Department of Finance & Administration

STATE OF TENNESSEE ARTIFICIAL INTELLIGENCE (AI) ADVISORY COUNCIL MEETING

November 20, 2024

Agenda

- Opening Remarks (1:00 p.m.)
- Public Comment
- Charter Amendment & Approval (1:10 p.m.)
- Artificial Intelligence for Disaster Relief Efforts (1:15 p.m.)
- Subcommittee Report Outs & Discussion (1:55 p.m.)
- State AI Operations Update (2:45 p.m.)
- Next Meeting & Action Items (2:55 p.m.)
- Closing Remarks & Meeting Adjournment (3:00 p.m.)

TN

Opening Remarks

Commissioner Jim Bryson
CIO Stephanie Dedmon

Charter Amendment & Approval

Commissioner Jim Bryson

Charter Amendment & Approval

Engagement Subcommittee Charter Amendment

Purpose: The Engagement Subcommittee will evaluate Tennessee's effectiveness in fostering public and stakeholder – including local governments – engagement regarding the use of artificial intelligence in government. Through proactive outreach, the subcommittee will ensure clear communication, address concerns and seek input from all affected stakeholders. By prioritizing transparency and accountability, the subcommittee aims to build trust and facilitate informed participation in the implementation of AI technologies.

Deliverable: The subcommittee will contribute to a comprehensive report with actionable recommendations to promote transparency and accountability in the use of AI technologies. The report will include recommendations for tracking progress and explore strategies for supporting local governments in their transition to AI, ensuring effective implementation across the state.

Artificial Intelligence for Disaster Relief Efforts

Dr. Prasanna Balaprakash, Dr. Philipe Ambrozio Dias & Dr. Dalton Lunga

OAK RIDGE National Laboratory

GeoAI for disaster relief efforts

Geospatial Science and Human Security Division - National Security Sciences Directorate

Presented by: Philipe Dias
Dalton Lunga
Prasanna Balaprakash

U.S. DEPARTMENT OF ENERGY

ORNL IS MANAGED BY UT-BATTELLE LLC
FOR THE US DEPARTMENT OF ENERGY

A history of creating high-resolution critical infrastructure datasets across the US

Scientific achievement

- Breakthrough **high performance computing machine learning** and **computer vision** techniques to create unique seamless **critical infrastructure datasets**
- Developed **AI models** that address spatial generalization challenges – models **reusable across different geographies**

Significance and impact

- Generated **comprehensive foundational data** to **support**:
  - **High resolution population distribution** estimates
  - Effective **FEMA's post-disaster damage assessment** → time-critical response & recovery
- Over 7 years, **we have mapped ~40 countries (1 billion footprints)**

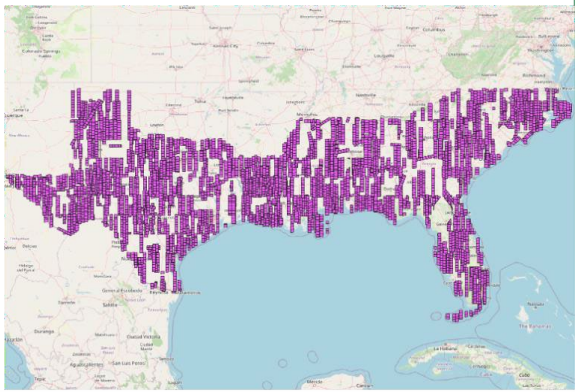
Research details

- Self-supervised algorithms introducing **labeling efficiency** to enable few-shot learning
- Models finetuned to **detect individual structures** (450 SF and larger)
- **Enhanced attribution** through scalable multi-source conflation in minutes

Rapid & high-quality infrastructure mapping updates across the United States

Scalable workflows - processing terabytes of satellite imagery

- Curated 5,831 new WorldView-2/-3 images (2017-2024)



