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DATA SCIENCE AFRICA 2017

# Data Science Africa

*Building an African data science community*

**Ciira Maina**  
DSA, Dedan Kimathi University of Technology



# Africa in Context - People



# Africa in Context - Places





# Problems like everywhere else ...

- But let's focus on solutions



# The case for Data Science

- A number of fields have been revolutionized by the availability of large amounts of data
  - Health - DNA sequencing, imaging, digital health records
  - Agriculture - Weather and satellite imagery
  - Urban planning - Traffic data
  - Environmental conservation - ecological monitoring



“There is a sea of data, but most of it is undrinkable” - Prof Neil Lawrence



# Data Science + Africa

# Current Gaps

- Skills
  - Mathematics
  - Engineering
  - Computer science
  - Statistics
- Data
  - Appropriate datasets
  - Data engineering
- Infrastructure
  - Computational resources



# Skills Gap

- Skills gaps exist in
  - Data science - gaining insights from data
  - Machine learning - developing algorithms that learn from data
  - Artificial intelligence - automation of intelligent behavior
- A number of initiatives have emerged to plug the gap

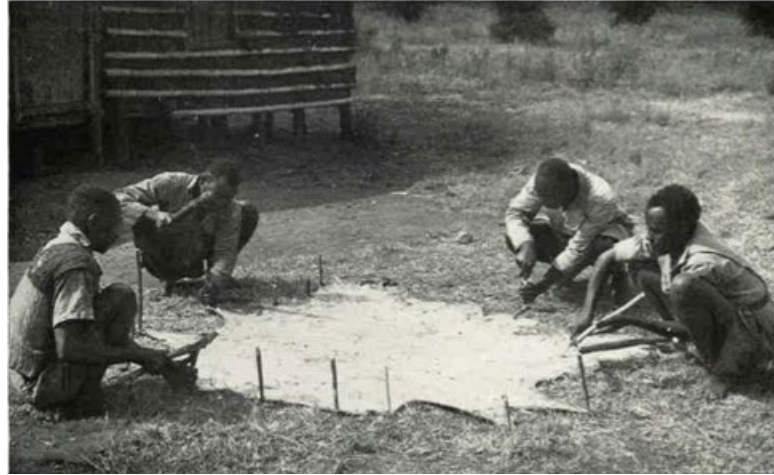




# Data Science Africa

- DSA is grassroots initiative aimed at increasing data science expertise in Africa
- We run “**summer schools**” and **workshops** bringing together students and leading experts
- Focus on **solving problems** relevant in the African context
- Create a **community** of researchers employing data science and AI to solve problems relevant to Africa

# Data Science Africa - Community



*Rũambo rŭmwe rŭtiambaga ndarŭa*

*It takes a team*



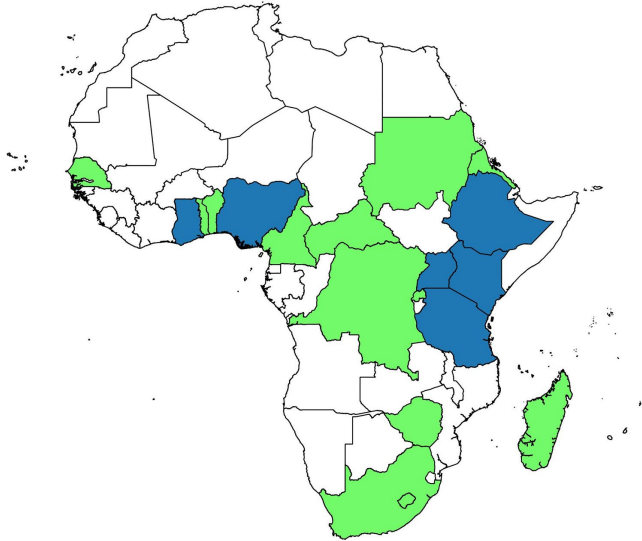
# Data Science Africa - The Beginning



- Inaugural event was organized and sponsored by the Dedan Kimathi University of Technology in Nyeri, Kenya from June 15th to 19th, 2015
- A three day series of lectures was delivered to approximately 60 students
- A two day workshop featuring work on real life applications of data science

# Data Science Africa - Reach

- Since 2015 - Eight events in six countries with one virtual
- We continue to follow the summer school - workshop format





# Our Core Tenets

- By Africa
- Student Focus
- About solutions
- Sustainable and inclusive
- Agility

By Africa

# Organising Committee

- Martin Mubangizi - UN Pulse Lab Kampala
- Ernest Mwebaze - Google AI
- Dina Machuve - NMAIST Arusha
- Billy Okal - Voyage
- Ciira Maina - DeKUT
- Neil Lawrence - University of Cambridge
- Elaine Nsoesie - Boston University
- John Quinn - Google AI
- Mike Smith - University of Sheffield
- Morine Amutorine - UN Pulse Lab Kampala
- Charles Saidu - AUST



