

Equitable Global AI Innovation Ecosystem and Open Science

Bishesh Khanal

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Founding Director & Research Scientist,

Nepal Applied Mathematics & Informatics Institute for research (**NAAMII**) <https://naamii.org>

Founding Executive Member, and Member,

National Young Academy of Nepal (NAYAN)

<https://www.youngacademynepal.org.np>

AI, Open Science and the Global Digital Divide,

4th UN Open Science and Open Scholarship Conference,

United Nations University,

Tokyo, Japan; 16 October, 2025



Open Science and Open Scholarship Conference



Outline

NAAMII: a multidisciplinary AI Center of Excellence (AICE) in Low Resource Settings

Open Science enabling Advances in AI

Challenges that remain in AI for Open Science

The Big Alignment in AI for Equitable AI Innovation Ecosystem



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Country-Level Low Resource Settings in Science & Innovation

Lack of Funding and Brain Drain

- Limited to No systematic approach to fund science based on merit
- Lack of Funds in Science from Government, Philanthropists and Industry

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Lack of Supporting Environment

- Limited Industry that sees direct value of science for them or are in position to fund R&D
- Limited to No strong history and culture (or lost track) in science and innovation
- Lack of Institutions (Universities, Research Centers) attracting top scientists & innovators

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Lack of (or distorted) Belief and Brand

- Do you really do science and technology as good as "other countries"??
- Priorities are "simpler needs"; let others invent & we adapt

Nepal: in Computing Sciences and AI Research: Low Resource

Number of Scientific Publications in top-tier computing science venues such as Neurips, ICLR, ICML, CVPR, ECCV, ACCV, ICCV, EMNLP, MICCAI, ...

Before 2019 ?

- Almost Zero [couldn't find on quick search]



Nepal: in Computing Sciences and AI Research: Changing!

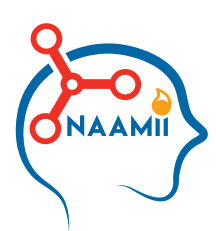
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Before 2019 ?

- Almost Zero [couldn't find on quick search]

After 2019

- 60+
- NPJ Digital Medicine, BMJ, TMI, Melba, MedIA, Brain Sciences, ...
- MICCAI, CVPR, ECCV, ACCV, Neurips, ICLR, COLING, CPAL, ...



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My Trajectory Towards Building Capacity in Low-Resource Settings



BE, Electronics Engineering

2004 ● 2009



Tribhuvan University
Institute of Engineering
Pulchowk campus



2010 ● 2012

Msc: 1. Computer Vision (Robotics)
2. Computational Biology & Biomedicine



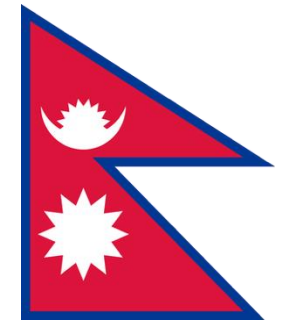
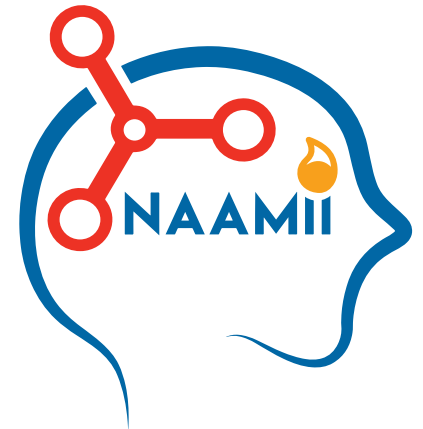
PhD, Computational Medicine

2012 ● 2016



2017 ● 2018

Postdoc, Artificial Intelligence for Fetal Ultrasound Imaging



Co-founders of NAAMII: Scholars desiring building capacity



BE, Electronics
Engineering



PhD, Computational
Medicine



2004 ● 2009

2010 ● 2012

2012 ● 2016

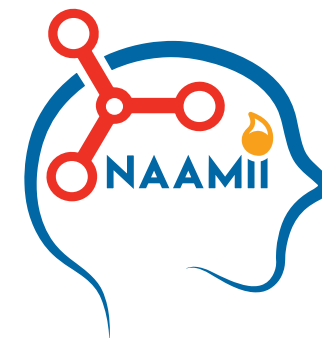
2017 ● 2018



Msc: 1. Computer
Vision (Robotics)
2. Computational
Biology & Biomedicine



Postdoc, Artificial
Intelligence for Fetal
Ultrasound Imaging



Established in 2018 as a company not-distributing profits

Vision

A world class center of excellence to improve the lives of people through scientific research



Multidisciplinary AI Center of Excellence (mAICEs) in LMICs: building an ecosystem