Coverage of newer images for the nine priority states

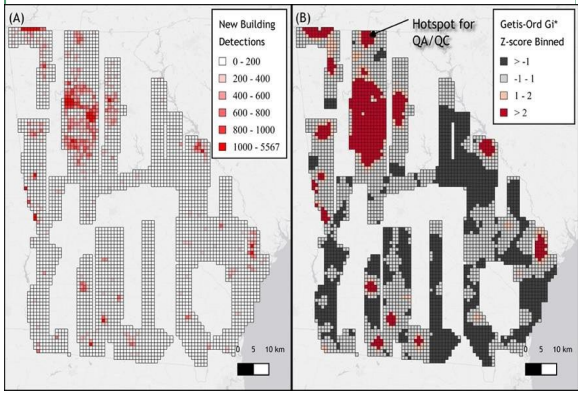
OReole Foundation model improving label efficiency

- Leveraged OReole for structure updates
- Higher accuracy in detection and delineation of built infrastructure

Comparisons between raw geometries from Phase I (in blue)and Phase III (in red)

Buildings feature updates with high precision

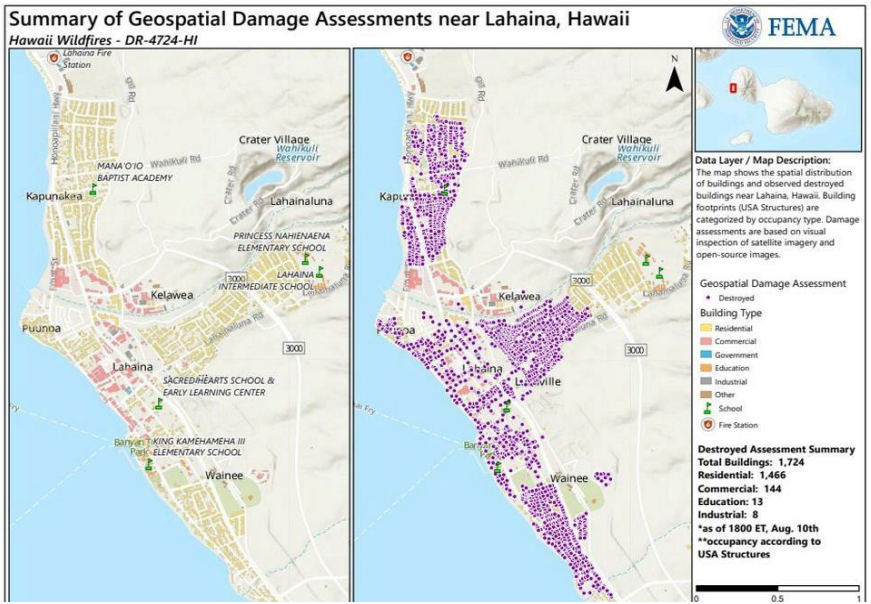
- Achieved exceptional 99.43% precision in manual QA/QC of 1.3 million new detections over hotspot areas



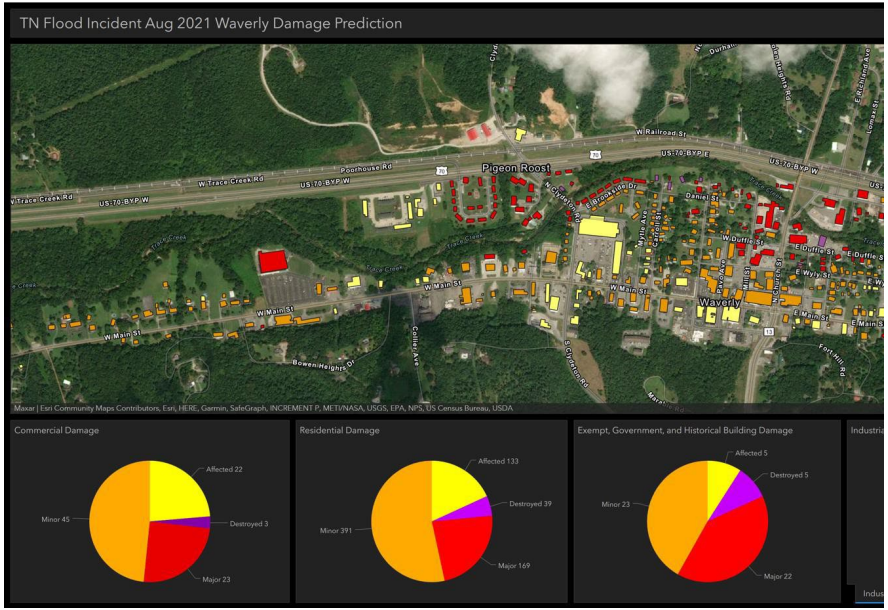
Example of hotspots for manual QA/QC **(A)** New building detections in GA mapped as a 5km grid **(B)** Getis-Ord Gi* analysis with z-scores binned for display. Grid cells with a z-scores of 2 or greater were chosen for review.

