
**e아동행복지원시스템 운영 개선 및 아동정책 관련
APPAM Conference 참석**

2019. 11.

□ 출장목적

- 보건복지부 및 사회보장정보원 수탁과제로 수행 중인 “e아동 행복지원시스템 운영 개선을 위한 위기아동 발굴방안 연구” 수행을 위하여, 미국 정책분석 및 평가 관련 핵심적인 학회인 APPAM(Association for Public Policy Analysis and Management)가 “Rising to the Challenge: Engaging Diverse Perspectives on Issues and Evidence”를 주제로 개최하는 2019년 Research Conference에 참석
- 빅데이터 기반 다양한 정책분석 및 평가, 사회정책 분야 위험 예측 방법론 활용 사례 및 윤리적 이슈와 쟁점에 대한 논쟁 관련 연구동향 등을 파악하여 e아동행복지원시스템 운영체계 개선 연구수행에 반영하고, 행정데이터 소득보장 및 아동빈곤 정책 등 다양한 정책분석 및 평가 연구결과, 정책이슈 등을 벤치마킹하여 후속 연구주제 발굴 및 수행에 활용함

□ 연구과제 : e아동행복지원시스템 운영 개선을 위한 위기아동 발굴방안 연구

(보건복지부, 사회보장정보원, 2019. 8 ~ 2019. 12)

□ 출장자 : 최 현 수 연구위원 (사회보장통계센터장)**□ 출장지역 : 미국 Denver (Sheraton Denver Downtown)**

□ **출장기간 및 일정 : 2019. 11. 5 (화) ~ 11. 9 (토) (3박 5일)**

| 출장일 | 행선지 (국가/도시) | 방문기관/면담자 | 세부 활동내용 |
|---------------|---------------------|---|---|
| 2019.11.5.(화) | 인천 - 미국 (Denver) | | 출국(LA 경유) |
| 2019.11.6.(수) | 미국 (Denver) | Sheraton Denver Hotel / APPAM 발표자 및 참석자 (주요 프로그램 및 세션 구성, 세부내용 참조) | 2019 APPAM Research Conference (Rising to Challenge: Engaging Diverse Perspectives on Issues and Evidence) 1일차 Pre-Conference Workshop 참석 |
| 2019.11.7.(목) | 미국 (Denver) | Sheraton Denver Hotel / APPAM 발표자 및 참석자 (주요 프로그램 및 세션 구성, 세부내용 참조) | 2019 APPAM Research Conference (Rising to Challenge: Engaging Diverse Perspectives on Issues and Evidence) 2일차 Main Conference 참석 |
| 2019.11.8.(금) | 미국 (Denver) | Sheraton Denver Hotel / APPAM 발표자 및 참석자 (주요 프로그램 및 세션 구성, 세부내용 참조) | 2019 APPAM Research Conference (Rising to Challenge: Engaging Diverse Perspectives on Issues and Evidence) 3일차 Main Conference 참석 |
| 2019.11.9.(토) | 미국 (Denver) - 인천 | | 8일 저녁 귀국 (LA 경유) / 10일 새벽 인천 도착 |

가. APPAM 2019 개요

□ APPAM 개요 및 Pre-workshop과 주요 프로그램



APPAM is dedicated to improving public policy and management by fostering excellence in research, analysis, and education.

APPAM promotes its mission through the following activities:

- A multidisciplinary annual research conference that attracts the highest quality research on a wide variety of important current and emerging policy and management issues, and is structured to encourage substantive interaction among participants.
- A peer-reviewed multidisciplinary journal that publishes the highest quality research on public policy and management.
- A dedication in all activities to respecting and enhancing racial, ethnic, gender, disciplinary, and other forms of diversity among participants in all of the Association's activities.
- The involvement of policymakers, practitioners, and scholars in the Association's governance and the Fall Conference.
- Initiatives that include and foster participation in the Association among students interested in public policy and management.

the APPAM 2019 Fall Research Conference will be a multi-disciplinary research conference attracting the highest quality research on a wide variety of important current and emerging policy and management issues. The current political context underscores the value of bringing together researchers and practitioners with a wide range of perspectives to engage the evidence and discuss how best to improve public policy.

The theme, “Rising to the Challenge: Engaging Diverse Perspectives on the Issues and Evidence”, will encourage a conference with conversations that reach across disciplinary, methodological and ideological divides.

This conversation will take place across 300+ educational programs in a variety of formats, including panels, round tables, poster presentations, super sessions and special events.

나. 연구수행 관련 APPAM 주요 발표자료 및 내용

○ Pre-Conference Workshop 주제 및 주요 프로그램

(Deploying Machine Learning Tools for Public Policy Impact)

- 주최: Alexandra Chouldechova, Carnegie Mellon University
(e아동행복지원시스템 유사 미국 운영사례 연구팀 관련 연구진)
Jens Ludwig, University of Chicago
Sendhil Mullainathan, University of Chicago
- 주요 이슈 및 쟁점
 - ☞ 사회보장 빅데이터 기반 e아동행복지원시스템 구축 및 운영 관련 유사 해외사례 및 운영 개선 이슈와 쟁점 연계

While public policy analysis as a field has had considerable impact by helping to answer key causal questions, many policy decisions hinge not on a causal inference but instead on a prediction: Which defendants are too high risk for a judge to release from jail as they await adjudication of their case? Which calls of potential child abuse are most likely to reflect actual abuse? Which students are at elevated risk for dropping out of school, and so should be prioritized for academic supports? Which households are most likely to be eligible for social services but unlikely to be enrolled in them? Which chronically ill low-income patients are most likely to miss doctor's appointments or forget to refill or take their prescription medications, and so might particularly benefit from home visits or reminders?


The growing availability of government administrative records ('big data') combined with new tools from the computer science field of machine learning create important new possibilities for substantial impact across a

broad range of policy problems. These new machine learning tools share some similarities with the usual policy analysis tool-kit (regression, matching, etc.), but do have some important differences in their goals and methods. They also make it possible to draw on new sources of data that policy analysts historically have not even recognized as data, such as written text, audio clips, or video images.

At the same time, re-deploying these machine learning tools to policy problems raises new challenges that are quite different from those associated with canonical computer science applications, which create important opportunities for the field of policy analysis to add value. These include: challenges in evaluating the social impact of algorithms in the presence of outcome data that is non-randomly missing, as the result of the decisions of humans in the existing policy system; potential mis-alignment between what is being predicted and the objectives that policy makers are trying to optimize; and the possibility of algorithmic bias, and how that compares to human bias.

