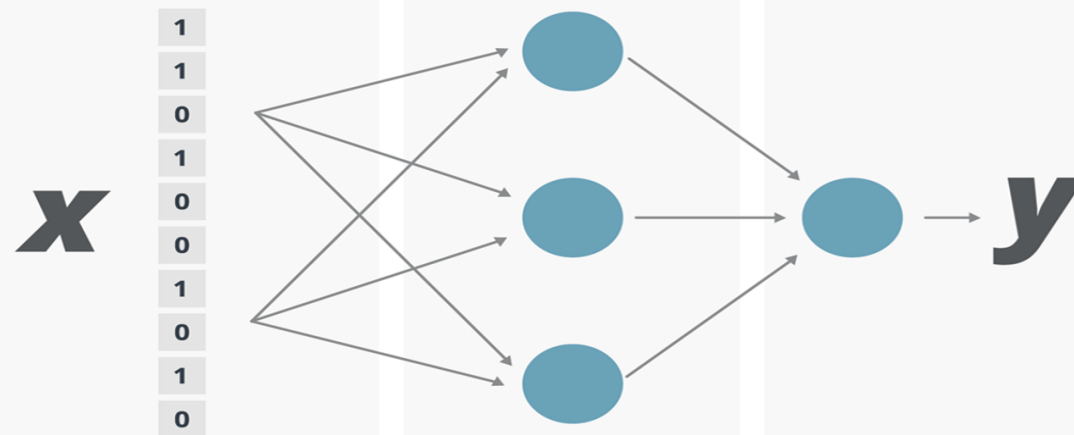
Complex classifiers



Input layer

Hidden layer(s)