National authoritative datasets supports local government disaster response efforts

2023 Hawaii Wildfire



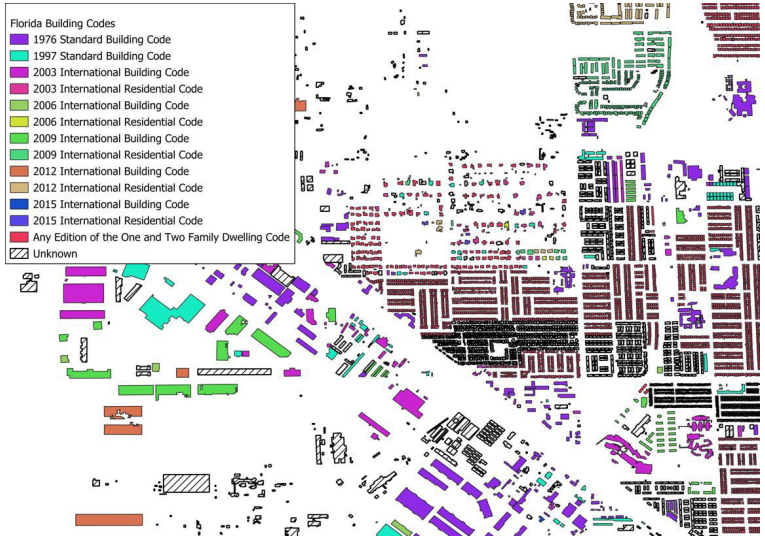
2021 Tennessee Flooding



Adoption of building codes and population estimates into disaster impact assessment

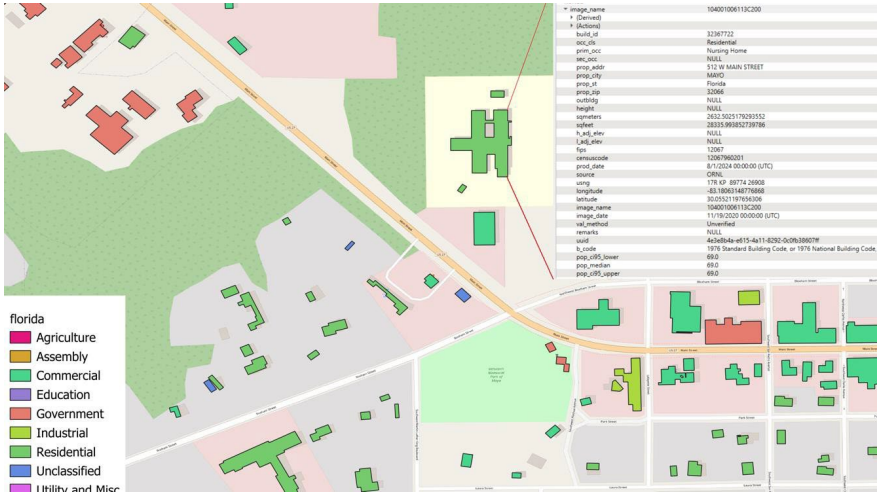
Building Code for Disaster Impact Modeling

Integration of FEMA's Building Code Adoption Portal data based on location, occupancy class, and parcel data