Scientific Research

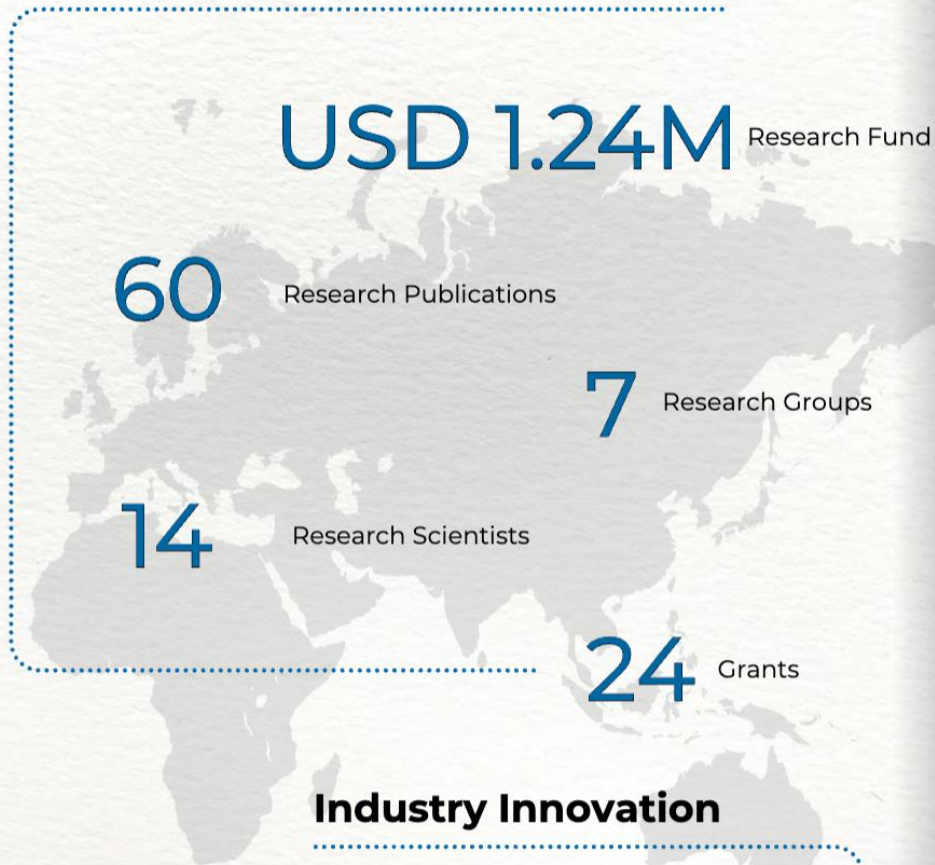
Education & Outreach

Industry & Innovation



NAAMII IN NUMBERS (2018-2024)