Output layer

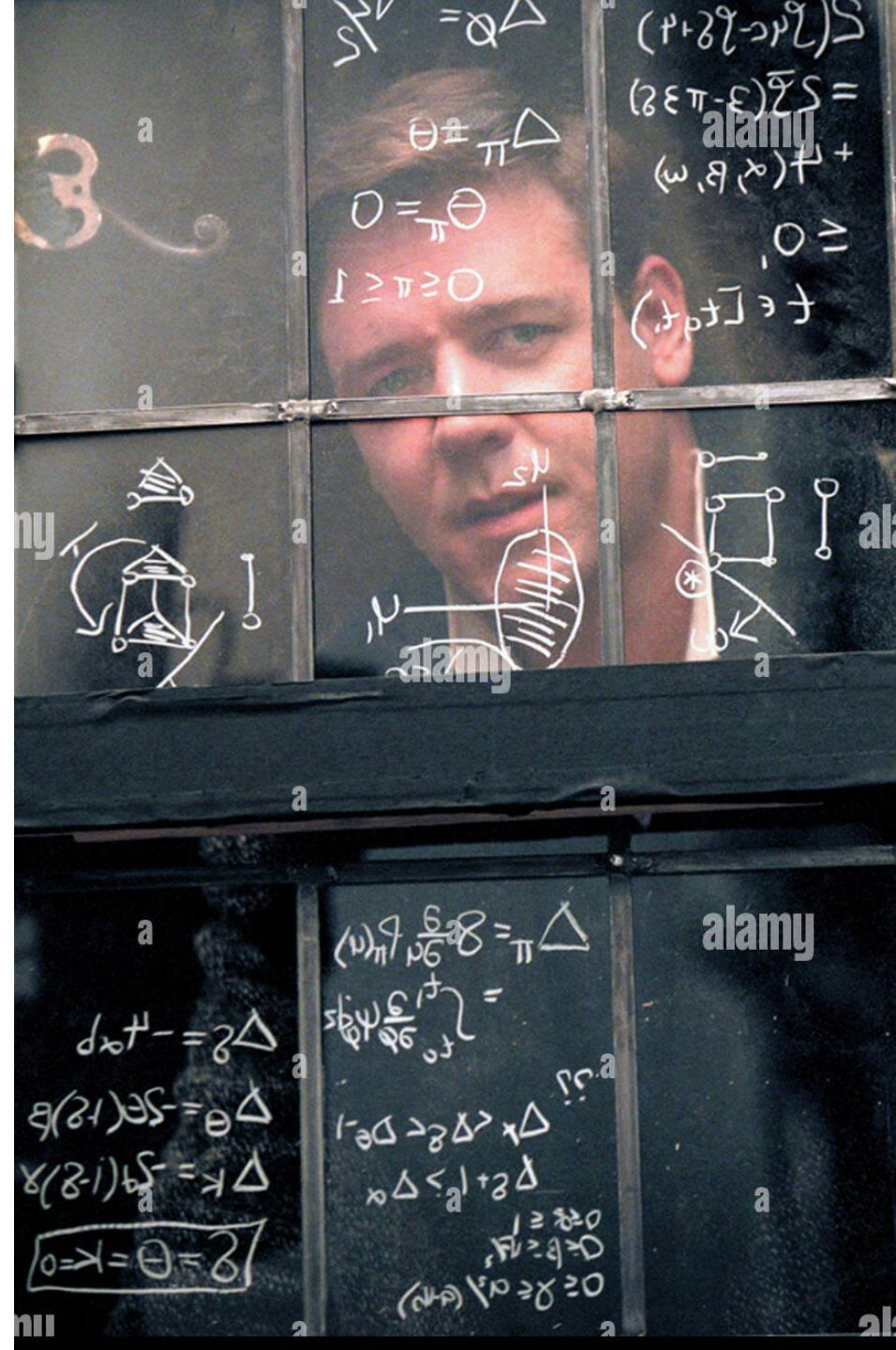


Weights

Weights



*Think of a GPT  
as speaking  
with John  
Nash...*

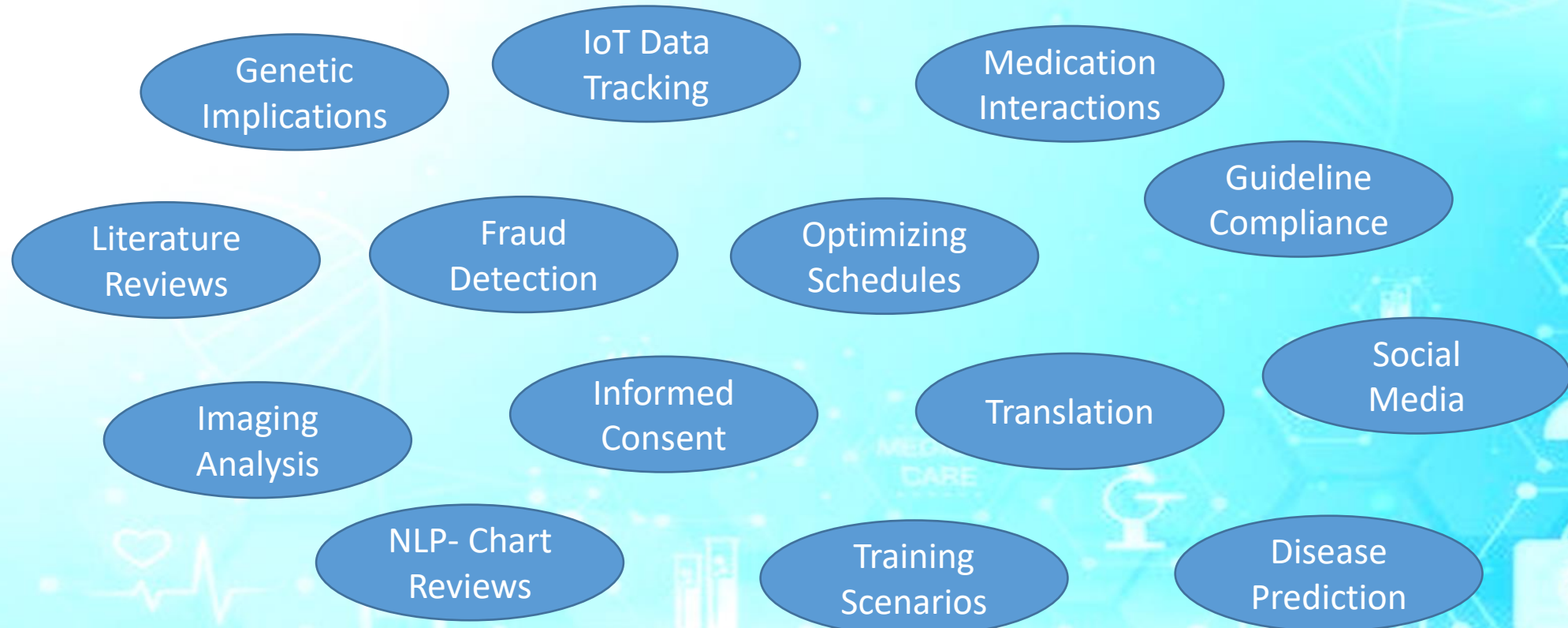




# Artificial Intelligence Myths

- “I can use pre-built, ‘off the shelf’ algorithms to create AI”
- “Artificial Intelligence is likely to introduce hidden biases into the data outputs”
- “AI creates ‘black-box answers’ that are beyond human understanding”
- “If AI is more accurate than human diagnoses, it should be able to drive clinical decisions”