Population Count Estimation

2024 First-time application of ORNL's UrbanPop synthetic population estimates at individual building level



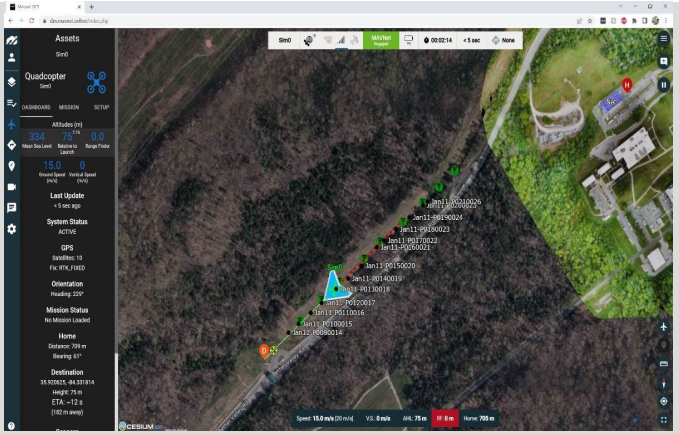
Infrastructure assessment with Small UAS

- AI model for accurate and rapid object classification ➔ **inform status of energy infrastructure after disasters**
- Develop and deploy AI/ML models using computing resources available on UAV
- **Utility pole locations** (lat/lon) and **stop-light status** value transmitted via best available communication network

Undamaged Pole at latitude/longitude

Damaged pole at latitude/longitude

Uncertain pole status at latitude/longitude



MAVNet GCS with sample detections. The green icons represent undamaged infrastructure.

Damage Assessment with UAV Data Collection After Ida Hurricane

Innovating for rapid infrastructure damage assessment in armed conflict zones and natural disasters (UT-Battelle Awards)

Scientific achievement

- Building Damage Assessment model for individual structures
- Improvements in model generalization (data labeling + view-angle awareness)
- Rapid mapping for several dates & scales (multiple cities/regions)

Significance and impact

- Generating data is critical for effective emergency planning: preparedness, response, and recovery efforts
- Easier rapid population estimate updates

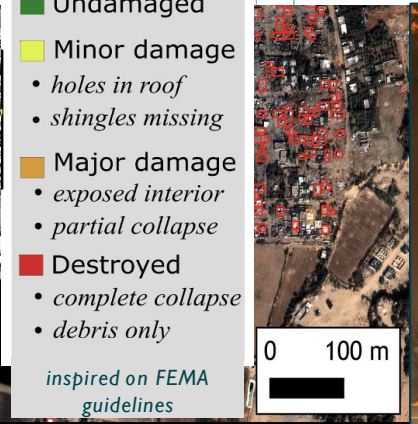
Research details

- A CNN-based architecture trained on damage severity using high resolution satellite imagery
- A human-machine teaming for model-guided data labeling during crisis

Damage levels & criteria

- Undamaged
- Minor damage
  - *holes in roof*
  - *shingles missing*
- Major damage
  - *exposed interior*
  - *partial collapse*
- Destroyed
  - *complete collapse*
  - *debris only*

inspired on FEMA guidelines



Beyond the visible spectrum: synthetic aperture radar (SAR) and multimodal AI for mapping flood impacts

New research efforts

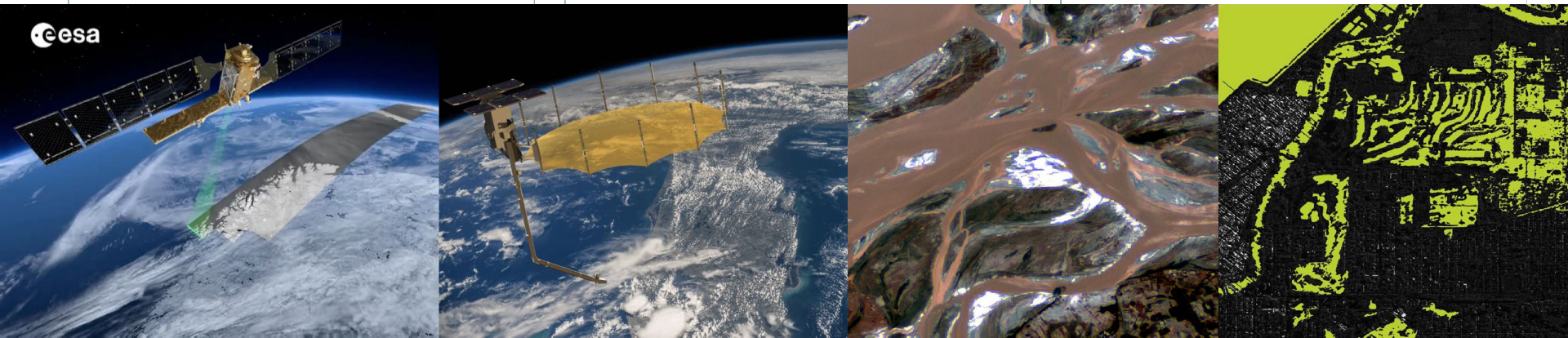
- Preprocessing pipeline implemented for Sentinel 1 SAR imagery
- Flood mapping algorithms developed for both optical and SAR modalities

