CENTER FOR EQUITABLE AI & MACHINE LEARNING SYSTEMS

NOAA SAB AI Panel Sessions

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MISSION

To facilitate the development, deployment, and verification of socially responsible and equitable artificial intelligence systems and to ensure the public is well informed of how evolving technologies in this space affect their health, prosperity, and happiness.

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VISION

The Center for Equitable AI and Machine Learning Systems (CEAMLS) facilitates the research, development of standards, identification of new methods, and advancement of innovative technologies that benefit everyone on the planet.

CEAMLS serves as an interdisciplinary nexus for thought leadership in the application of fair and unbiased technology and its applications. The Center remains rooted in scholarly stewardship, cultivating the next generation of students at all levels, as well as life-long learners across industries and areas of study.

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PRIMARY CENTER GOALS

Conduct research in theoretical and applied socially responsible and trustworthy AI aimed at solving complex real-world problems

Address algorithmic bias in AI research and educate the public on the possible disproportional impact to health, prosperity, and society

Increase diversity of thought in the field of AI by attracting significantly more underrepresented computer scientists and engineers

Collaborate with educational, non-profit, government and industrial organizations to study, document, and mitigate the effects of algorithmic bias

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INTERDISCIPLINARY RESEARCH THRUSTS

1. Best Practices & Standards
2. AI Transparency
3. Objectivity Optimization
4. Bias Detection & Remediation
5. Testing & Validation
6. AI Misapplication
7. Model Stress Testing

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ETHICAL AI FRAMEWORK

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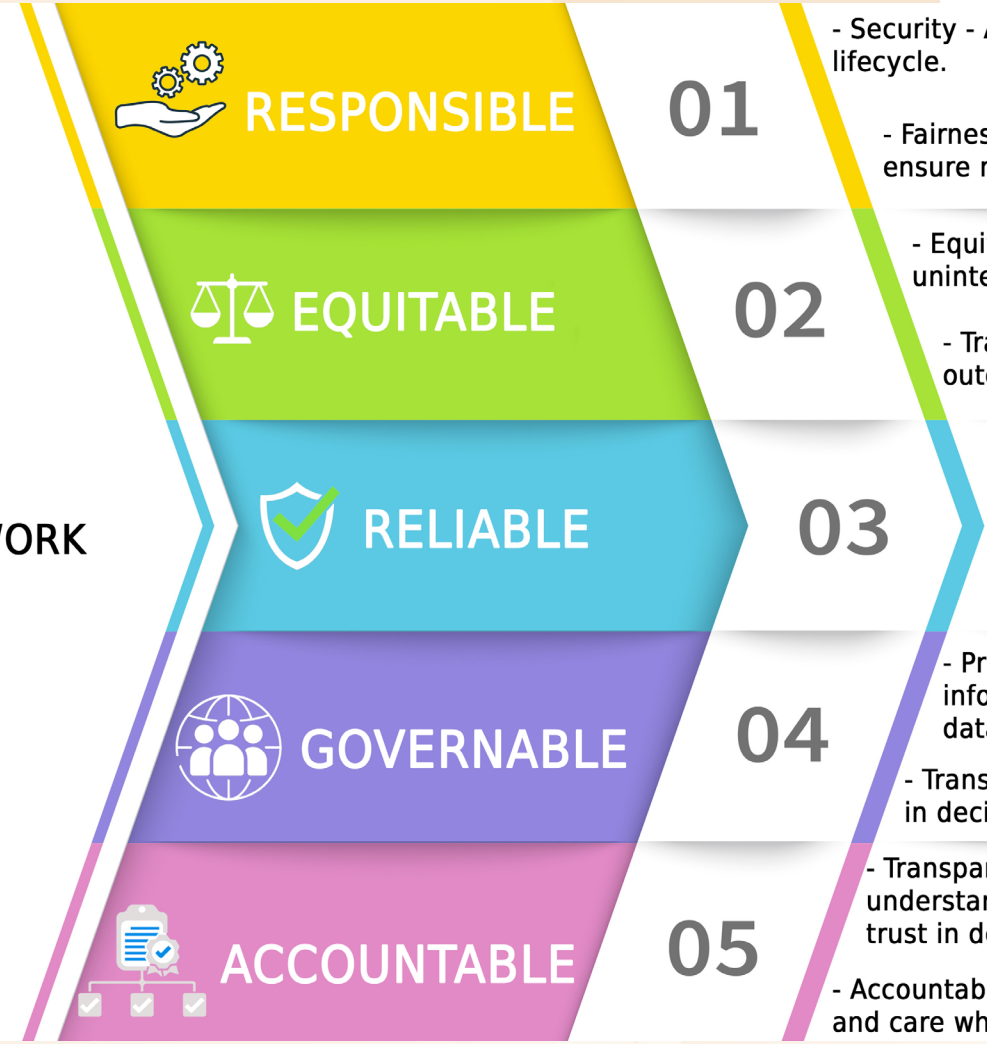
ETHICAL AI FRAMEWORK