The workshop seeks to provide an accessible introductory overview to machine learning tools, illustrate the range of policy problems to which they can be applied, develop understanding of what makes for a good policy application for these tools, what can go right (and wrong), and where and how policy analysts can add value to making progress on these problems. We will also include some discussion about how machine learning tools can be useful for solving the sort of causal inference problems that have traditionally been the focus of policy analysis work.

－ 프로그램 및 발표주제

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|---|---|
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div> <p>ASSOCIATION FOR PUBLIC POLICY ANALYSIS & MANAGEMENT</p> </div> </div> | |
| <p>Pre-Conference Workshop <i>Deploying Machine Learning Tools for Public Policy Impact</i> Wednesday, November 6, 2019 11:00 am – 5:00 pm</p> | |
| 11:00 AM – 11:10 AM | <p>Welcome and Introduction Alex Chouldechova, Carnegie Mellon University, Jens Ludwig, University of Chicago, and Sendhil Mullainathan, University of Chicago</p> |
| 11:15 AM – 12:00 PM | <p>Session 1: Intuition About Machine Learning Tools and How They Work Alex Chouldechova, Carnegie Mellon University, and Sendhil Mullainathan, University of Chicago</p> |
| 12:05 PM – 1:05 PM | <p>Session 2: New Data Sources That Machine Learning Tools Can Be Used With Jason Anastasopoulos, University of Georgia, James Evans, University of Chicago, and Chenhao Tan, University of Colorado, Boulder</p> |
| 1:15 PM – 2:15 PM | Lunch |
| 2:30 PM – 3:15 PM | <p>Session 3: What Type of Policy Problems Make for Good Machine Learning Applications and Why? Peter Bergman, Columbia University, and Stefan Wager, Stanford University</p> |
| 3:15 PM – 3:25 PM | Coffee Break |
| 3:25 PM – 4:10 PM | <p>Session 4: What New Challenges Arise When Applying Machine Learning Tools to Policy Problems? George Chen, Carnegie Mellon University, and Jens Ludwig, University of Chicago</p> |
| 4:15 PM – 5:00 PM | <p>Session 5: Algorithms and Fairness Jennifer Doleac, Texas A&M University, and Aaron Roth, University of Pennsylvania</p> |

Policy Applications of Machine Learning

Sendhil Mullainathan
joint with
Jann Spiess
Jens Ludwig
& others

Machine learning's fit for purpose

Alexandra Chouldechova
Assistant Professor, Statistics and Public Policy

2019 APPAM Pre-conference Workshop
November 6, 2019

Carnegie Mellon University
HeinzCollege
INFORMATION SYSTEMS • PUBLIC POLICY • MANAGEMENT



Deep Bias

Deep learning, image analysis and challenges for public policy

Jason Anastasopoulos
janastas@uga.edu

APPAM 2019 Pre-Conference Workshop, Denver, CO



SOCIAL SCIENCE

After 2000 (relabeled 2009)

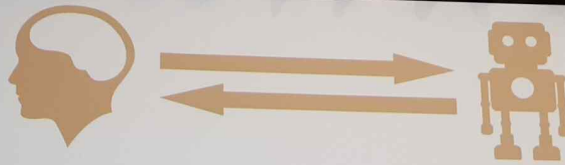
Computational Social Science

David Lazer,¹ Alex Pentland,² Lada Adamic,³ Sinan Aral,^{2,4} Albert
Devon Brewer,⁶ Nicholas Christakis,¹ Noshir Contractor,⁷ James
Tony Jebara,⁹ Gary King,¹ Michael Macy,¹⁰ Deb Roy,² Marshall V.

Science

data
research
information
many
analyses
researchers
evolution
human
technology





Towards Human-Centered AI: Opportunities and Challenges for Natural Language Processing in Policy