Research significance

- Flood maps generated in near-real time can be of great significance to disaster management personal for rescue operations
- Historical flood mapping informs insurance programs such as NFIP

Technical details

- A CNN based deep neural Network architecture developed for flood detection from SAR imagery
- Finetuned foundation model for flood detection from Optical Imagery



Subcommittee Report Outs & Discussion

CIO Stephanie Dedmon

Outcomes Subcommittee Status Update

Presented by:
Lynne Parker
Chair, Outcomes Subcommittee

Email:
LEParker@utk.edu
dr.lynne.parker@outlook.com

Subcommittee Members

Chair: Lynne Parker
Vice-Chair: Carter Lawrence

Membership:
- Prasanna Balaprakash
- Bo Watson
- Gregory Mays
- Kevin Vaughan
- Richard Littlehale

Staff:
- Adam Bohanan
- Bill Lewis

Outcomes Subcommittee Updates

- **Charter directives:**
  - Identify expected & potential outcomes
  - Provide overview of goals, benefits, potential uses, risks, & limitations of AI systems
  - Produce report on current state of AI, use cases, and expectations or potential outcomes to TN with increased AI use; development of risk analysis of potential threats to TN's key infrastructure from AI technologies
- **Clarified scope:**
  - Focus on ***use cases*** of AI, rather than rather than the technology itself
  - ***State government operations***, rather than broader private sector
  - Recognition that inward focus ***will have outward facing results*** that affect citizens and businesses
- **Upcoming deliverable due dates:**
  - Interim progress report [May 2025]
  - Comprehensive report [December 2025]
- **Expert briefings:**
  - [Oct. mtg] Learned about state governance approaches around the United States, guest speaker Elizabeth Laird, Center for Democracy & Technology

TN

Identifying Beneficial Use Cases

- **Beneficial outcomes (examples):**
  - Improving customer service
  - Preventing fraud and waste
  - Reducing administrative burden
  - Improving efficiency & effectiveness of public benefits decisions
  - Enhancing scalability
  - Accelerating innovation and new insights

- **Example use cases:**
  - **Accessibility:** Using AI to achieve ADA 508 compliance, adapting websites and mobile apps for non-English language users
  - **Process acceleration:** Using AI to identify potential instances of fraud
  - **Operational efficiency:** Using AI to synthesize information across departments