- Security - An ideal system should be secure, safe, and robust throughout its lifecycle.

- Fairness - Actively include checks & balances during algorithmic design to ensure no individual or group discrimination in the outcomes of the AI process.

- Equity & Bias Mitigation - Teams will take deliberate steps to minimize unintended bias.

- Trace, treat, and mitigate harm ethically to prevent unintended outcomes.

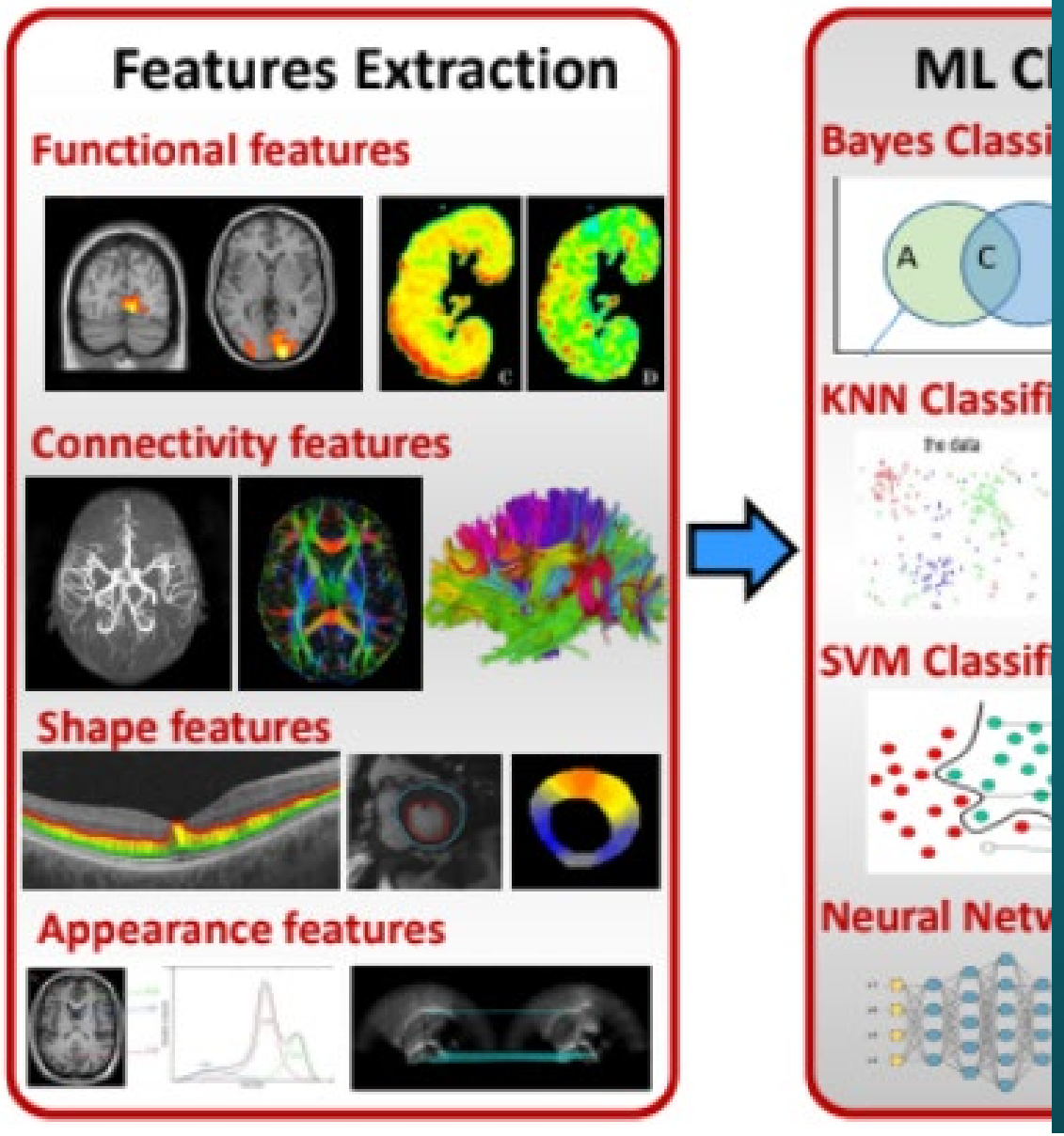
- Reliability - AI systems' capability and uses must be explicit and well-defined.

