AI for Social Good: Key Techniques, Applications, and Results

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Mission Statement: Advancing AI research driven by...

Grand Challenges of Social Work
- Ensure healthy development for all youth
- Close the health gap
- Stop family violence
- Advance long and productive lives
- End homelessness
- Achieve equal opportunity and justice...

Overview of CAIS Project Areas

AI for Assisting Low Resource Communities
- Social networks: Spread HIV information, influence maximization
- Real-world pilot tests: Big improvements
Overview of CAIS Project Areas

**AI for Earth**

- Machine learning/planning: Predicting poaching spots, patrols
- Real-world: Uganda, South Asia...

**AI for Public Safety and Security**

- Game theory: security resource optimization
- Real-world: US Coast Guard, US Federal Air Marshals Service...
AI Program: HEALER

HIV Prevention Programs: Using Social Networks to Spread HIV Information
Challenge: Adaptive selection in Uncertain Network

K = 5
1st time step

HAVE YOU HEARD?
TODAY'S AGENDA
1. INTRODUCTION
2. SEXUAL HEALTH + CONDOMS
3. HIV/HCV/STI 101
   LUNCH!
4. COMMUNICATION
5. OUTREACH
6. LEADERSHIP + SELF CARE
   WRAP-UP

WITH
ROBIN ERIC JAIN AMANDA

6/27/2017
Challenge: Adaptive selection in Uncertain Network

K = 5
2nd time step

Challenge 3: Adaptive selection

K = 5
3rd time step

NO LONGER A SINGLE SHOT DECISION PROBLEM
Creating an Adaptive Policy: “POMDP” [2015]

- Homeless shelters – sequentially select nodes under uncertainty
  - Policy driven by observations about edges

Real Networks – Simulation Results [2016-2017]

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<tr>
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<th>Venice</th>
<th>Hollywood</th>
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<tbody>
<tr>
<td><strong>Indirect Influence</strong></td>
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<td>Degree</td>
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<td>PSINET</td>
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<td>HEALER-1</td>
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<td>HEALER-2</td>
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Pilot Tests
with 170 Homeless Youth [2017]

Recruited youths:

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<tr>
<th></th>
<th>HEALER</th>
<th>HEALER++</th>
<th>DEGREE CENTRALITY</th>
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<td></td>
<td>62</td>
<td>56</td>
<td>55</td>
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Preliminary network —> HEALER
Bring 4 youth for training, get edge data —> HEALER
Bring 4 youth for training, get edge data —> HEALER
Bring 4 youth for training

Results: Pilot Studies

percent of non-Peer Leaders

Informed Non-Peer Leaders Who Started Testing for HIV
AI Program: HEALER

Next Steps

- 900 youth study begun at three locations in Los Angeles
  - 300 enrolled in HEALER/HEALER++
  - 300 enrolled in no condition
  - 300 in Degree centrality

“Picking youth as peer leaders was changing their self esteem and the sense of confidence that they could be an agent for positive change....”

Eric Rice
Overview of CAIS Project Areas

AI for Assisting Low Resource Communities

- Substance abuse, suicide prevention…
- Modeling gang violence, matching homeless and homes…

Protecting Wildlife in Uganda
PAWS: Applying AI for protecting wildlife

Poacher Behavior Prediction

Predicting Poaching from Past Crime Data

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Poacher behavior prediction [2016]

Data from Queen Elizabeth National Park, Uganda

Number of poaching attacks over 12 years: ~1000

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Poacher Attack Prediction [2017]

Poacher Behavior Prediction

Results from 2015

Real-world Deployment: (1 month)
Real-world Deployment: Results

- Two 9 sq KM patrol areas: Predicted hot spots with infrequent patrols

- Poached Animals: Poached elephant
- Snaring: 1 elephant snare roll
- Snaring: 10 Antelope snares

**Historical Base Hit Rate vs Our Hit Rate**

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<thead>
<tr>
<th>Historical Base Hit Rate</th>
<th>Our Hit Rate</th>
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<td>Average: 0.73</td>
<td>3</td>
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Catch Per Unit Effort (CPUE)

- Unit Effort = km walked
- Historical CPUE: 0.04
- Our high CPUE: 0.11

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Field Test Side Effects: Queen Elizabeth National Park

- Rangers followed poachers’ trail; ambushed camp
  - Arrested one (of 7) poachers
  - Confiscated 10 wire snares, cooking pot, hippo meat, timber harvesting tools.

- Pursuit of poachers
- Signs of road building, fires, illegal fishing

AI for Social Good
Towards the Future: AI for Social Good

- Significant potential: AI for low resource communities, emerging markets

- Not just applications; novel research challenges:
  - Fundamental computational challenges from use-inspired research
  - Designing AI systems in society:
    - Interpretability
    - Complementing human autonomy

- Methodological challenges:
  - Encourage interdisciplinary research: measures impact in society