Chenhao Tan

University of Colorado Boulder

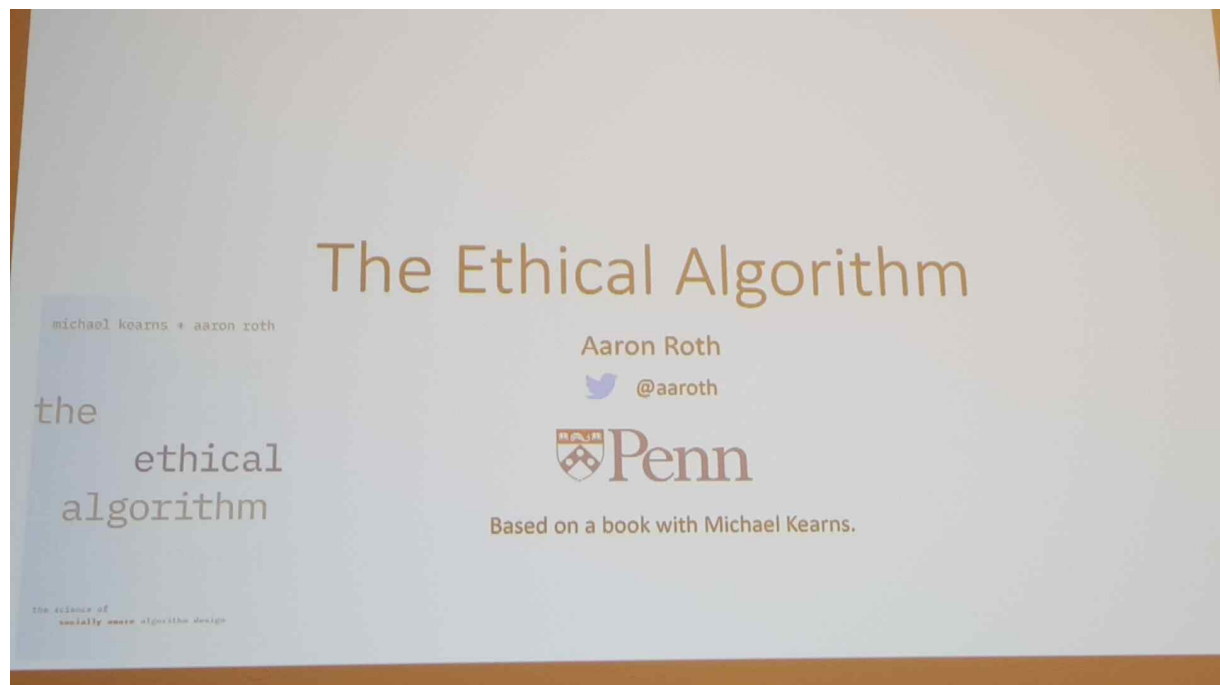
<https://chenhaot.com>

@ChenhaoTan

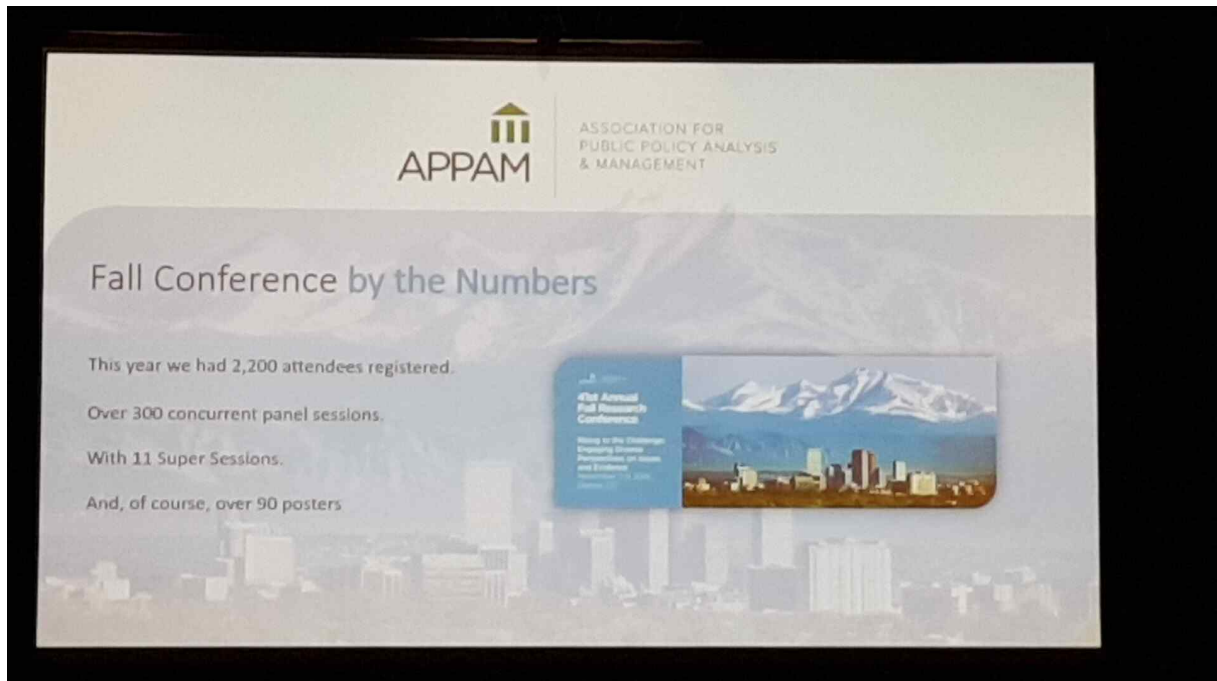
Some Challenges to Applying ML in Policy Problems

George Chen

Assistant Professor of Information Systems
Affiliated Faculty, Machine Learning Department
Heinz College, Carnegie Mellon University



○ Main Conference 정책 영역별 일정 및 주요 패널 주제
(2019 APPAM Research Conference: Policy Areas)



- Crime, Justice, and Drugs (17 Session)
- Education (67 Session)
- Employment and Training Programs (14 Session)
- Family and Child Policy (21 Session)
- Health (40 Session)
- Housing, Community Development, and Urban Policy (19 Session)
- Innovations in Science and Technology (17 Session)
- Methods and Tools of Analysis (11 Session)
- National Security and Homeland Security (4 Session)
- Natural Resource, Energy, and Environmental Policy (26 Session)
- Politics, Media, and the Policy Process (11 Session)
- Population and Migration Issues (8 Session)
- Poverty and Income Policy (27 Session)
- Public and Non-Profit Management and Finance (25 Session)
- Social Equity and Race (10 Session)

<Crime, Justice, and Drugs>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13201 Panel: Understanding the Roots of the School to Prison Pipeline and What to Do Next

10:15 AM-11:45 AM

ID#12366 Panel: Assessing and Building the Evidence Base on Reentry: What's Known, What's Needed, and What's Next?

ID#13019 Super Session: Cannabis Policy: Legalization, Impact, and the Influence of the Late Mark Kleiman

1:45 PM-3:15 PM

ID#13262 Panel: Costs of Crime

ID#12757 Panel: The Intended and Unintended Consequences of Drug and Crime Interventions

3:30 PM-5:00 PM

ID#13260 Panel: Crime in the Americas

ID#13023 Panel: Intergenerational and Spillover Effects of Incarceration

ID#13111 Panel: Schools, Crime, and Policing

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#13265 Panel: Cannabis Policy

10:15 AM-11:45 AM

ID#13158 Panel: Gun Violence, Solutions, and Unintended Consequences

1:30 PM-3:00 PM

ID#13259 Panel: Health Insurance & Crime

3:15 PM-4:45 PM

ID#13258 Panel: Sentencing & Recidivism

<Employment and Training Programs>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13345 Panel: Matching Employers and Workers: Lessons from Abroad

10:15 AM-11:45 AM

ID#12627 Panel: Building a Pipeline to Employment: Lessons from Publicly and Privately Funded Career and Technical Education and Career Pathways Programs

ID#12988 Roundtable: Employment Programs for Parents Unable to Pay Child Support: What We've Learned and Where Do We Go Next?

1:45 PM-3:15 PM

ID#13342 Panel: Alternative Strategies to Promote Reemployment

3:30 PM-5:00 PM

ID#13096 Panel: Gig Economy and the Future of Work

ID#12972 Panel: Long-Term Effectiveness of Sector Strategies and Career Pathways Programs: Lessons for the Field and Strategies for Scaling

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#12876 Panel: Innovative Approaches to Collaborating Around Workforce Data to Improve Job Programs

10:15 AM-11:45 AM

ID#13394 Super Session: Wage Stagnation: Crisis, Myth, or Neither?