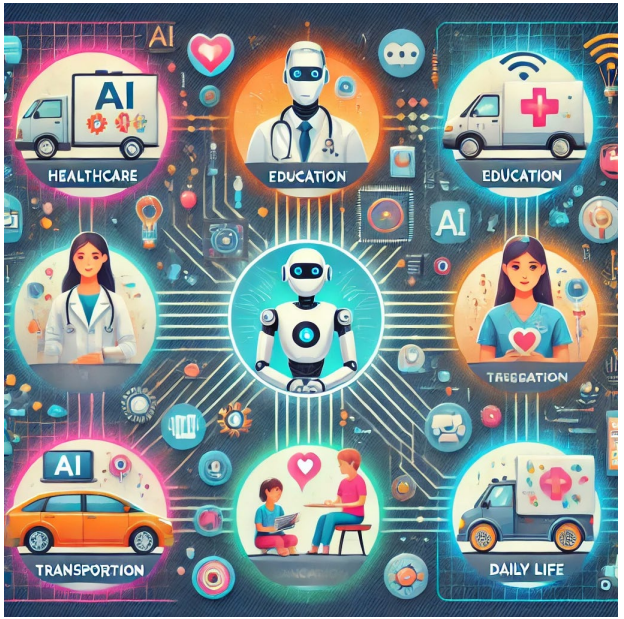


Image created by ChatGPT 4o

Subcommittee Request for Discussion

- **Outcomes Subcommittee Request:**
  - We propose that the full AI Advisory Council direct STS (Strategic Technology Solutions), in coordination with this subcommittee and the broader Council, to engage TN departments to generate an inventory of current AI use cases and products across the enterprise
- **Proposed process & timeline:**
  - [*As soon as practicable*] AI Advisory Council formally directs STS and TN departments to provide an inventory of current AI use cases and products, using the guidance provided (next bullet)
  - [*20-Dec-24*] STS & Outcomes Subcommittee collaborate to provide guidance for departments on how to report current AI use cases (to ensure consistency of reporting)
  - [*3-Mar-25 or when practicable*] STS/Departments provide current AI use case inventories to AI Advisory Council

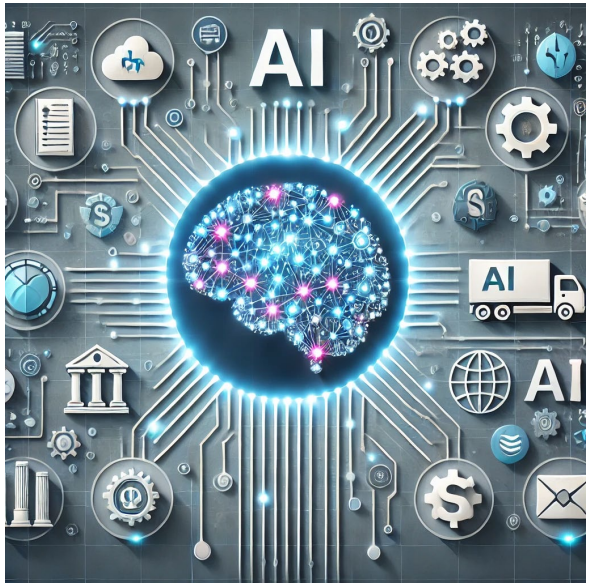


Image created by ChatGPT 4o

We welcome discussion!

Labor and Economy Subcommittee Status Update

Subcommittee Members

Chair: Ryan Allen
Vice-Chair: Callie Cook

Membership:
Lizzette Reynolds
Juan Williams
Grant Minchew
Joe Baker
Lynne Parker

Staff Lead:
Scott Radock

Labor and Economy Subcommittee

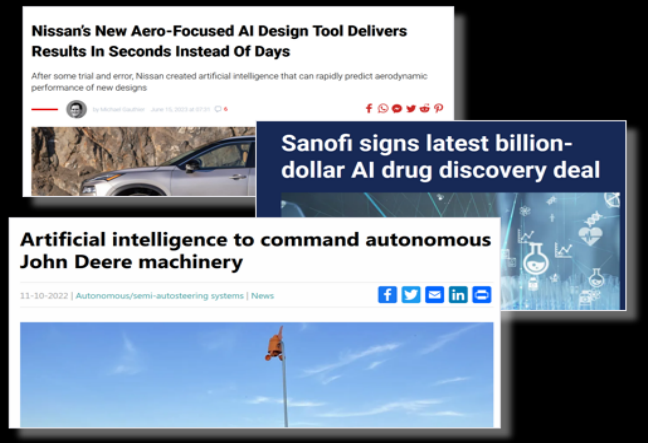
Goals for Workgroup

- Advise the council on what **impact AI will have on the Tennessee Economy and Workforce**
- Help to **harness the strengths and opportunities** that we have in our state
- Help to ensure we are **preparing students and educators** for AI driven careers.
- Position Tennessee as a **leader in AI** by creating partnerships with industry, organizations and institutions

Labor and Economy Subcommittee

AI will disrupt nearly every industry and state in the US; Tennessee can act early to leverage this transformation

AI technologies are already disrupting industries in unexpected ways…



…and the level of opportunity and disruption to come is enormous

$1.8 Trillion Dollars
Forecasted U.S. market size of artificial intelligence in 2030[1]

Over 500,000 jobs in TN
are expected to be augmented or replaced by AI[2]