Scientific Research



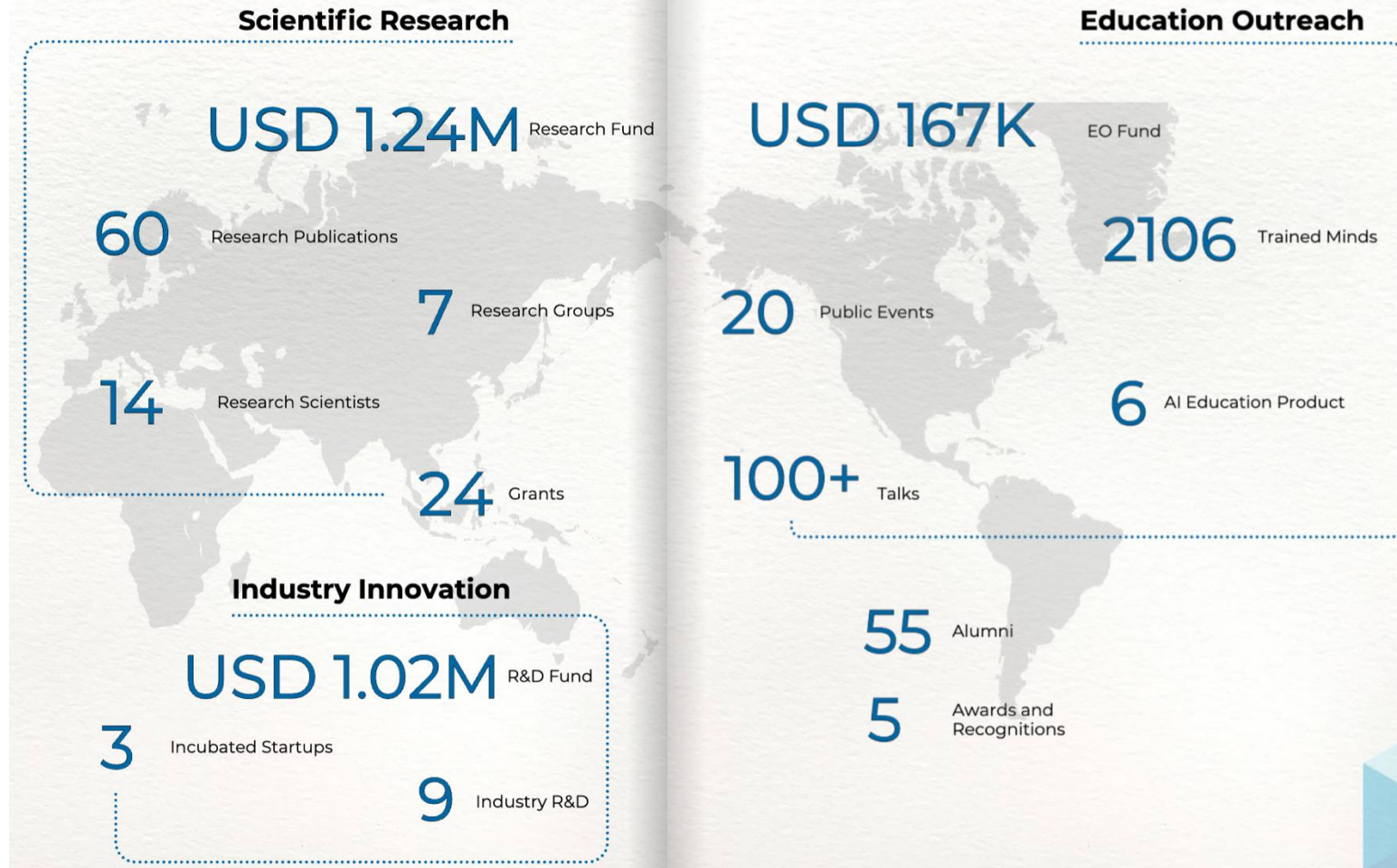
Industry Innovation



Education Outreach



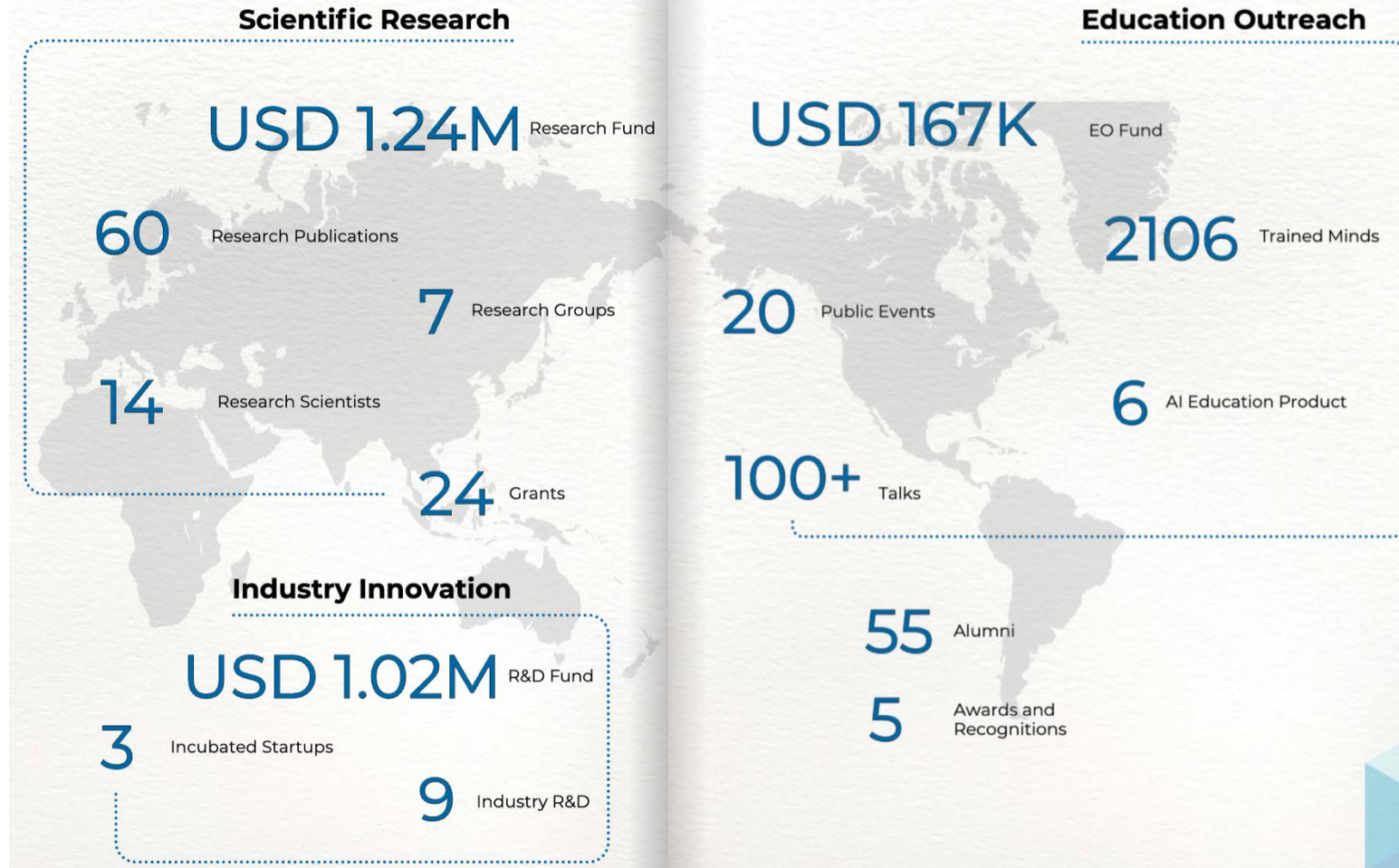
NAAMII IN NUMBERS (2018-2024)



ZERO Core Funding [Intentional: 1st phase Low-resource]



NAAMII IN NUMBERS (2018-2024)