1:30 PM-3:00 PM

ID#13197 Panel: What Are Effective Components of Training Programs for Disconnected Youth and How Can They be Improved: Evidence from RCTs of Job Corps, Youthbuild, and National Guard Youth Challenge

3:15 PM-4:45 PM

ID#12737 Panel: The Paths They Take: Transitions to Careers Among Low-Income Young Adults

<Family and Child Policy>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13223 Panel: Effects of Family Planning Policy: New Research and Findings

ID#13073 Panel: New Program and Policy Research on Fatherhood

10:15 AM-11:45 AM

ID#13293 Panel: Consequences of Instability for Families and Children

ID#13179 Panel: Studies on the Supply and Demand for High-Quality Early Care and Education

1:45 PM-3:15 PM

ID#12753 Panel: Disparate Impacts and Unintended Consequences – Taking the Complexity Seriously in ECE Markets

ID#13069 Panel: Food Insecurity and Food Assistance: Impacts on Children, Parents, and Preschool Experiences

3:30 PM-5:00 PM

ID#12722 Panel: Swimming Upstream: Child Support Enforcement & Nonresident Parents' Contributions to Children

ID#13294 Panel: The Impacts of Paid Leave

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#12933 Panel: Improving Child Care Quality? Insights into State and Federal ECE Accountability Systems

ID#12535 Panel: Research on Contemporary Issues in Foster Care and Policy to Improve Child Well-Being

10:15 AM-11:45 AM

ID#12664 Panel: Social Policies and Their Influence on Family Formation, Childbearing, and Resources

1:30 PM-3:00 PM

ID#12955 Panel: From Enforcement to Engagement: Strengthening Connections between Child Support and Public Benefits Programs to Improve Family and Child Well-Being

ID#13031 Panel: Lessons from California: How Paid Leave Policies Can Boost Family Health and Economic Stability

3:15 PM-4:45 PM

ID#12775 Roundtable: Effective Routes to Self-Sufficiency for Disconnected Youth Need More Roundabouts

ID#12558 Panel: Thinking Big: How Macro-Level Factors and Policies Affect Children

<Health>

Thursday, November 7, 2019

8:30 AM-10:00 AM

- | | |
|----------|---|
| ID#12937 | Super Session: Changing the Recipe: Examining the Effects of Policy Changes to Federal Food Assistance Programs |
| ID#12983 | Panel: Evaluating the Impacts of Affordable Care Act Health Insurance Expansions: What Are the Implications for Future Health Policies? |
| ID#13070 | Panel: Policy Issues in Generic and Biosimilar Drug Markets |
| ID#12862 | Panel: Programs to Improve Maternity Care |

10:15 AM-11:45 AM

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|----------|--|
| ID#12830 | Panel: Hospital Choices in the United States |
| ID#12581 | Panel: Use, Cost, and Quality of Care in Medicaid and Medicare |

1:45 PM-3:15 PM

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|----------|---|
| ID#12379 | Panel: Determinants and Consequences of Immunization |
| ID#12526 | Panel: Effects of Losing Health Insurance Coverage on Labor, Health, and Financial Outcomes |
| ID#12962 | Panel: Health Care and Household Finance Among Low-Income Households |

3:30 PM-5:00 PM

- | | |
|----------|---|
| ID#12605 | Panel: Competition in the Healthcare Industry |
| ID#12976 | Panel: From Cradle to Grave: The Effects of Income Policies on Health and Well-Being |
| ID#12912 | Panel: Improving Value in Healthcare |
| ID#13182 | Panel: Soda Taxes to Improve Health Outcomes: New Insights from Scanner Data |
| ID#12887 | Panel: Testing the Effect of Pairing Behavioral Nudges and Innovative Health Information Technology Interventions |

Friday, November 8, 2019

8:30 AM-10:00 AM

- ID#12606 Panel: Family Planning Policies, Childbearing, and Abortion
- ID#13091 Panel: Policy Determinants of Prescription Drug Use
- ID#12462 Panel: Surprise Medical Bills: Causes, Consequences, and Policy Solutions

10:15 AM-11:45 AM

- ID#13192 Panel: Health and Care of an Aging Population
- ID#12792 Panel: Impact of Health Policy on Maternal and Child Health: Examining the Role of Insurance in Increasing Access to Reproductive Health Services
- ID#13214 Panel: Is Cannabis a Potential Substitute for Conventional Healthcare?

1:30 PM-3:00 PM

- ID#13274 Panel: Opioids, Vaccines, and Public Policy Interactions
- ID#12875 Roundtable: Rising to the Health Care Cost Challenge
- ID#12811 Panel: Understanding the Changing Landscape of Hospital Care for Low-Income Patients

3:15 PM-4:45 PM

- ID#13408 Super Session: Beyond the Rhetoric: Tradeoffs of Different Approaches to Reforming U.S. Health Care
- ID#12958 Panel: Emerging Evidence to Inform Medicare Prescription Drug Policy
- ID#12989 Panel: Examining the Effects of and Policy Responses to the Opioid Epidemic
- ID#13180 Panel: Health Effects of Conventional and Electronic Cigarette Policies

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<Housing, Community Development, and Urban Policy>

Thursday, November 7, 2019

8:30 AM-10:00 AM

- ID#12886 Panel: Economic Development Pursuits: From Traditional Financial Tools to Alternative Economic Development Strategies
- ID#12839 Panel: Homeownership and Loan Performance for Vulnerable and Low-Income Populations

10:15 AM-11:45 AM

- ID#13198 Panel: Building Opportunity: Designing and Learning from the Creating Moves to Opportunity Experience
- ID#12904 Panel: Knowledge and Behavior of Mortgage Borrowers: Insights from the National Survey of Mortgage Originations

1:45 PM-3:15 PM

- ID#13157 Panel: Assessing the Effects of Alternative Rent Policies for Housing Subsidy Recipients on Work and Other Outcomes
- ID#13034 Panel: Race and Real Estate after the Recovery: Contemporary Dynamics of Housing Segregation & Integration

3:30 PM-5:00 PM

- ID#13079 Panel: Homeownership and Residential Mobility Among Older Adults
- ID#12272 Panel: New Market-Rate Development

Friday, November 8, 2019

8:30 AM-10:00 AM

- ID#12799 Super Session: Causes and Consequences of Eviction
- ID#13300 Panel: Neighborhood Effects on Health Education and Attitudes

10:15 AM-11:45 AM

- ID#13209 Panel: Using Big Data to Identify, Build, and Preserve Affordable Housing

1:30 PM-3:00 PM

- ID#12931 Panel: Homelessness
- ID#12942 Panel: Landlords and Tenant Selection in the Low-Rent Market

3:15 PM-4:45 PM

- ID#13170 Panel: Housing Supply and the Affordability Crisis: New Evidence from Local Policies

<Innovations in Science and Technology>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13042 Panel: Science & Technology Policy

10:15 AM-11:45 AM

ID#13093 Panel: Innovation in Internet Technology and Policy to Further Social and Economic Inclusion

3:30 PM-5:00 PM

ID#12872 Panel: Policies to Promote Industry Emergence

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#13060 Panel: Diverse Perspectives on Evidence Act Implementation for Federal Research, Development, and Innovation Investments

3:15 PM-4:45 PM

ID#12691 Panel: Diversity in STEM

<Methods and Tools of Analysis>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13151 Roundtable: Building Transparency & Reproducibility into Federal Evaluation

10:15 AM-11:45 AM

ID#12586 Roundtable: Variation in Human Services Systematic Reviews: How Much, Why, and What's Next?

