

Before We Share our Opinions.....

“At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position, explanation, or interpretation of the IEEE.”

IEEE-SA Standards Board Operation Manual (subclause 5.9.3)

IEEE Standards Association (IEEE-SA): Standards Advancing Technology for Humanity



Moira Patterson

Global Affairs Program Director,
IEEE Standards Association

Global Reach

420,000
Members



160+
Countries



1,800+
Annual Conferences



Technical Breadth

39 Technical Societies
6 Technical Councils



4,000,000+
Technical Documents



175+
Top-cited Periodicals



- Aerospace and Electronic Systems
- Antennas and Propagation
- Biometrics Council
- Broadcast Technology
- Circuits and Systems
- Communications
- Components, Packaging, and Manufacturing Technology
- Computational Intelligence
- Computer
- Consumer Electronics
- Control Systems
- Council on Electronic Design Automation
- Council on Superconductivity
- Dielectrics and Electrical Insulation

- Education
- Electron Devices
- Electromagnetic Compatibility
- Engineering in Medicine and Biology
- Geoscience and Remote Sensing
- Industrial Electronics
- Industry Applications
- Information Theory
- Instrumentation and Measurement
- Intelligent Transportation Systems
- Magnetics
- Microwave Theory and Techniques
- Nanotechnology Council
- Nuclear and Plasma Sciences
- Oceanic Engineering
- Photonics

- Power Electronics
- Power & Energy
- Product Safety Engineering
- Professional Communications
- Reliability
- Robotics and Automation
- Sensors Council
- Signal Processing
- Social Implications of Technology
- Solid-State Circuits
- Systems, Man, and Cybernetics
- Systems Council
- Technology and Engineering Management
- Ultrasonics, Ferroelectrics, and Frequency Control
- Vehicular Technology

IEEE Standards Association

Vision:

Be a world-class Standards Development Organization

Mission:

Provide a high-quality, market-relevant Standardization environment, respected world-wide

- Aerospace Electronics
- Broadband Over Power Lines
- Broadcast Technology
- Cognitive Radio
- Design Automation
- Electromagnetic Compatibility
- Energy Storage
- Ethernet/WLAN
- Green ICT
- IoT
- Medical Device Communications
- Power Electronics
- Radiation/Nuclear
- Reliability
- Renewables and Microgrids
- Software
- Smart Grid
- Transportation Technology

- **Independent global community** with an **open** standards development process
- **Over 1,200** IEEE standards are active
- Over **650** standards projects (PARs) under development
- **Approx. 7,000** IEEE-SA Individual Members and 200 IEEE-SA Entity Members

IEEE In Africa



- Approx. 7,000 members with a majority of Africa's 54 countries represented
- 16 African Sections/Sub Sections
- Approx. 70 Chapters and Affinity Groups (students, women in engineering, technology areas)

Specific IEEE Strategy: Assist in Building Engineering Capacity

- Support engineering education and workforce development
- Build a sustainable community of IEEE members and volunteers
- Support Government policy development and increase opportunities for IEEE to serve as a resource for engineering capacity development

Cooperative Relationships in Africa

IEEE has agreements with organizations in Africa, incl.:

- NEPAD Agency
- Sister Society Agreements with National Engineering Associations
- ARSO – African Organisation for Standardisation
- ATU – African Telecommunications Union
- GSA - Ghana Standards Authority
- RSB - Rwanda Standards Board
- SABS - South Africa Bureau of Standards
- ZABS - Zambia Bureau of Standards



IEEE-SA Platforms for Collaboration

- **Industry Connections** program addresses emerging technology issues where the needs for standards and related services are at the early formation stage
 - a venue for member collaboration to address new technology issues
- The **IEEE Standards Development** process produces results that reflect the collective, consensus view of participants and enables industry to achieve specific objectives and solutions
- The **IEEE Conformity Assessment Program (ICAP)** facilitates the development of test suites, test programs and certification services to assess whether standards are “met”



The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems

- Public launch in April 2016
- Currently more than 750 A/IS Ethics professionals involved from the US, EU, Australia, India, Africa, China, Korea, and Japan
- 13 Committees creating content plus groups supporting outreach, visibility, etc.
- Events featuring Ethically Aligned Design in India, Japan, China, World Economic Forum, EU Parliament, The Vatican and UN/ITU in Geneva
- Ethically Aligned Design, version 2 (EAD) launched December, 2017
- Thirteen approved Standards Working Groups inspired by EAD so far
- Website: http://standards.ieee.org/develop/indconn/ec/autonomous_systems.html

