Welcome!
Recent years have seen AI successfully applied to societal challenge problems; indeed, it has a great potential to provide tremendous social good in the future. In this course, we will discuss the potential use of AI in various topics that are essential for social good, including but not limited to health, environmental sustainability, public safety and public welfare.

Special focus:
- Multiagent systems
- "AI for Social Good": public health, conservation, public safety
- Ethical challenges faced in applications

Tuesday, Thursday
10:30am to 11:45am
Outline

- Introductions: Instructors and TFs
  - Brief overview of what we will cover in this course
  - Break
  - AI for Social Good
Instructor & TFs

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Outline

- Introductions: Instructors and TFs
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- AI for Social Good
Key points

• AI for social good: Emerging as a new field

• Trying to figure out foundations:
  Have to rely on case studies

• No textbook: Must read latest papers

• Need your help in figuring out this field

• Course project is a key component of this course
## Comp Sci 288: Lecture Plan

<table>
<thead>
<tr>
<th>Lecture #</th>
<th>Date</th>
<th>Topic</th>
<th>Purpose</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 26</td>
<td>Course intro, syllabus, goals, key concepts</td>
<td>Introduction</td>
<td>Tambe</td>
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<tr>
<td>2</td>
<td>Jan 28</td>
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<td>Case study</td>
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<td>Feb 11</td>
<td>Public health &amp; conservation</td>
<td>Define project</td>
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<td>Feb 16</td>
<td>World Wildlife Fund</td>
<td>Define project</td>
<td>Singh</td>
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<td>8</td>
<td>Feb 18</td>
<td>AI &amp; Covid</td>
<td>Define project</td>
<td>Mina</td>
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Also, trying to set up conversations with local area non-profits
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<td>Mar 2</td>
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<td>Students</td>
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<td>Project definition</td>
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<td>F, A, T</td>
<td>Tambe</td>
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<td>22</td>
<td>Apr 13</td>
<td>Interpretability in ML</td>
<td>F, A, T</td>
<td>Lakkaraju</td>
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<td>23</td>
<td>Apr 20</td>
<td>Is AI4SG often bad?</td>
<td>Discussion</td>
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<td>24,25</td>
<td>Apr 22</td>
<td>Final project presentations</td>
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<td>Students</td>
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Questions?
Grading

- Homework 1: Select papers and presentation partner (due Feb 10): 5%
- Paper presentation, discussion I (Per sign up date): (15%)
- Project proposal (March 1) and midterm discussion (March 11): (10%)
- Attendance and comments on assigned readings: (15%)
- Homework 2: Select papers and presentation partner (March 23): 5%
- Paper presentation, discussion II (Apr 1): (15%)
- Project presentation (Apr end): (30%)
- Ethics and broader impact in project: (5%)
Selecting papers for paper presentation

- Pick a paper on AI for Social Impact
- From calendar years 2020/2021.
- Paper should have appeared at a top AI conference: AAAI, IJCAI, AAMAS, NeurIPS, ICML, UAI, etc,
- Other venues ok: but must be rigorously reviewed not preprints
- Send the paper to us for approval
- Generally stick to topics of public health, environment (climate change, conservation, agriculture), disaster response/public safety.
- “Meta papers” also ok, but must have appeared in a rigorously reviewed setting, not just pre-print
Paper presentation

• This should be done in pairs.
• Presenters will be asked to present not only a summary, but also some evaluation of the paper.
• For evaluation, presenters should use “AAAI rubric”

[Appended to the syllabus on canvas, also available from AAAI web site in “AI for Social Impact”]

• Roughly 20 minutes per presentation

• Paper presentation 1: Done in class (sign up for dates by Feb 10)
• Paper presentation 2: will request you to send us a video (Apr 1)
Paper reading

- During weeks without paper presentation, read papers
- First week (Feb 4 reading): individually
- Beyond that, read in pairs
- One or max 2 papers per week (but exclude some weeks), provide a short summary
Projects: Main part of the course

Selecting projects:

• Will provide many expert lectures to select project topics
• Will try to connect with local non-profits as well
• Group of 2-3 students per project
• Should use cutting edge AI technique
Projects: Main part of the course

- Mid-term project presentation
- Final project presentation
- Project writeup
- Ethical component (broader impacts)
Expectations

• Attendance:
  • Class is based on discussions and presentations
  • Participation is crucial
  • Strongly encourage: keep your video on

