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USC CENTER FOR ARTIFICIAL INTELLIGENCE IN SOCIETY

January 11, 2018

Dear Members of the Little Hoover Commission,

The USC Center for Artificial Intelligence in Society (CAIS) is one of the first university-based centers focused on AI for Social Good. More importantly it is the first center to deliberately bring together computer science and social work science. CAIS is a joint venture between the Suzanne Dworak-Peck School of Social Work and the Viterbi School of Engineering. Our mission is to conduct research in Artificial Intelligence to help solve the most difficult social problems facing our world.

The overarching goal of the center is to be the creation of a new field of scientific research, namely the use of Artificial Intelligence to solve wicked social problems in the world. As a field AI has just begun to consider the role it can have in promoting social good (with many recent events focused on "AI for Social Good"), and social work has just begun to engage with computer science to enhance the impact of social work science. The center brings researchers from around the world to focus on how computer science can be used to solve social problems. It is our intention that the research which emerges from this center will impact changes in national and international policy, enhance specific social programs, and move toward the creation of a new field of study which merges the technological expertise of engineering with the domain expertise of social work in solving seemingly intractable social problems.

The complexity of the world can rarely be explained by one single discipline. Solving complex problems with one discipline stands an even lesser chance. We believe that much of the strength of our work rests in having created an intellectual space in which computer scientists and social work scientists are equal partners, who bring unique knowledge and expertise to the table. From AI come new technologies and approaches, and from social work comes a deep understanding of human behavior and how to intervene effectively in society. As such we see AI for social good as a new trans-disciplinary intellectual space.

AI can be used to improve society and fight social injustice. From our perspective, the vast majority of the persons who benefit from AI currently are people who live with a certain amount of privilege. Largely, this is due to the fact that much of AI is wrapped up in the high-tech economy. Yet, many of the most impoverished parts of the world still struggle with internet access. The digital footprints of homeless persons for example are far smaller than those of us who live in more affluent circumstances.

We have a great many collaborations. Some of our primary partners are: A Way Home America (an homeless youth advocacy organization), LA Housing Service Authority, MANY (a technical assistance provider for high risk youth programs), Microsoft AI for Earth, World Wildlife Fund,

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Wildlife Conservation Society, Panthera, AirShephrd, My Friend's Place: homeless youth drop-in center in Los Angeles, Safe Place for Youth: homeless youth drop-in center in Los Angeles, Urban Peak: homeless youth shelter in Denver, US Coast Guard, Wadhwani Institute of Artificial Intelligence, and Youth Center on Highland: homeless youth drop-in center in Los Angeles.

Our portfolio of projects focusses on three core areas: AI for low resource communities, AI for conservation, and AI for public safety and security. Our current projects include: AI for Cybersecurity, HIV prevention among homeless youth, Wildlife Conservation with drones, AI for Wildlife Conservation in Africa, , predictive modelling of tobacco use and prevention among abused children, Predictive models of vulnerability and housing prioritization for youth and families, Gang violence prevention using game theory, Social network-based substance abuse prevention for homeless youth, Predictive modeling for early identification of suicidal thinking among active duty service members, network-based suicide prevention for college students, AI for public safety and security using game theory, and others.

One of our most exciting project is our project working with homeless youth in Los Angeles to prevent the spread of HIV/AIDS. New data suggests that 1 in 10 youth age 18 to 24 experience at least one night of homelessness each year. In Los Angeles, our data suggest that 7% of these youth have HIV. Unfortunately, almost 1 in 3 youth on the streets has not been tested for HIV in the past six months and thus does not know their HIV status. In order to achieve the state of California's goal of reducing HIV transmission to zero, an increase in HIV testing and treatment for homeless youth is essential.

 Despite the great need for HIV prevention in this population, relatively few evidence-based interventions exist. Given the important role peers play in the HIV-risk and protective behaviors of homeless youth several major public health researchers, particularly as Mary Jane Rotheram-Borus at UCLA, Henry Green at RAND, and Eric Rice at USC, have suggested that peer-led programs for HIV prevention be developed for homeless youth. One of the complications of these programs is that the persons selected to be the messengers of HIV prevention are as important as the messages which they are trained to deliver. We use artificial intelligence to help us to select a group of youth within a network of homeless youth who collectively, will have the greatest reach in their community.