1:45 PM-3:15 PM

ID#12572 Panel: Issues and Evidence in within-Study Comparisons

ID#13374 Super Session: Machine Learning and Public Policy

3:30 PM-5:00 PM

ID#13336 Panel: Technical & Practical Issues for Quasi-Experimental Evaluation Designs

Friday, November 8, 2019

10:15 AM-11:45 AM

ID#13077 Roundtable: Combining Continuous Improvement with Impact Evaluation: From Theory to Practice

1:30 PM-3:00 PM

ID#13337 Panel: How Machine Learning Can or Cannot Improve Policy Studies

<Politics, Media, and the Policy Process>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13309 Panel: Advocacy Groups and Lobbying

10:15 AM-11:45 AM

ID#13253 Panel: Determinants of Political Participation

ID#13063 Roundtable: What Do You Mean By Evidence-Based? Diverse Perspectives from the Trenches

1:45 PM-3:15 PM

ID#13008 Roundtable: Designed for Impact: How the Policy Lab Model Ensures Research That Matters

3:30 PM-5:00 PM

ID#12728 Roundtable: Evidence in Action: Implementing the Foundations for Evidence-Based Policymaking Act of 2018

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#13311 Panel: Politics vs. Expertise

10:15 AM-11:45 AM

ID#13000 Panel: The Politics of Housing and Neighborhoods

1:30 PM-3:00 PM

ID#13308 Panel: Fake News and Focusing Events

3:15 PM-4:45 PM

ID#13239 Panel: Native Americans, Economics, and Opportunity

<Population and Migration Issues>

Thursday, November 7, 2019

8:30 AM-10:00 AM

ID#13319 Panel: Restrictive Immigration Policies

10:15 AM-11:45 AM

ID#12580 Panel: Immigration Policy and the Well-Being of Immigrants and Natives

1:45 PM-3:15 PM

ID#12423 Roundtable: Census 2020: Everyone Counts and You Can Help

Friday, November 8, 2019

1:30 PM-3:00 PM

ID#13320 Panel: Immigrant Families

3:15 PM-4:45 PM

ID#13321 Panel: Immigrants & Education

<Poverty and Income Policy>

Thursday, November 7, 2019

8:30 AM-10:00 AM

- | | |
|----------|---|
| ID#12991 | Panel: Policy Innovations for Meeting the Needs of Female Workers in the Diverse U.S. Economy |
| ID#12724 | Panel: Understanding Service Provision for Particularly Vulnerable Populations |

10:15 AM-11:45 AM

- | | |
|----------|--|
| ID#13109 | Roundtable: Supplemental Poverty Measure: Roundtable Discussion on Future Directions |
| ID#12675 | Panel: The Effects of SNAP on Individuals' Well-Being |

1:45 PM-3:15 PM

- | | |
|----------|--|
| ID#13312 | Panel: Challenges and Opportunities in Increasing Access to Benefits |
| ID#12997 | Panel: Examining the Implications of Recent Tax Reforms on Household Financial Outcomes |
| ID#12636 | Panel: Promoting Positive Nutrition Outcomes: The Evidence for Taxes, Transfers, Subsidies, and "Nudges" |

3:30 PM-5:00 PM

- | | |
|----------|--|
| ID#12815 | Panel: Rural Poverty, Economic Opportunity, and Public Policy |
| ID#12452 | Panel: The Labor Supply Effects of US Social Safety Net Programs |

Friday, November 8, 2019

8:30 AM-10:00 AM

ID#12921 Panel: How Can We Promote Economic Security in Vulnerable Populations?

ID#13121 Panel: Paid Leave in the US

10:15 AM-11:45 AM

ID#12759 Panel: Poverty Measurement: Methods for Incorporating Benefits

ID#12857 Panel: The Impact of Safety Net Programs on the Benefit Receipt and Labor Supply Decisions of Individuals with Disabilities and Their Families

ID#13009 Panel: Who Cares? Characteristics and Outcomes of Those Providing Care to Older Adults and Those in Need of It