ZERO Core Funding [Intentional: 1st phase Low-resource]
Entering 2nd phase now for core infrastructure and operations funding

NAAMII

Scientific Progress

Sectoral Impact

Global Equity

Advance Global AI Knowledge

Responsible AI & Global Reach

Build Capacity

Equitable Innovation

Scientific Research

Education & Outreach

Industry & Innovation



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Scientific Research

Theoretical Research

Pushing the boundaries of AI

Applied Research

Leveraging AI to solve real-world problems

AI for All

Making AI accessible to everyone

Scientific Research

Theoretical Research

Pushing the boundaries of AI

Applied Research

Leveraging AI to solve real-world problems

AI for All

Making AI accessible to everyone

RESEARCH GROUPS



Transforming Global Health With AI (TOGAI)

Transforming Global Health With AI



B Bhattarai MultiModal Learning Lab (BMLL)

Theoretical and Applied Research in Machine Learning



Computational Genomics Lab (CGL)

Solve complex problems in biological sciences using computational techniques.



Research using AI in Neuroscience (RAIN)

Focuses on AI and Neuroscience



Computation Endoscopy, Surgery & Pathology Group (CESP)

Endoscopic Computer Vision, Surgical Data Science, Computational Pathology.



Providential Use of Spatial & Visual Computing (PUSHVIC)

Advancing the fields of Augmented Reality (AR) and Robotics.

Autonomous Research Groups

Diverse Application Domains

- Healthcare, Agriculture, Finance, Education, AI-Society, ...

Research Scientists [Virtual and Borderless Labs]



Dr. Bishesh Khanal
Director / Research Scientist



Dr. Ajad Chhatkuli
Adj. Research Scientist



Dr. Binod Bhattarai
Adj. Research Scientist



Dr. Danda Pani Paudel
Adj. Research



Dr. Francois Rameau
Adj. Research Scientist



Dr. Nabin Koirala
Adj. Research Scientist



Dr. Prashnna K Gyawali
Adj. Research



Dr. Raunak Shrestha
Adj. Research Scientist



Prof. Dr. Sabita Maharjan
Adj. Principal Research



Dr. Sharib Ali
Adj. Research Scientist



Dr. Suman Raj Bista
Adj. Research Scientist



Dr. Taman Upadhaya
Adj. Research Scientist



Dr. Bipendra Basnyat
Adj. Research Scientist



Dr. Buddhi Pathak
Adj. Research Scientist

ETH Zurich, Switzerland; INSAIT, Bulgaria; University of Aberdeen, UK;
University of Leeds, UK; University of Oxford, UK;
Imperial College London, UK; KAIST, Korea; Yale, USA; UCSF, USA;
University of Oslo, Norway; ...



Research Groups at NAAMII

Published >75 research articles including MICCAI, CVPR, ECCV, NeuRIPS, MEDIA, TMI, ...

Trained > 60 research staffs, supervised 5 Msc theses, 5 undergrad final year projects

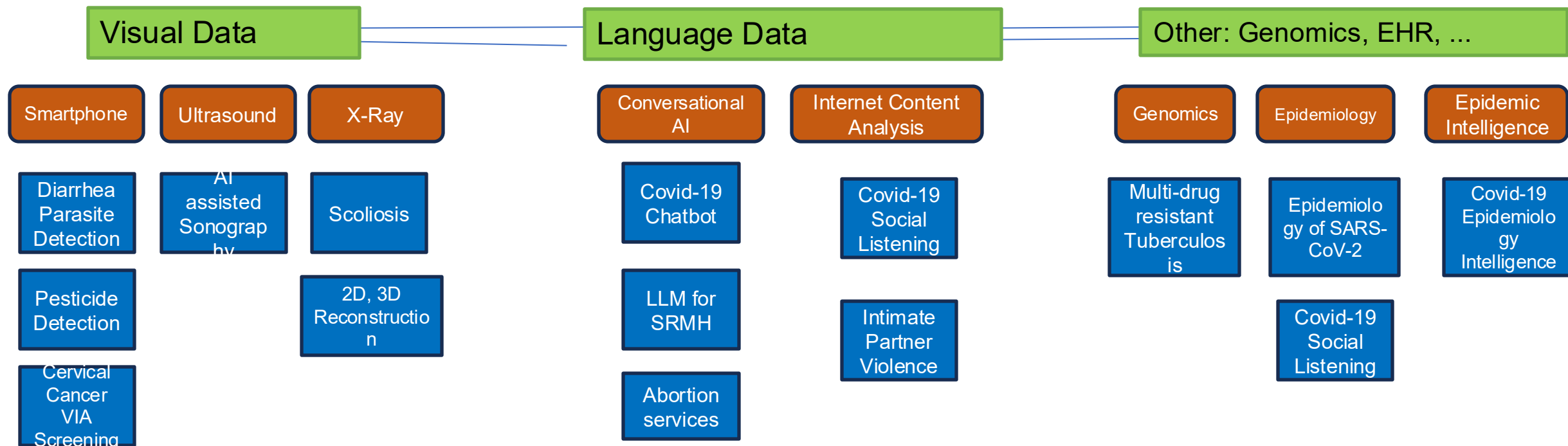
Many top venues publications: **1st time from Nepal**