AI explores the creation of computer software that is capable of making decisions or performing tasks that require intelligence. Much of the focus of AI in current popular press is on machine learning – a subfield of Artificial Intelligence, which involves the process of making good and useful predictions using algorithms designed to identify patterns or regularities. Our work, in general at CAIS goes beyond purely Machine Learning but also focuses on prescription, i.e., having made predictions, what plans or courses of actions should be put into place to mitigate harmful predictions or assist more helpful ones. This type of AI works falls is within AI

subfields of multiagent systems or Automated planning and scheduling systems. For our work with HIV prevention, we focus on such AI techniques based on "influence maximization".. These planning algorithms solve complex problems, recommend specific actions, and can account for the uncertainty of data available at any point in time and how these data may change.

Homeless youth networks are not only complex, but the dynamic nature of homeless youth social ties necessitates that we consider the uncertainty present in these networks. In general, adolescents and young adult relationships change rapidly – new connections form, grow closer over short periods of time, and connections dissolve. Homeless youths lives are more unstable than most, further complicating these fluctuating youth networks. Homeless youth may leave the network for a variety of reasons such as returning to city of origin, entering into a stable housing situation, or becoming incarcerated. Hence our need to use the sophistication of AI an its ability to explicitly model this uncertainty.

In 2016 we tested using AI to select "Peer Leaders" who would deliver HIV prevention information to their peers. We enrolled 173 youth into three study arms, two different algorithms to select peers (HEALER and HEALER++), and the typical public health method which is to select the most popular youth in the network. In each study we selected 20% of the participants to be trained as Peer Leaders, who conducted HIV prevention outreach with their peers.

After 1 month of intervention work, in both the AI conditions approximately 70% of the other youth in the network were reached by our Peer Leaders, compared to only 27% in the typical public health intervention control arm. Moreover, of those youth who had not tested for HIV in the past six months who received HIV testing messages from our peer leaders, approximately 30% went to get an HIV test, and no youth became new testers in the control arm.

We also looked at the overall impact the AI program had relative to the standard health program, by examining overall impact of the program on the HIV prevention behaviors in the target networks over a three month period. We found that youth in the AI arm of the study were 2.2 times more likely to have taken an HIV test in the past six months, 1.38 times more likely to have taken a Hepatitis C test, 1.9 times more likely to consistently use condoms during vaginal sex, and 1.22 times more likely to use condoms during anal sex, compared to the control group.

Currently with the support of the California HIV/AIDS Research Program (CHRP) we are conducting a large scale trial which will enroll nearly 900 youth over a two year period.. It is our great hope that if we show the efficacy of this intervention that we can disseminate it across the state to help curb the spread of HIV among this very vulnerable group of youth.

This trans-disciplinary work is very exciting but faces many challenges. First, computer

scientists, social scientists and community collaborators all have highly developed professional languages. Learning to communicate with one another require time, patience and building trust. We believe that at CAIS we have developed a model that facilitates these cross-sector collaborations and we want to share our expertise with the state.

Second, many techniques in AI, particularly machine learning, require large robust data sets. These data sets often do not exist for the populations which we want to serve, such as homeless youth. Coordination at the state-level to make more administrative data on low-income, high-risk populations more readily available could greatly enhance our capacity to help work on these problems. As an example to illustrate this point: data on child welfare, from juvenile justice, and public schools are not linked to data on homelessness. We know that most homeless youth come from one of these three systems and we could easily create predictive models that would identify children at risk of becoming homeless if these data were linked. Such models could serve as early warning systems to alert case workers in schools, child welfare, and juvenile detention as to which youth are most likely to need prevention programs.

Funding programs that would target work in "AI for Social Good" would be valuable in pushing such research forward. While specific targeted agencies focus on particular aspects of Social Good, targeting particular public health outcomes, they may not necessarily focus on the interdisciplinary space of "AI for Social Good" which requires fundamental advances in AI as well.

Fortunately, AI is not dependent upon "big data". As is the case with our work on homeless youth, one of the strengths of AI outside the domain of machine learning is the capacity to contend with sparse and uncertain data. As with any new technologies, the most effective tools need to be built to meet the needs of a specific project with specific goals. No single technique in AI is appropriate for all problems, but AI in collaboration with social work has the capacity to understand and model the complexity of wicked social problems. This collaboration has the potential to bring new insights and solutions that can help to push the needle on many of our most pressing social problems.

Sincerely,

Eric Rice and Milind Tambe

Founding Co-Directors

USC Center for Artificial Intelligence in Society