1:30 PM-3:00 PM

ID#13314 Panel: Interactions of Labor Markets and Anti-Poverty Policies

ID#12701 Super Session: Reducing Child Poverty: Uniting Diverse Perspectives

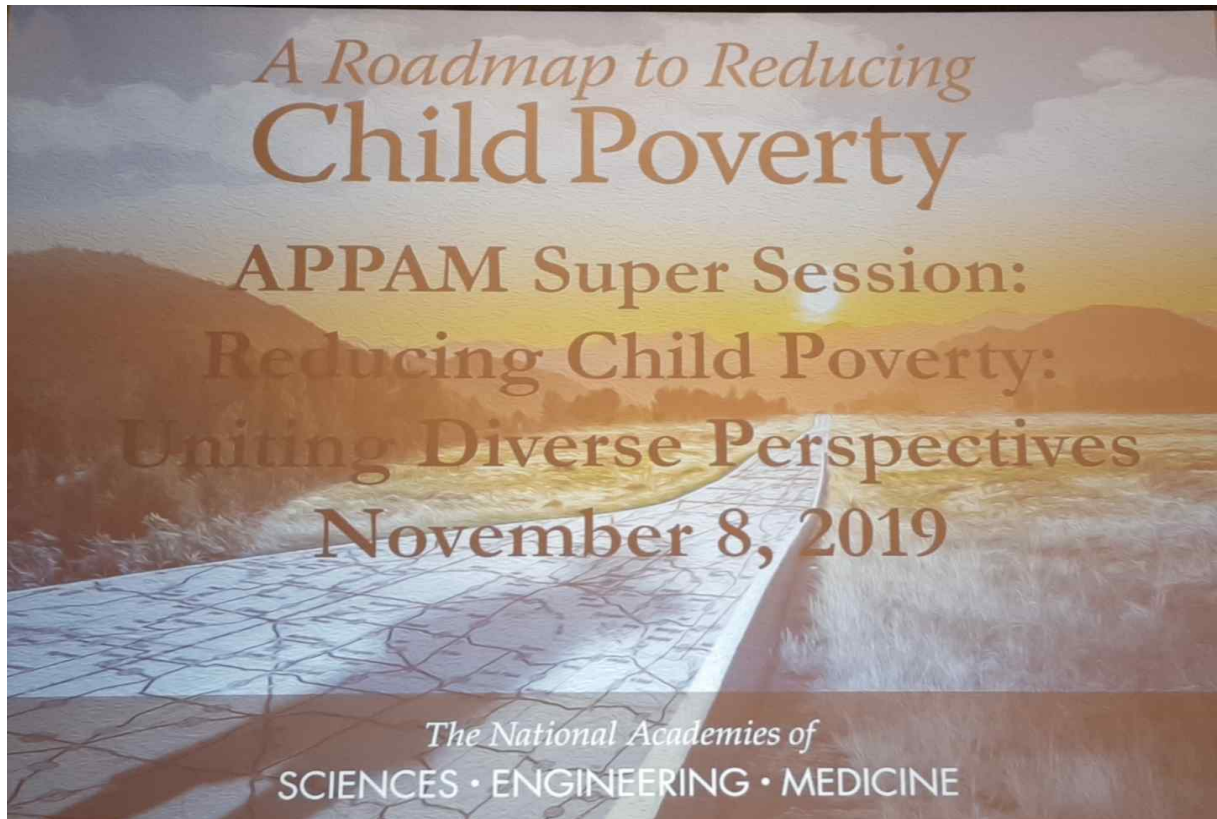
3:15 PM-4:45 PM

ID#12906 Panel: Low-Income Households and Effective Marginal Tax Rates: From Simulation to Family Voices

○ Super Session (미국의 아동빈곤 해소를 위한 정책 로드맵)

"Reducing Child Poverty: Uniting Diverse Perspectives

📖 A Roadmap to Reducing Child Poverty""





Statement of Task

- Review research on linkages between child poverty and child well-being
- Analyze the poverty-reducing effects of existing major assistance programs directed at children and families
- Provide a list of alternative evidence-based policies and programs that could reduce child poverty and deep poverty by 50% within 10 years

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Simulated Programs and Policies

Program and policy options tied to work:

- Expand the Earned Income Tax Credit (EITC)
- Expand child care subsidies
- Raise the federal minimum wage
- Implement a promising training and employment program called WorkAdvance

Modifications to existing provisions relating to immigrants:

- Increasing immigrants' access to safety net programs

Modifications to existing safety net programs:

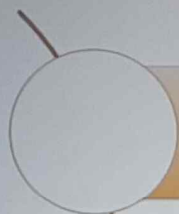
- Expand Supplemental Nutrition Assistance Program (SNAP)
- Expand the Housing Choice Voucher Program
- Expand Child Supplemental Security Income (SSI) levels

Policies used in other Countries:

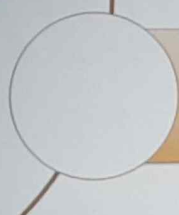
- Replace Child Tax Credit with a nearly-universal child allowance
- Introduce a child support assurance program that sets guaranteed minimum child support amounts per child per month

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Lessons From the Packages:



Individual policy and program changes are insufficient



Bundling work-oriented and income-support programs can reduce poverty AND increase employment

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The strengths and abilities children develop from infancy through adolescence are crucial for their physical, emotional, and cognitive growth, enabling them to achieve success in school and become economically self-sufficient and healthy adults. However, a wealth of evidence suggests that inadequate access to family economic resources compromises their ability to grow and achieve success in adulthood.

In this super session, expert members of a National Academies of Sciences committee will discuss the findings outlined in “A Roadmap to Reducing Child Poverty” from diverse disciplinary perspectives. The report draws on evaluation research literature, policy and contextual analysis, program implementation, and microsimulation data to examine the demographic and contextual factors of child poverty, and promising anti-poverty programs capable of reducing child poverty when combined into diverse and effective policy packages.

Timothy Smeeding, an economist and policy analyst will chair the panel, introduce the topic and the disciplinary perspectives for the participants; explain why APPAM members should be interested from policy analysis and program implementation perspectives, and briefly share reactions to and impact of the report.

The first presenter, Greg Duncan, a child development and program evaluation experts, will briefly overview the report, and then examine the demographic and contextual factors of child poverty. He will explain how poverty is measured and why the relatively new Supplemental Poverty Measure (SPM), provides a somewhat different view of child poverty than the

older Official Poverty Measure (OPM). He will also briefly compare child poverty in the U.S. with other countries and provide examples of successful poverty reduction efforts in these countries.

The second presenter, Cynthia Osborne, an academic policy implementation experts, will focus on some of the contextual factors of child poverty that can have a profound effect on the success of anti-poverty programs and policies. This includes income stability and predictability, equitable and ready access to programs, equitable treatment by the criminal justice system, neighborhood conditions, and family health.

The third speaker, Irwin Garfinkel, a social work professor and economist, will discuss additional programs and policies that were judged promising but not amenable to precise estimates of impact on child poverty. He will also summarize the committee's recommendations for future research and mechanisms that could be implemented to measure future progress.

The fourth presenter, Ron Haskins, a developmental psychologist and congressional expert, will detail the policy and program proposals simulated, discuss the historical economic impact of these programs. Simulations included modifications to current programs, such as the Earned Income Tax Credit and policies used in other countries, such as child support assurance and universal child allowance. He will also summarize the potential effects and associated costs of combining these programs into diverse packages.