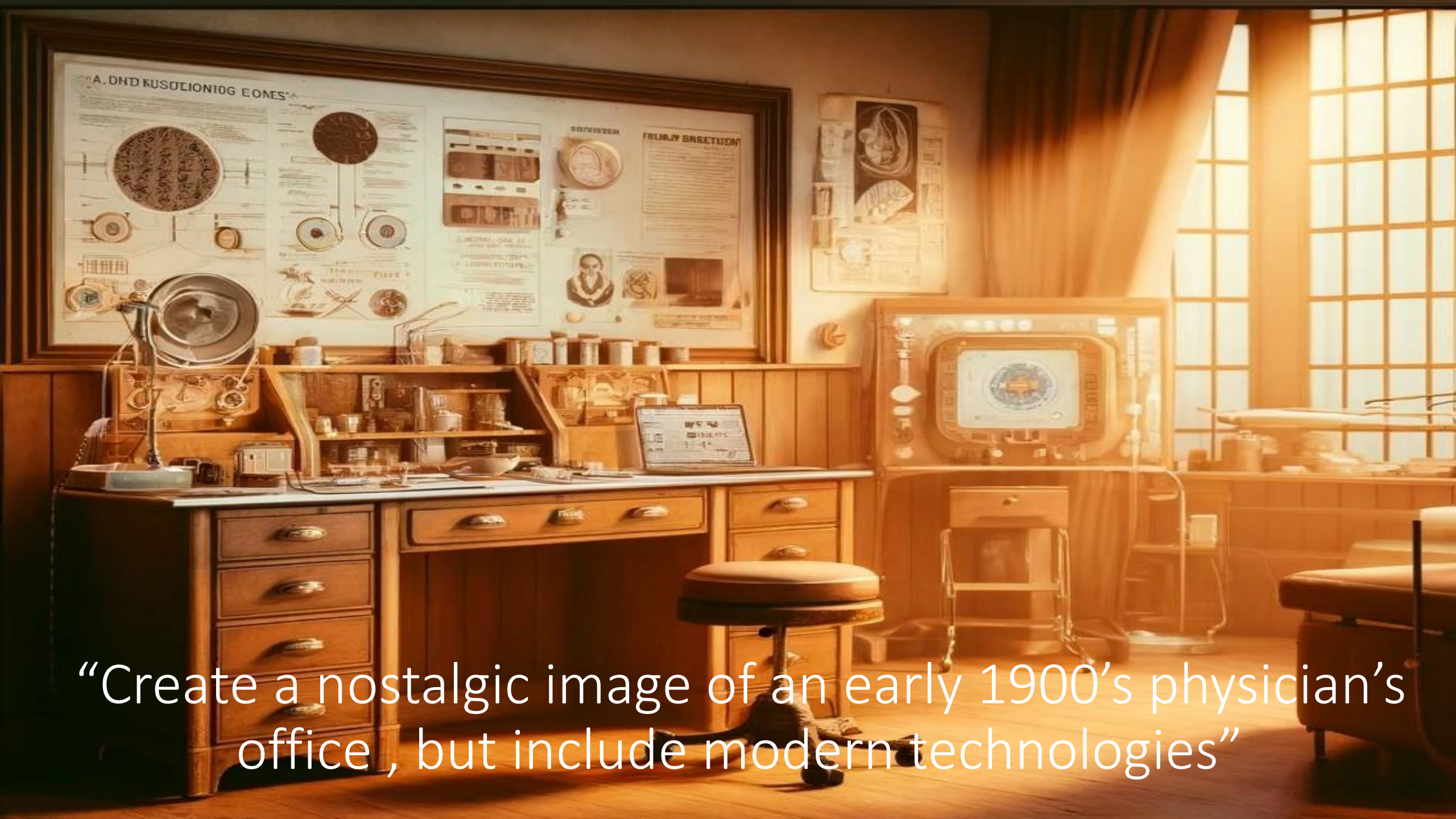
# What is AI Good At?