Won International Scientific Challenges competed by **top University labs globally**





Transforming Global Health with AI



Scientific Progress

Sectoral Impact

Global Equity

Dental Hospital (with startup) OPG images auto-analysis [in-progress]

Telemedicine & AI integration in CHEERS hospitals:

- oral cancer
- otitis media
- Glaucoma and other eye diseases

NAAMII

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Scientific Research

Education & Outreach

Industry & Innovation



Education and Outreach

Building a strong foundation of education & skills in computing sciences and AI

Preparing the society for the rapidly changing digital world

Children & Schools

University Faculty &
Students

Software &
AI Engineers

Professionals

General Public

Government &
Policy Makers



Training Different Sections of the Society

AI4leaders

For senior leadership of government and industry

AI4productivity

For mid-level management of government and industry

AI4nexgen

High school students for their AI career orientation

AIreadiness

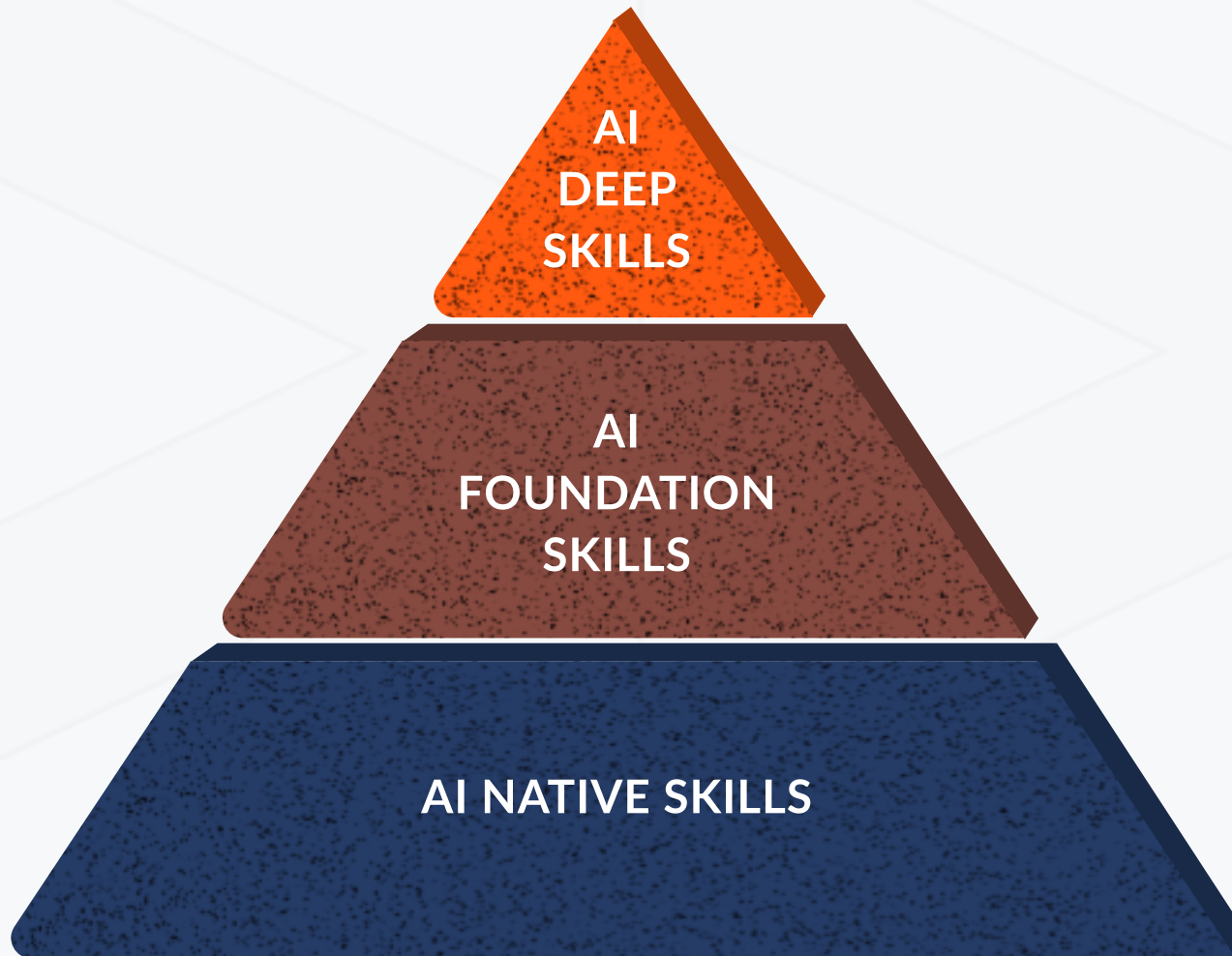
Help tech companies build their AI talent