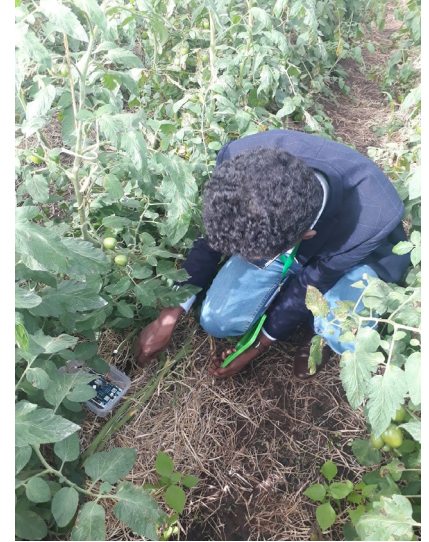
# Student Focus

*Maũndũ mothe no ndiganĩro*

*It's all about the next generation*

# End to End Data Science

- A hands on approach to instruction





# DSA Young Scholars

- Mentor promising participants between events
- Help them move projects further
- Jared Makario - DeKUT Student Class of 2019
- Currently a research intern at DSAIL



# Encouraging Students to Reach Further

- DSA Young Scholar Benjamin Akera
  - Mentored at the AI lab in Makerere
  - Attended DSA Nyeri 2018
  - Currently a Research Intern at MILA
  - Has returned to DSA as an instructor



# Mentoring New Trainers

- Several DSA attendees return as trainers
- DeKUT students taught IoT during the Deep Learning Indaba at Kenyatta University



## About Solutions



# Agriculture

- Mcrops project for early detection of plant disease
- Led by Ernest Mwebaze while at the AI lab at Makerere



**Disease Incidence**



**Healthy**



**Bacterial Blight**



**Green Mite**



**Mosaic Disease**



**Brown Streak**



**Disease Severity (Mosaic Disease)**



**Severity-1**



**Severity-2**



**Severity-3**



**Severity-4**



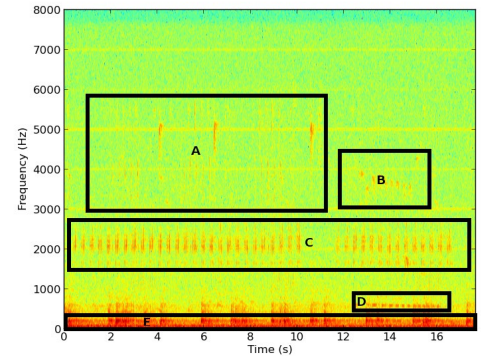
**Severity-5**





# Ecosystem Monitoring

- Acoustic monitoring of ecosystems project at Dedan Kimathi University
- With limited budgets, conservation efforts must be targeted.
- Traditional approaches to biodiversity assessment are laborious
- Focus on bird species which serve as **indicator species**



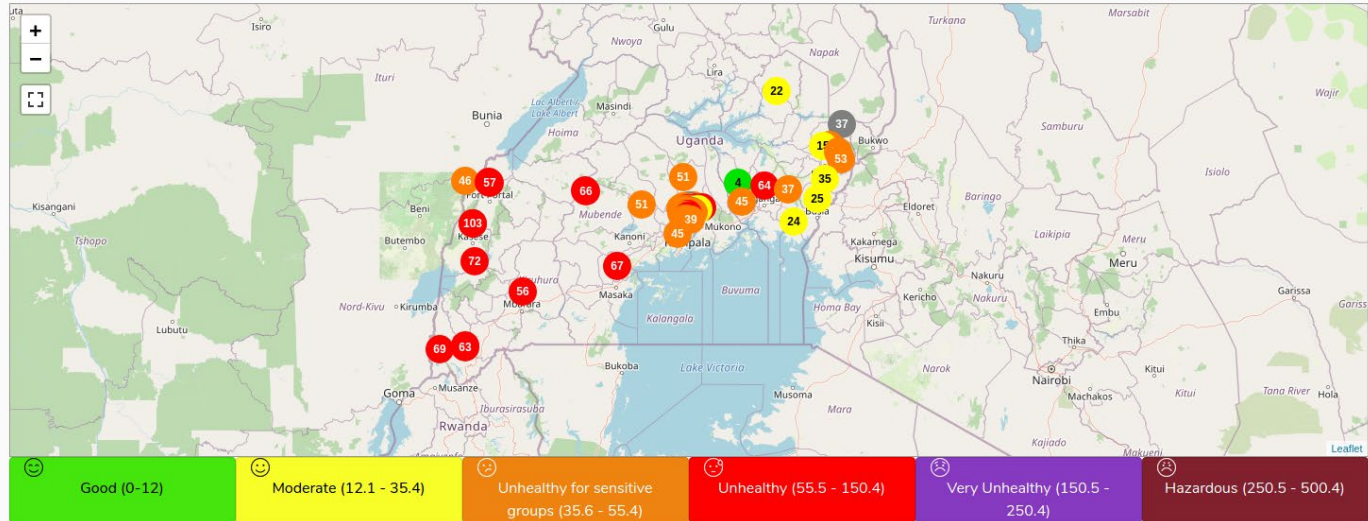
# Health



**Prof. Engineer Bainomugisha**

Project Lead

With over 80 installations, we are continuously scaling up our low-cost air quality monitoring network in Uganda, making us the leading air quality data monitoring, analysis and modelling platform within the region. Collaborate with us as we use data to improve air quality.



PM<sub>2.5</sub> - Particulate Matter

# Growing the Community

- DSA Research Award
  - <http://www.datascienceafrica.org/dsa-research-award/>
- Country Chapters
- Webinars on topical issues
- Mentor program
- Research Assistant Program

# How you can participate

- Attend our events and present or teach
- Mentor students
- Sponsor our events
- ...

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- Google
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- Voyage
- Amazon

- Partners

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- Makerere University - Uganda
- Nelson Mandela African Institute of Science and Technology - Tanzania
- African University of Science and Technology - Nigeria