# How Can I Use a GPT?

- Patient letter templates
- Pt education
- Data analysis
- Expedite medical research
  - (consensus.app)
- Develop basic website
  - (mixo)
- Develop basic outline/slideset





“Create a nostalgic image of an early 1900’s physician’s office , but include modern technologies”

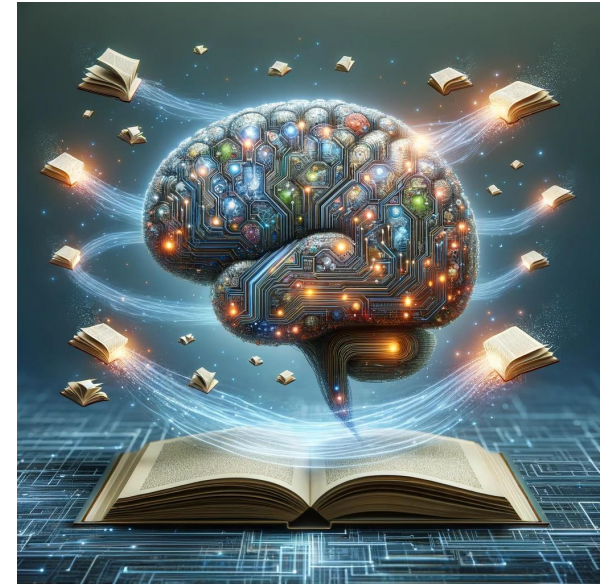


“Create a 16:9 Powerpoint Background of That Image”