NAAMII AI Club

AI clubs at high schools



The AI Pyramid



Annual Nepal AI School (AN AIS) 4 editions



30+ countries

550+ participants

1500+ applications



65 speakers

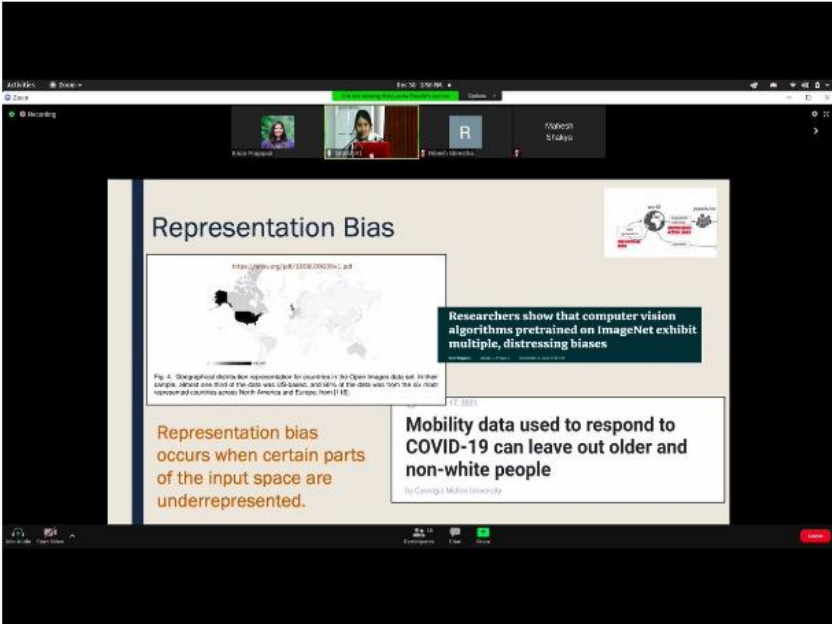
50+
companies/
organizations



Annual Nepal AI School (AN AIS) 2018, 2019



Annual Nepal AI School (AN AIS) 2021, 2023



11 DAYS OF INTENSIVE LECTURES, LABS AND HACKATHON

Building the Future of Intelligence: From Foundations to Impact

ANAIIS THROUGH THE YEARS



OUR SPEAKERS

- Michael Bronstein (University of Oxford, UK)
- Frank Dignum (Umeå University, Sweden)
- Virginia Dignum (Umeå University, Sweden)
- Anubha Gupta (IIIT Delhi, India)
- Balaraman Ravindran (IIT Madras, India)
- Mayank Vasta (IIT Jodhpur, India)
- Xavier Bresson (National University of Singapore, Singapore)
- Ashutosh Modi (IIT Kanpur, India)
- François Rameau (SUNY, South Korea/NAAMII)
- Raunak Bhattacharya (IIT Delhi, India)
- Bipendra Basnyat (University of Maryland, Baltimore)
- Vijay Prakash Dwivedi (NTU, Singapore)
- Ismail Ceylan (University of Oxford, UK)
- Viktor Schlegel (Imperial College London, UK)

THEMES AND TOPICS

- Foundations & Core Methods
- Geometric Deep Learning (GDL)
- Large Language Models (LLMs)
- Reasoning
- Agents & Autonomy
- LLM Agents
- Multimodal Agents
- Robot Agents
- Perception & Understanding
- Computer Vision
- AI for Society & Industry
- AI in Agriculture
- AI in Healthcare
- AI in Finance

**APPLICATION DEADLINE:
16TH OCTOBER, 2025**

Scan to register



LEARN FROM WORLD RENOWNED SCIENTISTS



29th Dec 2025 to 8th Jan 2026

anais.naamii.org.np



NAAMII

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Sectoral Impact

Global Equity

Advance Global AI Knowledge

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Build Capacity

Equitable Innovation

Scientific Research

Education & Outreach

Industry & Innovation



Support building global products and innovation-based companies

Collaborate with industries in R&D to produce products that help solve important problems in the society