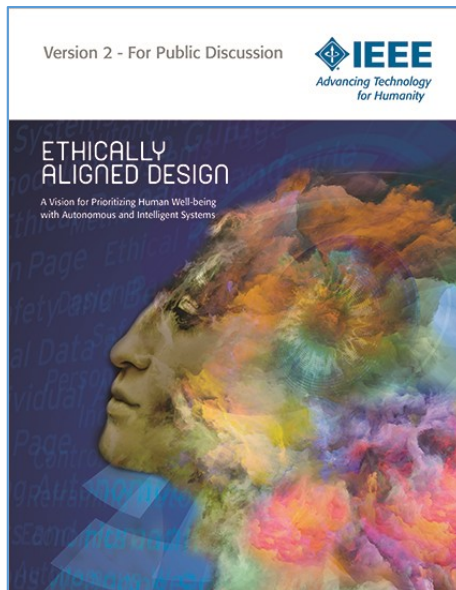
NOTE: The IEEE Internet Initiative is driving a critical program on internet inclusion and universal access

- Website: <https://internetinitiative.ieee.org>

Ethically Aligned Design

A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems

Version 2



- Launched December 2017 as a Request for Input
- Created by over **250 Global A/IS & Ethics professionals**, in a bottom up, transparent, open and increasingly globally inclusive process
- Incorporates **over 200 pages of feedback** from public RFI and new Working Groups from China, Japan, Korea and more
 - **Thirteen Committees / Sections**
- Contains **over one hundred twenty** key Issues and Candidate Recommendations
 - Open for **public feedback until 7 May 2018**
 - Over 100 pages of feedback received (so far)

Inspiration for IEEE P7000 Working Groups

IEEE P7000™ - Model Process for Addressing Ethical Concerns During System Design

IEEE P7001™ - Transparency of Autonomous Systems

IEEE P7002™ - Data Privacy Process

IEEE P7003™ - Algorithmic Bias Considerations

IEEE P7004™ - Standard on Child and Student Data Governance

IEEE P7005™ - Standard on Employer Data Governance

IEEE P7006™ - Standard on Personal Data AI Agent Working Group

IEEE P7007™ - Ontological Standard for Ethically driven Robotics and Automation Systems

IEEE P7008™ - Standard for Ethically Driven Nudging for Robotic, Intelligent and Autonomous Systems

IEEE P7009™ - Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems

IEEE P7010™ - Wellbeing Metrics Standard for Ethical Artificial Intelligence and Autonomous Systems

IEEE P7011™ - Standard for the Process of Identifying and Rating the Trustworthiness of News Sources

IEEE P7012™ - Standard for Machine Readable Personal Privacy Terms

African Context: Quality Infrastructure Institutions



- Well developed QI
- Reasonably developed QI
- Partially developed QI
- Limited QI
- Non or very limited QI

Pan-African Quality Infrastructure – Stocktaking Document
2017: http://www.paqi.org/wp-content/uploads/2014/09/PAQI_Stock_Taking_2017-english.pdf

The African Union's Agenda 2063 – The Africa We Want

Aspiration 1, Point 11:

- “By 2063, African countries will be amongst the best performers in global **quality of life** measures. This will be attained through strategies for inclusive growth, job creation, increasing agricultural production; investments in **science, technology, research and innovation**; gender equality, youth empowerment and the provision of basic services including health, nutrition, education, shelter, water and sanitation.”



Status Of Artificial Intelligence In Africa: Some Key Background and Environmental Issues

Zvikomborero Murahwi
ICT Strategy and Project
Management Consultant



Agenda

- The Technology Environment
- Current AI Efforts in Africa: A perspective
- Current AI Education, Awareness and Advocacy Campaigns
- Dealing with the challenges of the current efforts
- Observations, Remarks and Suggestions

The ICT Landscape In Africa

This is varied with both extremes: Parts with good and others with very bad ICT Infrastructure

- There are Countries (like South Africa, Namibia, Nigeria and countries in North Africa) which have good Infrastructure.
- In most other parts of Africa, Unstable Economic and Political situations have had a negative impact on ICT infrastructure development.
- Extensive use of Mobile Technologies has been an option in the less advanced parts of Africa
- The above disparities in ICT Infrastructure are clearly reflected in the current status of AI development in the African Continent.