다. 연구 수행 관련 시사점 및 제안사항

- 잠재적 위험 예측모형(Predictive Risk Modeling) 기반의 e아동행복지원 시스템 운영 및 위기아동 발굴 프로세스별 쟁점과 개선 관련 시사점
 - (1) e아동행복지원시스템 운영 목표 설정 및 상호 보완에 따른 역할 조정
 - － 위기아동 특성 정보 및 연계 가능 데이터 부재에 대한 처리 및 활용, 세부 집단별 상세 정보의 편차와 활용 여부에 따라 저소득층 등 특정 집단으로 편중되는 문제해결 방안
 - － 현행 시스템 운영 과정에 사회보장정보시스템에 신청 및 조사 정보가 있는 기존의 복지대상이 많은 비중을 차지하며 발굴대상의 중복이 발생하므로 이에 대한 차별화 필요
 - (2) 위기아동 발굴 관련 신규 연계정보 개발 및 연계 속성 다원화 추진
 - － 신규 정보 발굴 및 구축을 통한 연계 확대
 - － 기존 연계 정보 기준 재조정 및 상세 정보 추가 연계
 - － 기존 연계 정보 가공을 통한 신규 정보 생성 및 활용
 - (3) 위기아동 발굴대상의 연령별 특성을 고려한 예측모형 다변화
 - － 위기아동 발굴 및 조치 결과 환류데이터 분석을 통한 모형 고도화 시 연계 정보 속성 및 대상 등을 고려하여 연령집단 구분 및 예측모형 다변화 필요
 - － 다양한 환류데이터 분석 구조 다양화를 통해 적정 활용방향 및 상시 발굴 체계 마련
 - (4) 통계적 방법론 선택 및 시스템 적정 활용방안 모색
 - － 고도화된 기계학습 방법론 기반 위험 예측모형이 '블랙박스'라는 비판 제기 및 정보 비대칭성의 문제와 e아동행복지원시스템의 경우 특히 개인정보의 속성과 잠재적 학대 위기아동이라는 접근에 따른 현장 대응 논리 개발 및 인권 보호 중요

- 저소득층 또는 특정 취약계층(가구유형) 등으로 데이터 편향성에 따라 예측 결과가 집중적으로 편향 및 고착화되는 문제점 개선방안 검토 필요

○ (5) 발굴대상 선정 및 배분을 통한 방문 조사 기준과 원칙 재설정

- 해외의 유사 운용사례 등을 심층 검토하고, 현장 여건 등을 보다 면밀하게 조사하여 위험예측 결과 기준 Cutoff line, Grouping 및 Filtering 기준 및 원칙 등 재설정 필요
- 발굴대상 범위 선정 시 분위 기준(상위 x%) 설정 및 위험확률 예측 결과에 근거한 필수 방문 가구 지정(mandatory) 및 정보 제공
- 지역별 집중 및 편차에 따른 발굴대상 배분 상한 재설정
- 미 선정 가구 정보 소실 및 추가 활용방안 검토
- 모형 미반영 신규 연계정보 추가 시 발굴대상 선정 및 환류 데이터 분석 프로세스 설정

□ 빅데이터 기반 기계학습 및 인공지능의 공공부문 도입에 대한 비판적 접근 필요성 관련 시사점 및 제언

- 4차 산업혁명에 대한 관심이 높아지면서, 4차 산업혁명의 핵심기술인 ‘인공지능(artificial intelligence)’에 대한 관심이 증폭됨
- 이러한 사회 분위기 속에 인공지능이 우리가 안고 있는 많은 사회문제를 ‘과학적으로 ‘손쉽게’ 해결해줄 수 있을 것이라는 기대로 사적 민간부문(private sector)에서 급속하게 도입되고 있는 기계학습(machine learning)이 공공부문(public sector)에서도 활용되기 시작하고 있으나, 이와 더불어 사회 정책 영역에서의 기계학습 활용의 한계와 윤리적 이슈가 제기되고 있음
- 이에 따라, APPAM pre-workshop을 통해서 사회정책 영역에서의 인공지능 활용과 한계, 그리고 이를 극복하기 위한 다양한 방향성 등이 논의됨
- 인공지능 및 기계학습 기술은, 과거 데이터를 계산 가능한 형태로 변환하여

학습하여 예측하는 기술이며, 축적된 데이터가 신뢰할만한 수준이 아니라면 예측결과 또한 신뢰할만한 수준의 예측이 불가능함

- 이는 인공지능, 기계학습 알고리즘의 양적, 질적 수준과 무관하며, 벤치마크 성능이 매우 우수하고 정교하게 증명되어 객관적으로 우수한 알고리즘 역시, 학습 데이터가 높은 수준으로 준비되지 않으면 결과는 좋지 않을 수 있음을 의미하는 것으로, 공공 사회정책 영역별로 이러한 학습 데이터가 축적되어 있는 상황인지가 매우 중요한 차이를 가져옴
- 데이터 기반의 기계학습은 정보 처리 능력은 매우 빠르나, 정보 처리 결과에 대한 설명은 불가능함. 다시 말해, 분류/예측/의사결정이 이루어 졌을 때, 이러한 결과가 어떤 절차를 거쳐, 혹은 어떤 요인으로 인해 분류/예측/의사결정이 이루어 졌는지 설명하기 어려우며, Accountability / Explainability의 문제가 제기되고 있음
 - 기존 로직 기반 인공지능 시스템의 경우, 의사결정 과정은 인간의 확인이 가능하기에 이를 검증 (Verification)하는 것은 가능했으며, 특히 인공지능 시스템이 잘못된 결정을 내리거나, 오작동 했을 경우에는 추론 로직을 확인하고 인공지능 시스템의 결정을 설명할 수 있는 여지가 분명히 존재했음
 - 에러 기반 기계학습은, 주어진 데이터의 특징이 모델의 변수(Variable) 공간이고, 각 변수의 파라미터로 weight가 주어지는 상황에서 데이터 기반으로 weight를 추정한 후, 모델을 완성하여 의사결정을 내리는 시스템으로, 의사결정이 이루어졌을 때 잘못된 결과이거나 오작동한 경우, 왜 이런 결정이 이루어졌는지 확인하는데 weight에 의존하는 방법 이외에는 찾기 어려움
 - 게다가 개별 특징에 대한 weight의 크기가 어떤 이유로, 어떤 과정을 거쳐 형성되었는지 확인이 불가능하고, 이는 해당 weight의 크기에 따른 특징의 중요도를 추론하는 것에 무리가 따름
- 또한, 인공지능, 기계학습에 의한 의사결정 가치 중립성 및 윤리성에 대한 부분 관련 우려가 증대되는 상황에 직면하고 있음