Incubating Start-ups



R&D for Companies



GE HealthCare

Contributions to the fourth pillar of the ecosystem

Scientific Research

Education & Outreach

Industry & Innovation

Policy & Regulations



Policy

Research to Policy Initiatives

International Networks and co-developing sectoral ai policy



Research to Policy Initiative

2020

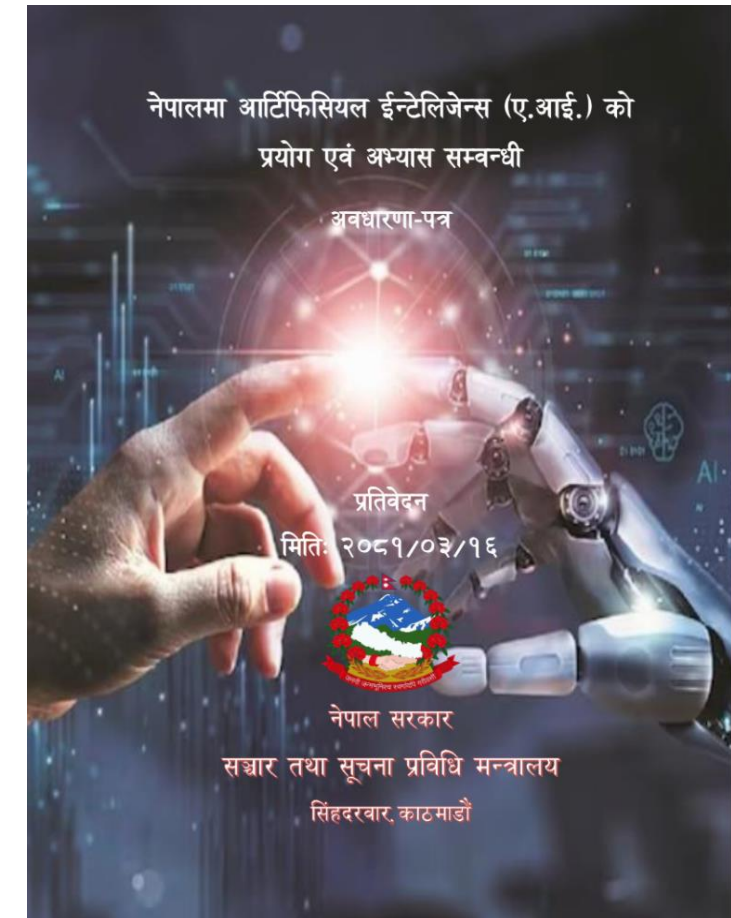
June 2024



February 2024 **NAVIGATING NEPAL'S AI LANDSCAPE** **RAPID ASSESSMENT SURVEY REPORT**



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International Networks

[HOME](#)[ABOUT HAINet](#)[EVENTS & ACTIVITIES](#)[HAIcon](#)[PUBLICATIONS](#)[Become a Member](#)

Advancing **Health AI** in Resource Limited Settings



International Networks

Highlights from HAICon-2025



20+ Speakers from 8
Countries



Keynotes from
Global Health AI
Pioneers



Focus on Real-World
Impact in
Underserved
Regions



Numerous
Collaborations
Sparked



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Open Science in AI: Crucial role in Rapid AI Advances



Open Science in AI: Crucial role in Rapid AI Advances

HOME > NEWS > ALL NEWS > WHY ARE AI RESEARCHERS BOYCOTTING A NEW *NATURE* JOURNAL—AND SHUNNING OTHERS?

NEWS | ENGINEERING

Why are AI researchers boycotting a new *Nature* journal—and shunning others?

Conference papers and open-review websites win favor

17 MAY 2018 • BY MATTHEW HUTSON



Open Science in AI: Crucial role in Rapid AI Advances

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NEWS | ENGINEERING

Why are AI researchers boycotting a new *Nature*

ARTIFICIAL INTELLIGENCE

AI Researchers Are Boycotting A New Journal Because It's Not Open Access

Artificial intelligence will only flourish with transparency.

By **Dan Robitzski** / Published **May 3, 2018 2:32 PM EDT**



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Open Science in AI: Crucial role in Rapid AI Advances

Statement on Nature Machine Intelligence

Machine learning has been at the forefront of the movement for free and open access to research. For example, in 2001 the Editorial Board of the *Machine Learning Journal* resigned en masse to form a new zero-cost open access journal, the *Journal of Machine Learning Research* (JMLR).

Quoting from the 2001 resignation letter:

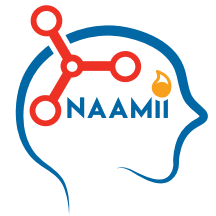
"...journals should principally serve the needs of the intellectual community, in particular by providing the immediate and universal access to journal articles that modern technology supports, and doing so at a cost that excludes no one."

We see no role for closed access or author-fee publication in the future of machine learning research and believe the adoption of this new journal as an outlet of record for the machine learning community would be a retrograde step. In contrast, we would welcome new zero-cost open access journals and conferences in artificial intelligence and machine learning.

[Add Signature](#)

[View Signatures](#)

<https://openaccess.engineering.oregonstate.edu/>



AI Research Community Mostly Open

OpenReview.net



Open Peer Review. Open Publishing. Open Access. Open Discussion. Open Recommendations. Open Directory. Open API. Open Source.

Active Venues

[TMLR](#)

[Computo](#)

[DMLR](#)

[YouthLACIGF 2024 Edition](#)

[ISAPh 2024 Symposium](#)

[MSLD 2024 Meeting](#)

[ICAPS 2024 Demo Track](#)

[RAILS 2025 Conference](#)

[AIR 2024 Newsletter Round 1](#)

[ACM SIGIR 2024 Workshop Gen-IR](#)

[HKUST 2024 AIAA5027](#)

[MELBA](#)

Open for Submissions

[AAAI 2026 Workshop AI4EDU](#)

⌚ Due 16 Oct 2025, 20:59 Japan Standard Time

[EurIPS 2025 Workshop SIMBIOCHEM](#)

⌚ Due 16 Oct 2025, 20:59 Japan Standard Time

[IEEE IROS 2025 Workshop Wheeled-Legged Robots](#)

⌚ Due 16 Oct 2025, 22:59 Japan Standard Time

[EurIPS 2025 Workshop MedEurIPS](#)

⌚ Due 16 Oct 2025, 22:59 Japan Standard Time

[Analytical-Connectionism 2023-2024](#)

⌚ Due 17 Oct 2025, 08:59 Japan Standard Time

[AACL-IJCNLP 2025 Workshop QuantumNLP](#)

⌚ Due 17 Oct 2025, 09:00 Japan Standard Time

[EurIPS 2025 Workshop EIML](#)

⌚ Due 17 Oct 2025, 09:00 Japan Standard Time

[EurIPS 2025 Workshop CausalityImpact](#)

⌚ Due 17 Oct 2025, 20:59 Japan Standard Time



AI Research Community Mostly Open

Computer Vision Foundation open access

These research papers are the Open Access versions, provided by the [Computer Vision Foundation](#).