- Privacy - Privacy and data protection are crucial. AI encounters sensitive information which requires better protection compared to other personal data.

- Transparancy - Highlights the process behind the results & enhances trust in decision-making with explainable processes and systems.

- Transparency - Highlights the process behind the results - helps with understanding the backend functionality, improves accountability, & enhances trust in decision-making.

- Accountability - Training to ensure teams exercise appropriate levels of judgement and care while remaining responsible for the development, deployment, & use of AI.



RELEVANT RESEARCH AREAS

- Computer Vision (Imagery)
- Medical Image Analysis (Imagery)
- Trustworthy & Reliable Machine Learning for Test & Evaluation
- Automated navigation for unmanned ariel, ground, and sea vessels
- Environmental Justice (Weather & Climate)
- Cyber Assessment of ML Tools (Trustworthy AI)
- Healthcare Cyber Threat Analysis (Trustworthy AI)

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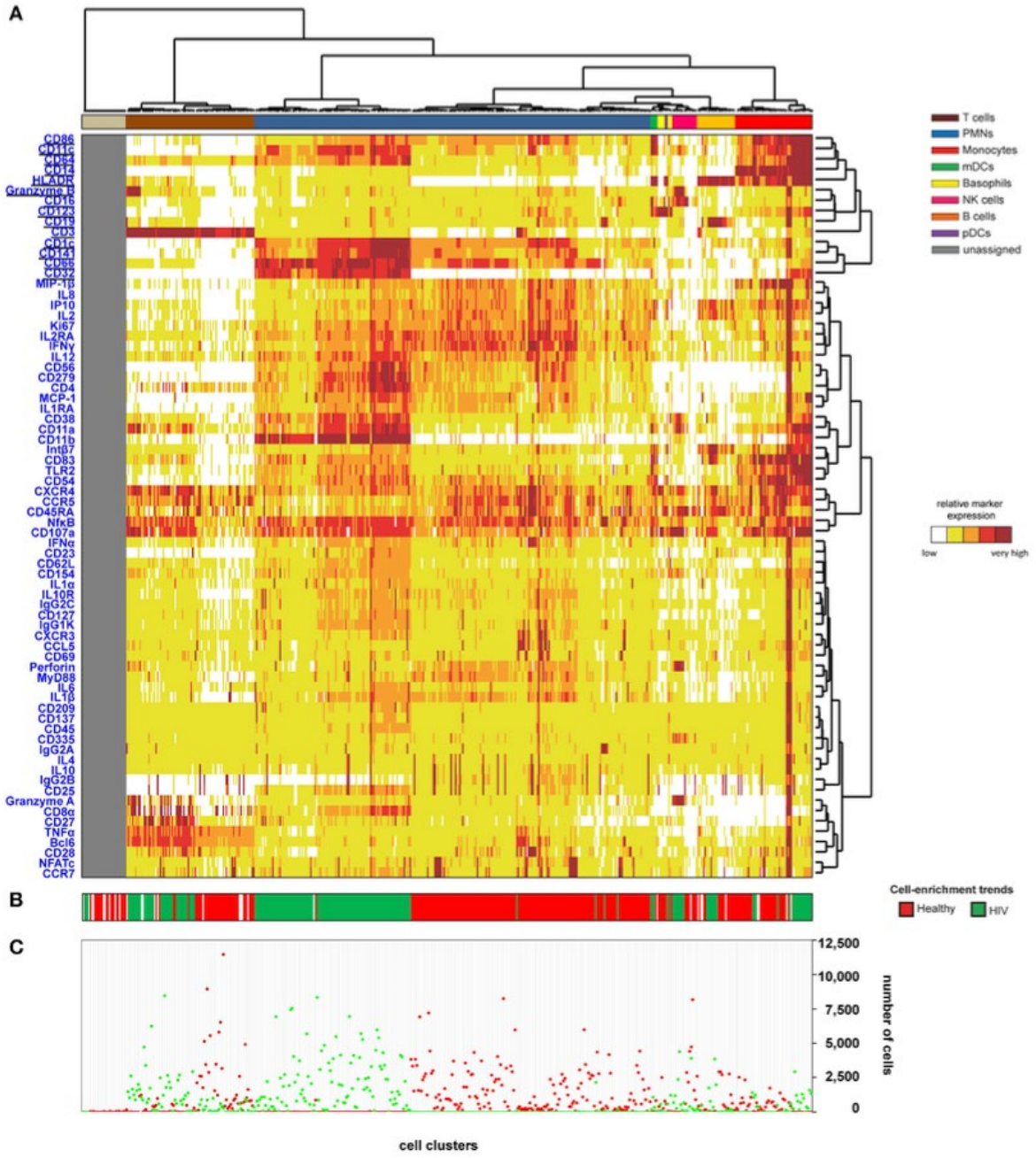