- 인공지능, 특히 데이터 기반의 기계학습은 추론/예측/의사결정은 주어진 데이터를 바탕으로 형성되며, 과거 데이터가 의도적/비의도적으로 편향되게 만들어진 경우, 인공지능 시스템은 더 이상 공정한 것으로 보기 어려움
 - 예를 들어, 아마존의 채용 시스템에 인공지능 시스템을 적용했을 때, 어느 시점부터 여성 지원자의 지원서가 채택되는 경우가 극도로 적어지고, 이는 아마존 입사에 성공적인 지원자들 중 여성 이외 지원자들 숫자가 많아짐에 따라 성별 중립성이(아무도 모르는 사이에) 무너졌을 것이라고 추측함. 이러한 사건 이후 아마존은 채용 시스템에서 인공지능 시스템을 제외하는 결정을 내림
- 보편타당한 윤리적 결정에 대한 우려도 대두되고 있으며, 계산적 합리성에만 의존하는 인공지능, 기계학습 시스템은 경제학에서 이야기하는 효용(Utility) 기반 시스템으로 볼 수 있음
 - 이 경우, 효용에 반하는 정신적 가치, 윤리적 가치, 사회적 가치 등은 인공지능 및 기계학습의 의사결정에서 배제되는 경우가 발생할 수 있으며, 또한 어떤 의사결정이 내려졌을 때, 인간의 윤리성에 반하는 결정이라면 예외적으로 인공지능 시스템이 이를 종료 또는 취소하거나 혹은 윤리적 타당성에 입각한 의사결정으로 바꿀 수 있는 예외적 처리가 존재해야 하는데, 이를 위해 인간의 보편타당한 가치를 학습하거나, 혹은 간섭을 통해 통제받을 수 있는 장치가 반드시 필요함
- 이러한 사회정책 영역에서의 인공지능 활용의 한계를 극복하기 위하여 몇 가지 대안적인 방향성 등이 제시됨
- 설명 가능한 AI 기술 개발 결과의 적용
 - 인공지능 기술이 다가오는 미래의 핵심적 기술로 부상할 수 있는 가능성을 고조시키는 동시에, 부정적인 결과를 가져오는 가능성이 가장 높은 기술로 알고리즘의 조작 가능성, 축적 데이터 및 의사결정의 편향성 등 인공지능의 부작용이 알려지면서 이에 대한 신뢰성 문제가 제기되기 시작함
 - 특히, 공공 사회정책 영역에서는 도출한 최종 의사결정의 근거, 도출과정의

타당성 등을 제공하지 못하고 있는 기계학습의 블랙박스 이슈는 인공지능 기술의 높은 성능을 신뢰할 수 없게 만드는 결과를 가져오고 있음

- 이에 따라, 이와 같은 문제를 극복하고, 투명하고 신뢰할 수 있는 인공지능 기술로 도약하기 위한 '설명 가능한 인공지능 (Explainable AI, XAI) 개발 및 적용 필요성'이 적극적으로 제시됨
- 특히 사람의 생명과 재산에 적용할 수 있는 인공지능 기술의 경우, 최종적 판단에 이르는 사유의 설명이 필요하며, 블랙박스 형태의 결과로 판단하는 것은 많은 위험을 수반하기 때문에, 이러한 대안은 필수적임
- 설명 가능한 AI (이후 XAI)는 Explainable AI로 불리며, 인공지능의 행위와 판단을 사람이 이해할 수 있는 형태로 설명 가능한 인공지능 기술을 의미하며, 인공지능 알고리즘의 작동 과정을 이해하고, 의사결정 결과에 대해 이유를 설명할 수 있는 기술 개발을 통해 공공 사회정책 영역 적용 필요

○ 데이터 편향성에 대한 대응

- 인공지능 기술, 특히 빅데이터 기반 기계학습이 다양한 분야에 확산되면서 편향성으로 인한 인공지능 추론 결과의 공정성이 보장되지 못함
- 딥러닝 등 최신 인공지능 기술들은 데이터 기반의 학습이 이루어지는 바, 특정 성향 혹은 특정 집단에 대하여 편향성을 지닌 데이터로 학습될 경우, 이를 그대로 활용하여 불공정한 결정을 내리는 사례 발견
- 이는 다양한 분야에서 발견되고 있는데, 예를 들어 인공지능 기반의 채용 및 승진 등 인사 시스템에서 성별/학벌/나이 등에 대한 차별을 학습하여, 결국 사회 내에서 인간의 편향/편견에 의해서 발생하는 차별이 동일하게 발생하는 현상을 보임
- 이러한 차별의 위험은 기존 불평등과 편견이 자리잡고 있고, 학습 데이터가 많이 수집되지 않은 국가에서 특정 집단을 대상으로 높게 나타나는 경향이 존재함

- 편향성으로 인해 공정성이 결여된 인공지능 기술을 공공부문, 특히 인간을 중심으로 하는 사회정책 영역 전반에서 사용할 경우, 특정 대상 및 집단에 대해 차별과 편견이 있는 불공정한 의사결정의 위험성이 있으며, 이는 인공지능에 대한 신뢰감을 저하시키고, 활용에 대한 반감을 증폭시킴
- 편향성은 크게 알고리즘 측면에서의 편향성과 인공지능 학습을 위한 학습 데이터 편향으로 구분될 수 있으며, 이를 적극 대응하기 위해서 인공지능 개발 적용 시 편향성 제거를 위한 프로세스 기반 프레임워크 마련 필요
- 또한, 인공지능 기술 적용에서 차별 근절을 위한 핵심적 원칙을 제시하고, 학계, 산업계, 공공 부문에서 준수할 수 있도록 만드는 과정이 필수적임

○ 윤리적 인공지능 설계 및 적용

- 앞서 두 가지 대표적 접근들은 인공지능 기술의 편향성을 방지하거나, 인공지능 기술의 의사결정 절차 및 정당성을 확인하여, 인간과 상호 작용하는 동안 공정하고, 믿을 수 있는 인공지능을 개발하여 적용하는데 초점을 둠
- 이와 더불어, 최신 인공지능 기술을 이용하여 사용자들을 위해 혹은 공공 이익을 목적으로 인공지능 시스템을 기획하고, 구현하는 과정에 의도적으로 편향성을 보이거나 차별을 경험하며, 사용자들에게 피해를 미치는 방향으로 동작하도록 시도할 수 있는 경우가 분명히 존재하므로, 이를 방지하기 위해 인공지능의 신뢰를 높이기 위한 윤리적인 가이드라인 혹은 제도적 규제가 마련되어 이를 예방할 수 있는 조치가 필요함