Every state and industry will have to engage with AI; Tennessee has an opportunity to leverage, rather than react to, this new technology, in order to **capture outsized impact** and **prepare our workforce**

1.Source: Grandview Research. Artificial Intelligence Market Size, Share & Trends Analysis Report By Solution, By Technology (Deep Learning, Machine Learning), By End-use, By Region, And Segment Forecasts, 2023 - 2030
2."Exposure" a is proxy for potential economic impact that reflects the technical capacity to make human labor more efficient w/o distinguishing between augmenting or displacing
Source: GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models - OpenAI, OpenResearch & Upenn

Labor and Economy Subcommittee

AI is impacting the workplace

Source: Goldman Sachs article on Generative AI, *05-Apr-2023*

2/3

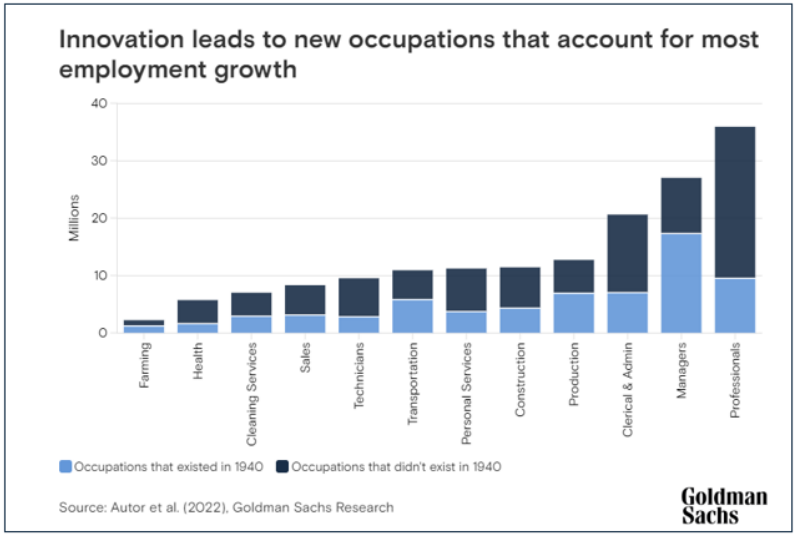
Fraction of U.S. occupations that could be partially automated by AI

60%

Percentage of today's workers in occupations that didn't exist in 1940

85%

Percentage of employment growth over last 80 years due to technology-driven creation of new positions



Labor and Economy Subcommittee

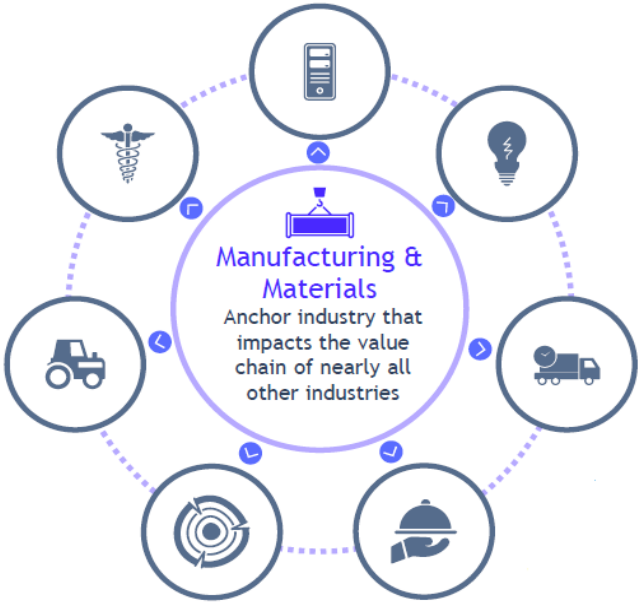
Our Method of Approach

- Information Gathering Phase
  - University of Tennessee
  - Vanderbilt
- Decision on how we are measuring
  - Job losses
  - Job gains
  - Specific industry
- Adoption
  - Could help or hinder

