The Abdus Salam International Centre for Theoretical Physics

Responsible and Sustainable AI for Embedded Systems

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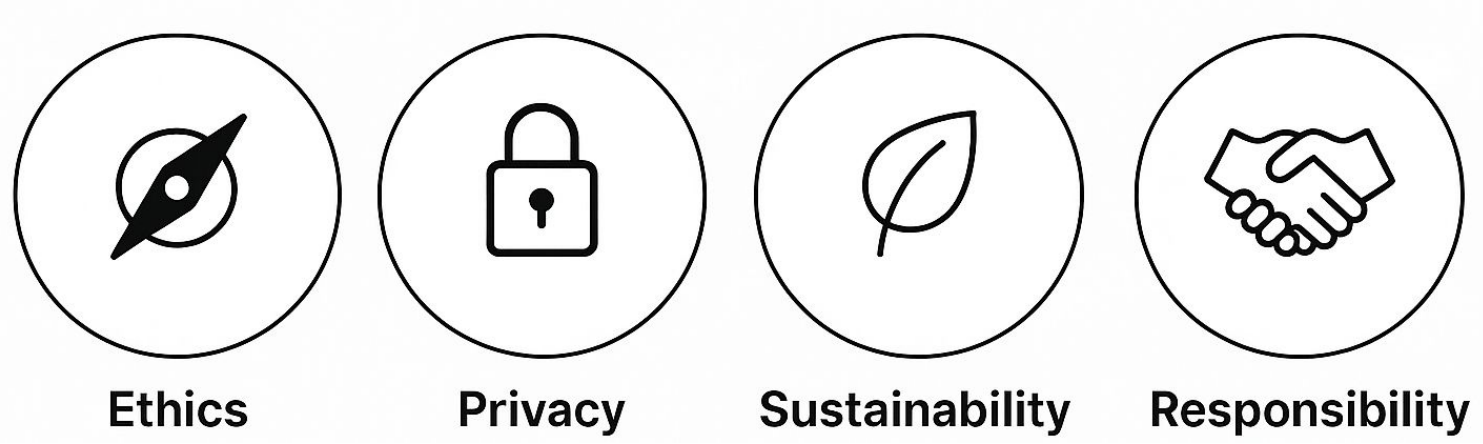
Universidad Tecnológica del Perú

Responsible and Sustainable AI for Embedded Systems



Responsible and Sustainable AI for Embedded Systems

Ethics, Privacy, Sustainability, and Responsibility

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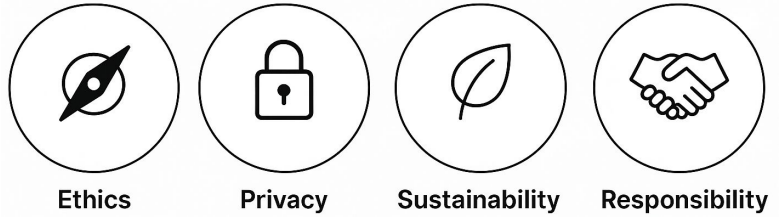
  Ensure fairness, transparency, and accountability in AI models.
  Avoid bias propagation and promote explainable ML — even on constrained hardware.



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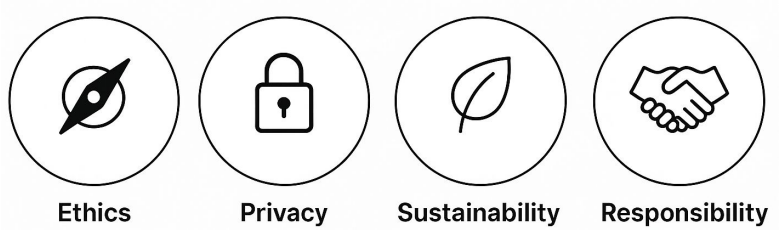

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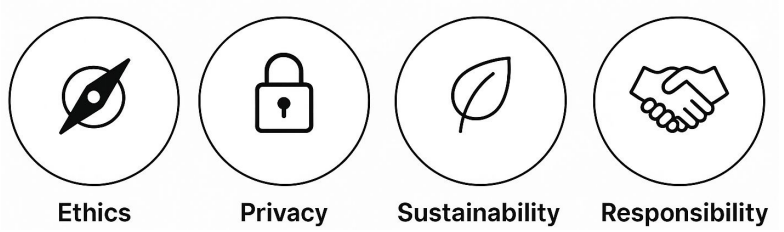
  Design lightweight models that minimize environmental impact.



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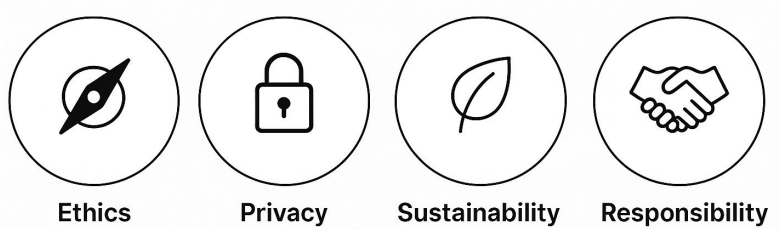
- **Responsibility**
  Promote safe and reliable AI deployment.
  Encourage human oversight and continuous evaluation of system behavior.



Responsible and Sustainable AI for Embedded Systems

- **Fairness:**
  - Ensure models serve all users equitably.
- **Bias:**
  - Prevent bias propagation during optimization or quantization.
- **Transparency:**
  - Promote explainable and auditable ML, even on hardware.
- **Accountability:** Maintain traceability from data to deployment.

Responsible and Sustainable AI for Embedded Systems

- **On-device ML:**
  - Less data sent to the cloud.
- **Data sovereignty:**
  - allowing users or organizations to maintain control over their information.
- **Local inference:**
  - Enables real-time anonymization and secure data processing at the edge.
- **Challenge:**
  - Balance between performance and confidentiality.

Responsible and Sustainable AI for Embedded Systems

- **FPGAs**
  - Lower energy use than GPUs.
- **Reconfigurable:**
  - Longer hardware lifespan.
- **Efficiency** reduces AI's carbon footprint.
- **Design ML with resource-awareness**:
  - to optimize both performance and sustainability.

Responsible and Sustainable AI for Embedded Systems

- **Accountability** in AI hardware–software co-design.
  - ensuring that both model and hardware choices are transparent and justified.
- Ensure **reproducibility** of ML.
  - enabling consistent results across platforms.
- Promote responsible open-source use.
  - fostering collaboration without compromising ethics or safety.
- Emphasize the responsibility to society: aim not only for faster AI, but for better, fairer, and more human-centered AI systems.

Responsible and Sustainable AI for Embedded Systems

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