Except for the watermark, they are identical to the accepted versions; the final published version of the proceedings is available on IEEE Xplore.

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AI Research Community Mostly Open

About the MELBA journal

Mission Statement

MELBA (The Journal of Machine Learning for Biomedical Imaging) is a web-based journal devoted to the free and unrestricted access of high quality articles in the broad field that bridges machine learning and biomedical imaging. MELBA's aims include:

MELBA is a web-based journal and submission to arXiv prior to submission to MELBA is encouraged.

Peer review process

MELBA is a web-based journal and submission to arXiv prior to submission to MELBA is encouraged. MELBA uses a single-blind review process, where the reviewers are anonymous, but the authors are known to the reviewers. The detailed review process can be found [here](#).

minimize the financial burden on authors by leveraging web-based technologies.



AI Research Community Mostly Open



PyTorch

<https://pytorch.org> > projects > pytorch

...

PyTorch - PyTorch

PyTorch is an **open source** machine learning framework that accelerates the path from research prototyping to production deployment. Built to offer maximum flexibility and speed, **PyTorch** supports

PyTorch Conference: October 22–23,
2025, San Francisco, CA **Open Source** AI
Week's flagship event, PyTorch Conference
2025, brings together AI pioneers,
researchers, developers, and startup
founders for keynotes, technical talks,
tutorials,...



AI Research Community Mostly Open



ImageNet

<https://image-net.org>

...

ImageNet

ImageNet contains millions of images classified by WordNet hierarchy of nouns. It is a free resource for non-commercial use and a benchmark for deep learning and computer vision research.



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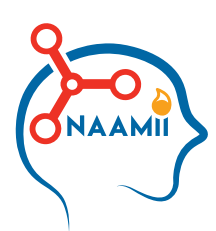
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Key Challenges

Lack of Reproducibility

- Incomplete information in the papers to reimplement
- No access to data for independent verification



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Statistics > Machine Learning

[Submitted on 9 Jul 2018 ([v1](#)), last revised 26 Jul 2018 (this version, v2)]

Troubling Trends in Machine Learning Scholarship

Zachary C. Lipton, Jacob Steinhardt



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Expensive resources few can use to build upon

- Primarily big industry and big-funded institute's work



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Expensive resources few can use to build upon

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Risk of "Winner takes all Dynamics" discourages Openness

- Lack of clarity on where exactly is the MOOT? Data <-> Code <-> Infrastructure ...?



Where exactly is the biggest value in AI development?

Identifying the right problem

- What exactly the AI model should do, where and how?
- What does it change in existing workflow

Data

- How to annotate, what to annotate and how to access the data

Model Architecture or trained weights from large resource

- Model architectures are fairly open, but training is EXPENSIVE, big DATA is expensive



Where exactly is the biggest value in AI development?

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IP rights, or licensing of code or data or problem <-> AI fit?

Data

What kind of licensing for Data

Model Architecture or trained weights from large resource

- Model architectures are fairly open, but training is EXPENSIVE, big DATA is expensive



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The Big Picture

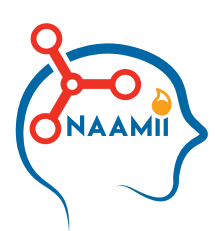
How will the AI impact societies globally ?

Equity ?

Transparency ?

Identifying right problems to work on -> Resources to do research -> Who build products?

How expensive are products -> Socio-economic analysis of the AI services



Think of Social Good and Opportunity to Make Business Globally!

AI can fundamentally transform the way people

- Access to Information & Services
- Have opportunities to do businesses online
- Leverage their heritage, history, and story-telling (e.g. pottery, artists) at low-cost



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AI can help solve difficult problems in Global south

- To provide important services to everyone at scale
- Help tackle issues such as TB, RHD, poor WASH, Malaria, Dengue

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- Help tackle issues such as TB, RHD, poor WASH, Malaria, Dengue

AI can help Government implement

- Processes to regulate malpractices in procurement, contract bidding
- Reduce corruption and improve processes



The Big Picture

The Big Alignment

- Efforts of Social Good (Governments, Foundations, Unions, Philanthropy ...)
- Ability of individuals to make money [Respectable opportunity in the world economy]

The Big Alignment in AI & Network of AICEs to tackle big challenges

The Big Alignment

- Efforts of Social Good (Governments, Foundations, Unions, Philanthropy ...)
- Ability of individuals to make money [Respectable opportunity in the world economy]

Heading into the future: AICEs

Multidisciplinary AI Centers of Excellence (AICEs) in the Global South

1. Culture-Ethics-Beliefs diverse (and conflicting) groups in the global community
2. Geopolitical challenges with AI race
3. Fundamental Economic System: Need/opportunity for an innovation



<https://naamii.org.np>



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<https://www.linkedin.com/company/naamiinepal/>

