

# CS57100: Artificial Intelligence

## *AI in Healthcare*

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21 November 2022



## How could AI impact healthcare?

- Healthcare is approximately 20% of U.S. GDP
  - Tech is around 10%
- How can we use AI to improve this?
  - Direct interaction with patients
  - Diagnosis/treatment
  - Long-term planning
  - Research/discovery
  - ???

## Direct Patient Interaction: Robotic Surgery

- Why?
    - Micro-surgery
    - Sterile
  - Is this AI?
  - But what about:
    - Preventing errors
    - Speed – surgeons plan, machine executes
    - Remote – delay
- Prof. Yexiang Xue, SARTRES*



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## Direct Patient Interaction: Non-surgery medical devices

- Increasing automation in medical devices
  - New capabilities
  - Reduce error
- But limitations / reliability issues
  - Real world is a messy environment
- Can AI address this?
  - What about errors?
  - Again, [research at Purdue](#)



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## Diagnosis/treatment

- AI systems for medical diagnosis and treatment plans
  - Radiology / image interpretation
  - Incorporation of multiple test results to identify disease
  - Detailed treatment following (complicated) best practices

*AI systems beat human performance*
- Challenges
  - Real world performance often fails to match R&D testing
  - Lack of explainability
  - Impact of errors

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## Long-term planning/prediction

- Healthcare is expensive
  - Do we really need a hospital on campus?
  - Are there better ways to spend [\\$70 million](#)?
- AI for prediction/planning
  - Population growth
  - Traffic prediction
  - Healthcare needs
  - ???

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## AI for R&D

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- Drug discovery
  - Molecular combinations with therapeutic effect
  - Manufacturability
- Genetics
  - Identifying genetic markers of disease
  - Potential treatments?
- ...

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## Takeaways

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- Healthcare is a huge business
- AI isn't just the business of tech companies
  - [Microsoft](#), [Google](#), others have tried to move into healthcare
  - Limited success
- Want to make a difference in healthcare?
  - Look towards those who know healthcare
  - On campus: [Regenstrief Center for Healthcare Engineering](#)

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