• Encourage you to ask questions

• Remarks by TFs
5 min break for short questions
Outline

- Introductions: Instructors and TFs
- Introductions
- Brief overview of what we will cover in this course
- AI for Social Good
Breakout rooms
How it all started (in my view)
Preparing for the Future of Artificial Intelligence

MAY 3, 2016 AT 3:01 PM ET BY ED FELTEN
Panel on **White House OSTP Workshops on Preparing for the Future of Artificial Intelligence**

*July 14th Thursday 3:10pm*

**Room:** Ballroom East

**Panelists:**

- Kate Crawford
- Milind Tambe
- William Scherlis
- Meredith Whitaker
Questions Discussed in this Course

WHAT IS AI FOR SOCIAL IMPACT/AI FOR SOCIAL GOOD?
WHAT IS THE OVERALL PROCESS IN ACHIEVING AI FOR SOCIAL IMPACT?
WHAT AI TOOLS DO WE USE, AND WHAT HAPPENS WHEN THE TOOLS FALL SHORT OF GOALS?
HOW DO WE MEASURE SOCIAL IMPACT?
HOW DO WE SUSTAIN SOCIAL IMPACT OVER TIME?
HOW DO WE ADDRESS ETHICAL CHALLENGES THAT COME ALONG THE WAY?
What is AI for Social Good (from the reading)

- AI4SG =def. the design, development, and deployment of AI systems in ways that:
  - (i) prevent, mitigate or resolve problems adversely affecting human life and/or the wellbeing of the natural world, and/or
  - (ii) enable socially preferable and/or environmentally sustainable developments.
AI for Social Good (our view)

- AI4SG =

- (i) Social impact is a first class objective: not enough to be motivated by social impact; must have social impact

- (ii) Work for the benefit of vulnerable or endangered groups (or benefiting the natural world)

- (iii) Groups that have not benefited from AI in the past
Examples of AI for Social Good

Forbes Top 10 AI for Social Good (June 2020, B. Marr)

- Medical imaging: cancer screening (94% accuracy), radiology assistant
- Fighting world hunger: Determine the perfect crop, maximize output
- Tools for people with disabilities: Identify visual disorders before causing blindness
- Climate change: Study the impact of rising sea levels
- ....

Examples from Google Research

Google researchers use deep learning to detect diabetic retinopathy with upwards of 90 percent accuracy.
More Traditional View vs AI4SI view

• Mostly we work on research ideas to provide methodological advances in the lab, providing new papers; the idea is that such models might eventually influence products and policy, but that is to be taken up by someone else

• We wish to provide methodological advance, but actually show actual impact on society.
“Social Impact Driven” Approach to AI Research

- *AI research & Social Impact go hand-in-hand*

### Advancing AI + MAS
- Game theory
- Social networks
- Bandits
- POMDPs
- RL
- Decision-focused Learning

### Achieving impact
- Public health
- Conservation
- Public safety
## Pasteur’s Quadrant

**“Social Impact Driven” Approach to AI Research**

### Donald E. Stokes’ Pasteur Quadrant

<table>
<thead>
<tr>
<th>Quest for fundamental understanding?</th>
<th>Considerations of use?</th>
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<tbody>
<tr>
<td>Niels Bohr</td>
<td>✓</td>
</tr>
<tr>
<td>Louis Pasteur</td>
<td>✓</td>
</tr>
<tr>
<td>Thomas Edison</td>
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Source: Donald E. Stokes, *Pasteur’s Quadrant*, p. 73
In this view, AI for social impact as a field actually includes the entire pipeline shown below. It is not just the algorithmic portion, but also includes the HCI component of “immersion” all the way to field testing and deployment (see below).

The Entire Pipeline is part of AI for social impact

Field test & deployment: Social impact is a key objective
Implementation Science


• Historically, this research-to-practice gap has not been the concern of academic clinical researchers. The traditional academic business case for career success has primarily supported conducting descriptive or mechanism-oriented studies and intervention studies on highly selected, typically academic medical center-based populations, and publishing in—ideally—top quality academic journals. Whether these findings translate into public health impact has typically not been the concern of traditional healthcare researchers.
Some things to keep in mind…

Date: 2/18/2021
…And the Past

“…prize every invention of science made for the benefit of all”
AI and Multiagent Systems Research for Social Impact

Public Health

Conservation

Public Safety and Security
Viewing Social Problems as Multiagent Systems

Key research challenge across problem areas:

Optimize Our Limited Intervention Resources when Interacting with Other Agents
Interdisciplinary Partnerships

Empower non-profits to use AI tools; avoid being gatekeepers to AI4SI technology