RELEVANT RESEARCH AREAS

- Equitable, Sustainable and Intelligent Logistics Systems with Drones in Rural Areas (Numerical Modeling)
- Identification of Data and Algorithmic Bias in ML (Responsible AI)
- Algorithmic bias detection and fairness benchmarking for cloud-based AI and Machine Learning systems (Responsible AI)
- A Methodology for the Development of Cognitive Twins to Predict Behaviors & Bias

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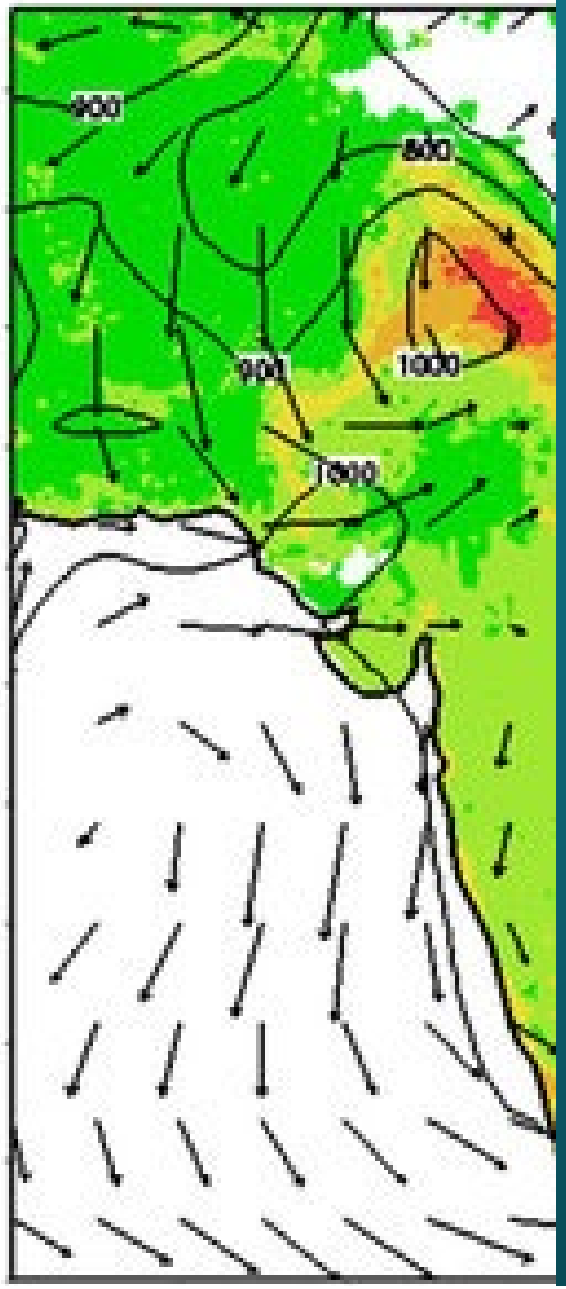

RELEVANT RECENT AWARDS

Long-Term, High-Resolution Urban Aerosol Database for Research, Education and Outreach [Agency: NASA]

Geophysics-guided machine learning system for identifying vertical land motion and projecting relative sea level rise in the Chesapeake Bay region using multi-geodetic data [Agency NOAA]

Artificial intelligence for Changing Climate and Environmental Sustainability [Agency: NSF]

Alignment with NOAA

- Development, application and standardization of trustworthy and responsible AI
- Democratizing ethical AI innovation
- Training the workforce

THANK YOU

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