Current Industry Status Of AI Initiatives

Only starting so far with practical indications in a few countries . The following are examples but are not exhaustive of all efforts in Africa.

- Notable Startups in South Africa are :
 - Autoprophet : focusing on Machine Learning in the Finance and Insurance Industries
 - Clevva: focusing on AI in Sales with for the banking, insurance, telecoms and oil and gas markets
 - Aerebotics: focusing on AI in the farming industry
 - Stockshop: used in South African Financial Institutions for Financial Intelligence Centre Act (FICA) compliance.
- Notable startups in Nigeria are:
 - Kudi.ai : Have developed an application Chatbot used to make payments and send money to Nigeria. It uses AI to understand user requests
- In Zimbabwe, Econet, a giant Mobile Network Operator are using AI to improve Customer Services.
- In Ethiopia there have been efforts through the establishment of an AI Research lab as some of my colleagues will present later

Education, Awareness and Advocacy For AI

Seems To Be individualized / Isolated / Not well established at all levels

- In the group A primary and high school education sectors of South Africa, there has been awareness campaigns calling for renewals in education delivery methods to adequately prepare the future work force for the world of AI
- The levels of research in Higher and Tertiary Education Institutions are not known but a number of Universities are believed to be running research and teaching programmes in AI as part of their normal Academic teaching programmes. It is believed that any efforts will be driven by Industry demands/requirements.

Expertise

Clearly currently in short supply at all levels

- Skills at all workforce levels seem to be lacking
- Reskilling programmes for designers/engineers/end-users necessary

Dealing With Some Of The Challenges

There are both Technical and Socio-Economic

- Recent Political and Economic Reforms in Africa are encouraging and will help drive ICT Infrastructure development which is a requirement for effective AI adoption and rollout. Advocacy efforts should take advantage of these developments.
- Affordability of ICT: Making ICT affordable will help to take up the AI agenda (with no equal access to ICT, there will be no equal access to AI)
- Participation of the African Continent in the current AI efforts like development of standards being led by the IEEE-SA.
- Removing fears at organizational and national levels through appropriate training and awareness programmes (Future jobs are going to be in an AI driven environment)

Remarks

- AI is here : The Technologies and Systems of tomorrow are going to be AI driven.
- Africa Needs AI . Key areas AI can fit in immediately include Skills development and training and Business Growth both of which are key drivers to strong economies
- There is a need for Education, Awareness and Advocacy Campaigns driven by policy at both organizational and National Levels
- There is a need for coordinated efforts with an AI agenda , may be specifically for Africa but will need to be aligned to that of the rest of the advanced world.

What Can IEEE Do?

- I suggest that a more practical approach to making Africa a part of the current efforts such as the current AI / AS standards development efforts.
- AI Adoption will need careful planning taking Humanity into consideration.

AI As a Development Tool

Hruy Tsegaye
iCog Makers Initiative



Africa's Artificial Intelligence Implementation

Practical look from an A.I. Developer

Tensae Ayalew
Artificial Intelligence Software
Developer at iCog Labs



Technical Description of A.I.

- Reactive Machines
- Learning Machines

Where can A.I. be used

- Agriculture
- Trade
- Medicine
- Educational Sector

Where can A.I. be used - Immediately

- Where is our data?
 - ICT
 - Mass Productions
 - Financial Systems
 - Large Corporations

A.I. Implementation Aftermath

- Technological Unemployment
- Security concerns

AI for Human Development and Ethical Concerns



Damola Morenikeji
Head of Strategy and Innovation,
The Roothub

**Africa Rising.
Tech Emerging.
Future Calling.**

AI and Human Development: a focus on freedoms, opportunities and well-being

Are Weapons of Math Destruction in Africa?

Social Good, Public Impact, Enterprise Growth without Private Death?

AI, Ethics and Your Values – What is Acceptable?

We need policy to prioritise 'fuzzy stuffs' too – without playing catchup

Thank You!



Questions?

Moira Patterson

Global Affairs Program Director,
IEEE Standards Association

Visit the IEEE-SA web site:

<http://standards.ieee.org>