*“Create an image of the Arthur Clarke saying about technology and magic”*

*“Create an image, without words, to explain what a GPT is”*

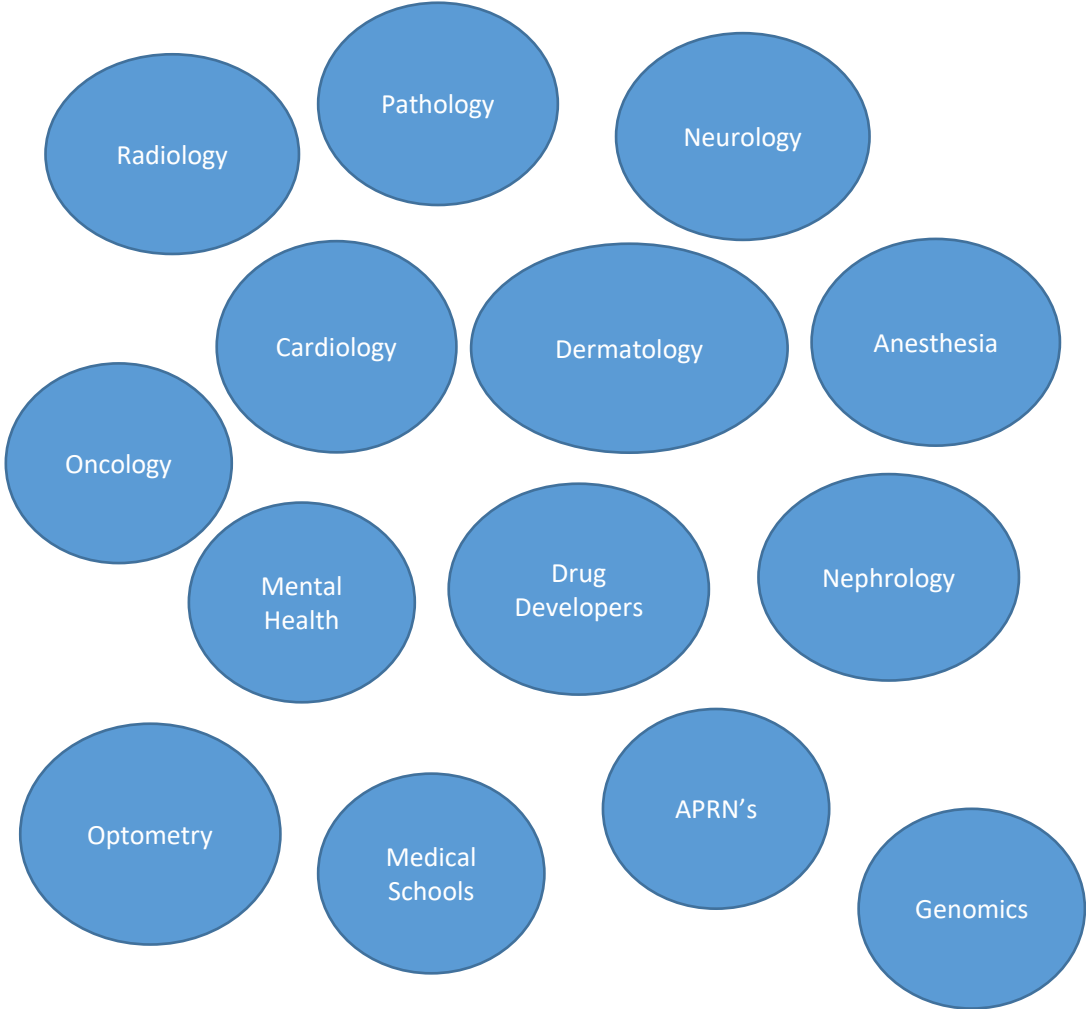


*“Create an image, without text, of a family physician using a GPT”*



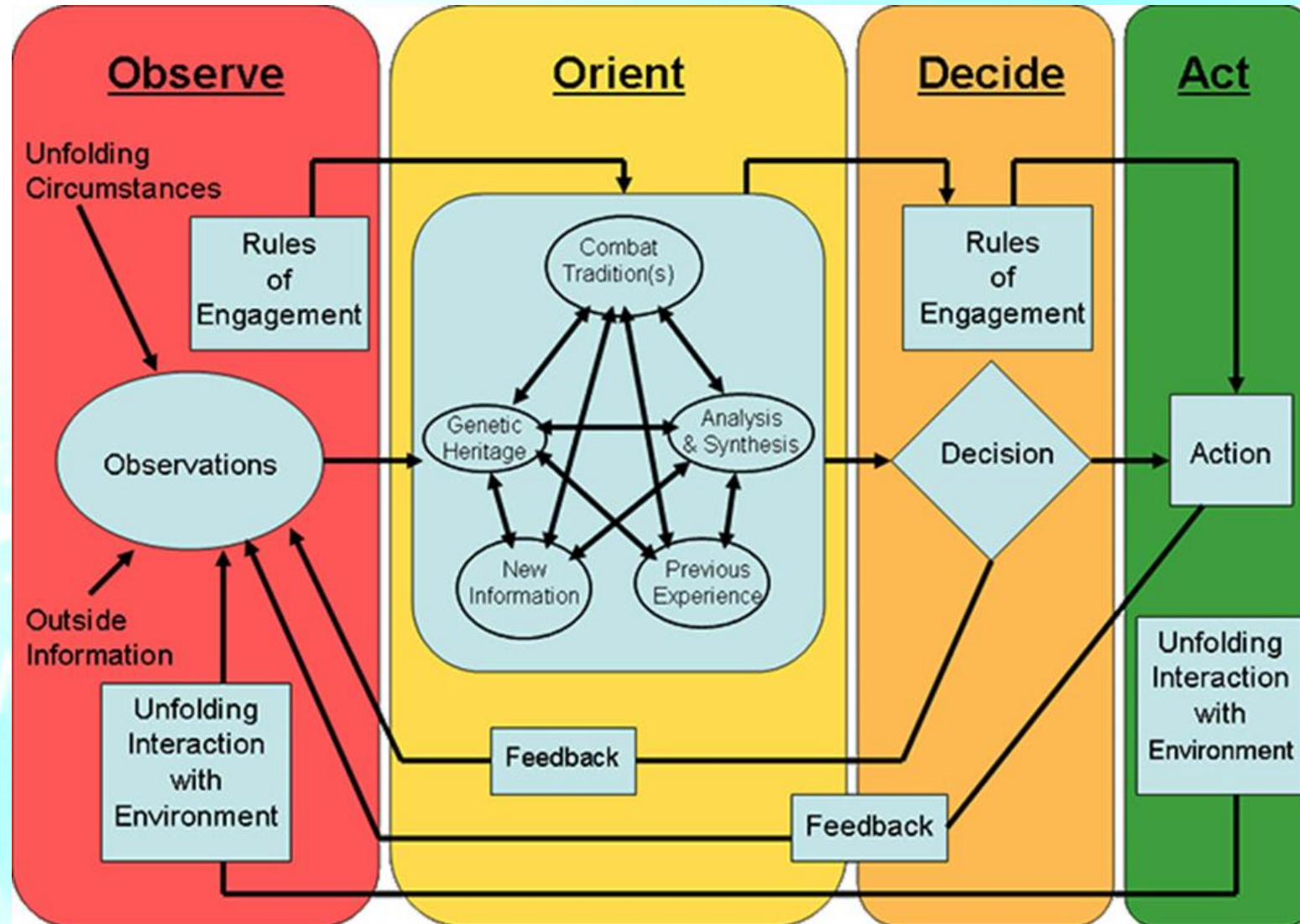
What is the Future of AI in Medicine?