Labor and Economy Subcommittee

University of Tennessee- Knoxville

- Boston Consulting Group
  - UT AI Report – 2023 Economic Study
- AI is going to affect 40% of jobs in TN
- Eight Top TN Industries examined
  - Agriculture & Farming, Energy, Forestry, Healthcare, Hospitality & Entertainment, Information Technology, Forestry, Healthcare, Manufacturing and Materials, Transportation & Logistics
- Aligned ecosystem: Employers, Researchers, and Talent



SCORE

What SCORE is and their mission

- State Collaborative on Reforming Education (SCORE)
- Non-profit advocacy and research institution
- SCORE's mission is to drive transformative change in education so that all Tennessee students can achieve success in college, career, and life

SCORE and AI

- Education must respond and evolve to equip students around AI
  - Preparing students to access positions that will require knowledge of AI
  - Reimagining the teaching role with AI

AI in Education Trends

- Gen AI will continue **rapid growth in education**
- Current Frameworks nationwide: Responsible use of AI, AI literacy, updating policies, training teachers, promoting equity and accessibility
- New law passed in Tennessee that **requires schools to adopt an AI policy**
- **Only approved AI programs** may be utilized in student instructions and work
- Teachers spend **less than 50% of their time** in direct interaction with students. AI can potentially help with this issue.
- Multiple AI tutors and assistants are being piloted throughout the state

SCORE

SCORE Recommendations

- Keep the human in the loop
- Learn with and about AI through AI literacy and training
- Research pilots and report learnings broadly
- Enable learning acceleration for all
- Ensure safety, ethics and security
- Prioritize evidence-based practices
- Assess equity in access

Engagement Subcommittee Status Update

Subcommittee Members

Chair: Cody York
Vice-Chair: Ann Marie Walp

Membership:
Jim Bryson
Paul Bailey
Vinay Dattu
Prasanna Balaprakash

Staff Lead:
Gina Long

Engagement Subcommittee Update

- Monthly meeting schedule set
- Clarification of charter purpose and deliverables
- Exploration of future guest speakers and training opportunities

Policy Subcommittee Status Update

Subcommittee Members

Chair: Lang Wiseman
Vice-Chair: Grant Minchew

Membership:
Stephanie Demon
Jonathan Skrmetti
Patrick Sabatini

Staff Lead:
Kelly Randall

Federal

- **EO13859 and 13960**
  - Trump Administration EO's focused on US leadership in AI R&D and deployment, and responsible use of AI in government
- **EO14110**
  - Biden Administration EO laying out a government strategy to support AI governance
- **AI Bill of Rights**
  - Biden Administration guidance establishing a set of principles and guidelines to protect individuals and promote responsible AI use

Laird, E. (2024, October). *Center for Democracy & Technology Presentation on AI. AI Advisory Council Policy Subcommittee*. Nashville.
Contact Elizabeth Laird: Center for Democracy & Technology | elaird@cdt.org

State Legislative Trends Across the Country

1. Launching task forces and studies
2. Requiring risk management practices for high-risk use
3. Documenting AI use cases
4. Establishing pilot programs
5. Appointing Chief AI Officers*

Laird, E. (2024, October). *Center for Democracy & Technology Presentation on AI. AI Advisory Council Policy Subcommittee*. Nashville.
Contact Elizabeth Laird: Center for Democracy & Technology | elaird@cdt.org

State EO Trends Across the Country

12 States and DC:

1. Deploying AI to deliver public services
2. Addressing bias and discrimination
3. Encouraging pilot projects
4. Prioritizing collaboration between academia, industry, government
5. Creating task forces

Laird, E. (2024, October). *Center for Democracy & Technology Presentation on AI. AI Advisory Council Policy Subcommittee*. Nashville.
Contact Elizabeth Laird: Center for Democracy & Technology | elaird@cdt.org

State AI Operations Update

CIO Stephanie Dedmon and Roger Waynick

State AI Operations Update

- TN AI Partner Experience Expo on September 9th
- State of Tennessee Enterprise Artificial Intelligence Policy
- National Governor's Association Report

Next Meeting & Action Items

CIO Stephanie Dedmon

Next Meeting & Action Items

Next Meeting: January 29, 2025

Action Items

Closing Remarks & Meeting Adjournment

Commissioner Jim Bryson

Thank You