# Who Should Be Nervous?





# How do we effectively “target” AI?

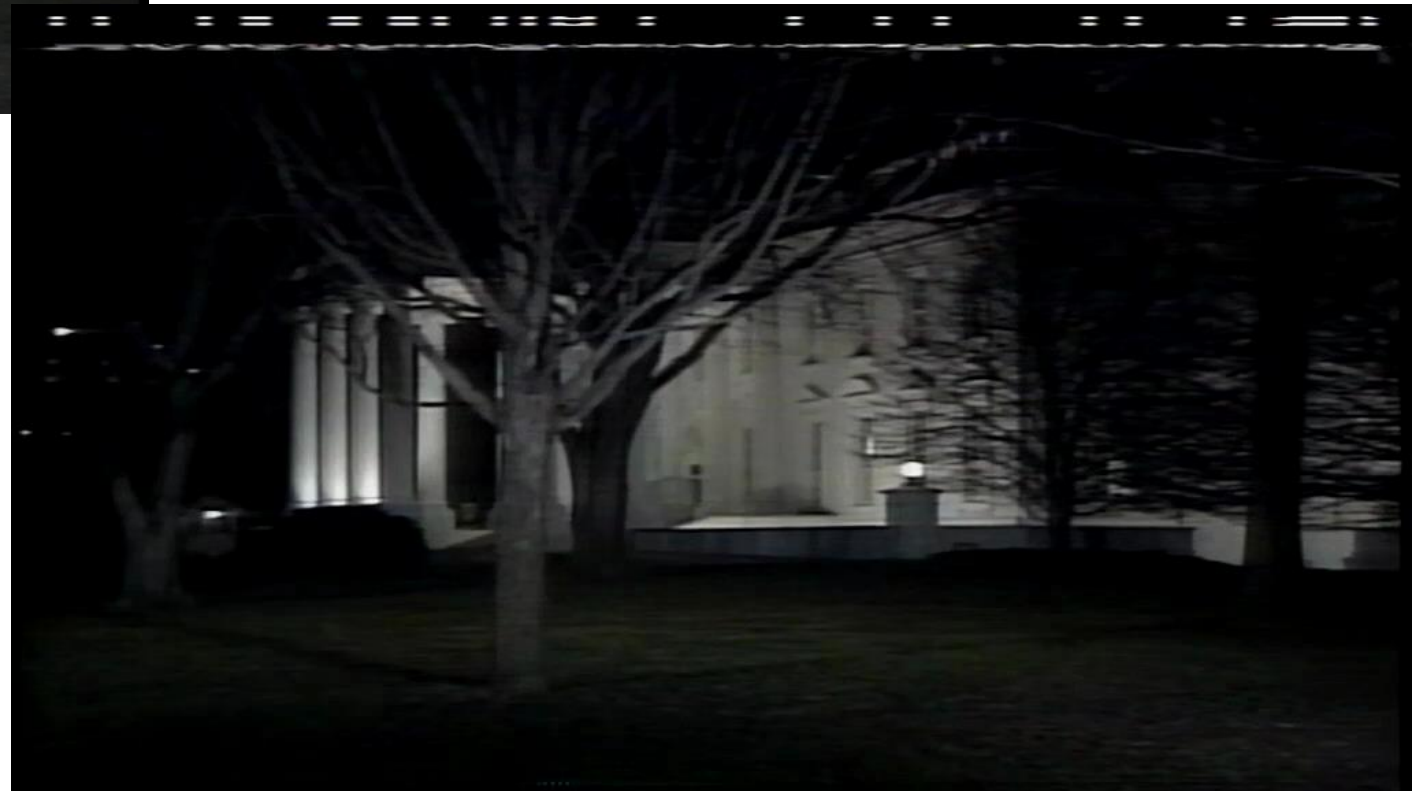
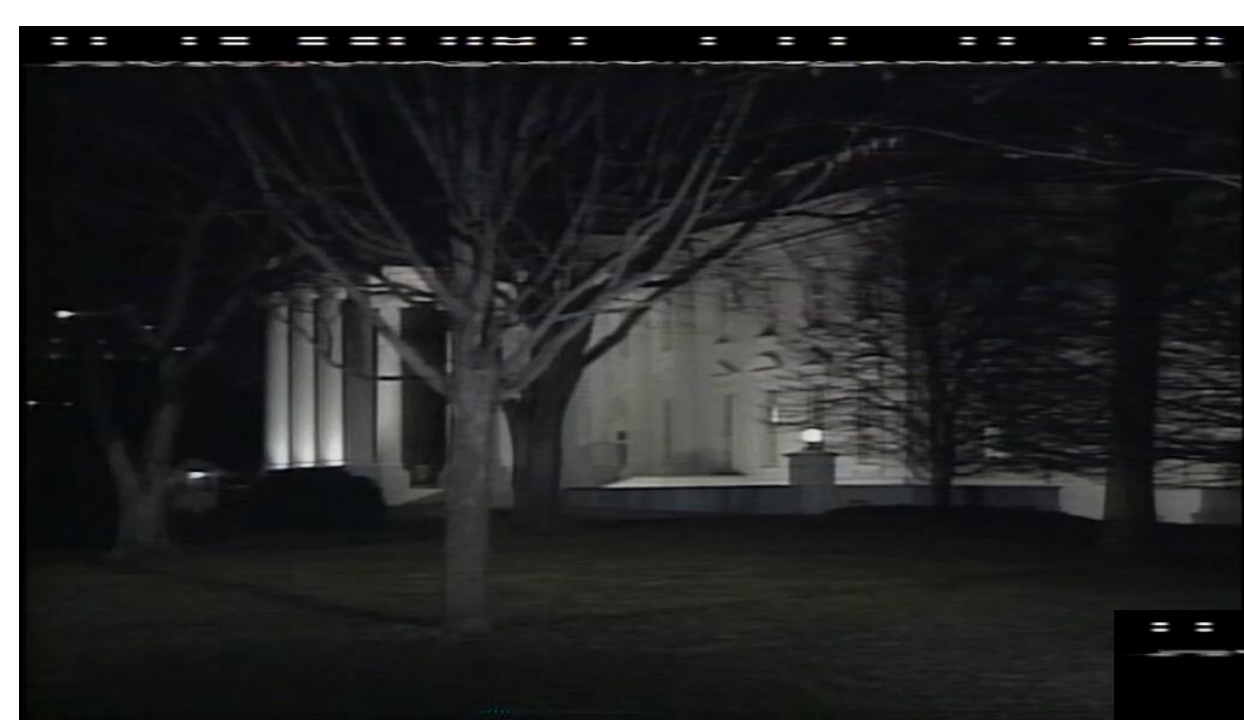




# *AI as a Digital Teammate*

- Observations
  - IoT Data Summary
  - Skin Lesions
- Orientations
  - Prior Auth / Formulary
  - Genomic Responses
- Decisions
  - Tailored Regimens
  - Intervention Impact Rankings
- Actions
  - Documentation / Follow-Up
  - Lab/Imaging tracking / Interp
  - Predictive Text Messaging

# Deep Fakes



MISSOURI  
FAMILY  
PHYSICIANS

# JOIN THE MISSOURI OF FAMILY PHYSICIANS

MISSOURI  
ACADEMY  
PHYSICIANS

Missouri Academy  
of Family Physicians



ADVOCACY  
OF MEDICINE

ADVOCACY  
OF MEDICINE

CONTINUING  
MEDICINE

CONTINUING  
EDUCATION

NETWORKING  
OPPORTUNITIES

816-433-5500

VISIT OUR WEBSITE TO LEARN MORE TODAY!

MISSOURIACADEMYOFFAMILYPHYSICIANS.COM

Questions /  
Discussion?