# IndabaX Teens in AI Africa Hackathon

# Report


Kenyatta University (Main Campus)

**Date:**

28th – 30th August

## Acknowledgment

The TeensinAIAfrica Hackathon would not have been possible without the support of Deep Indaba 2019, who allowed us to hold the event along the global forum of data scientist. We also want to acknowledge the support from the SDGs Kenya Forum, who even with the short notice came along to ensure a successful event by providing food for the children, thanks to open society who helped with the branding of the event and providing the children with Tshirts. We also want to appreciate the Judges who availed themselves even with their busy schedule to come and support the children.
We want to say a big thank to the organising committee led by Elena the founder and director of TeendInAI Global, Angela, Jammie, Wayne, and many more. Another big thank you goes to the mentors who availed themselves for three days to walk along the teens.

We also want to appreciate all the parents who brought their children to the venue to learn and participate and to our teens, you are true heros.

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## Introduction

Mtoto News co-organized the first **teensinai** hackathon in Africa held at Kenyatta University Main Campus from 28th to 30th August, 2019. This event targeted kids and teenagers between 6 and 19 years old. Besides Mtoto Newz International being a digital platform for news and information on children, we are also a major player in the world of technology.

With over 70 applications received from teenagers and 200 applications received from mentors, Teens in AI Africa had 13 speakers, 7 judges, 60 teens and 40 mentors working in 8 teams addressing 3 UN SDGs: climate change, education, and health and wellbeing. Following the hackathon, Teens in AI will now run monthly meetups in Nairobi, Kenya.

The target audience was introduced to data, Machine Learning and Artificial Intelligence; and how they can leverage on design thinking with a combination of AI and ML to come up with solutions that face SDGs 3, 4 and 13. AI is gaining traction at a quicker pace, influencing the way we live and interact.

## Background

SDGs are global goals which seek to improve the lives of future generations in a maintainable way. SDG 3 aims to promote good health and well-being. Good health is essential to sustainable development by eliminating the causes of common illnesses and enhancing child and maternal well-being. SDG 4 seeks to ensure that children get quality universal primary education, while

SDG 13 looks to tackle the issue of climate change. Moreover, Teens in AI exists to inspire the next generation of AI researchers, entrepreneurs and leaders who will shape the world of tomorrow. These three SDGs together with AI and ML and an understanding of data science can help build a better world and future for the generations to come.

## Objectives

This hackathon was mainly concerned with:-

a. Encouraging kids & teenagers across Africa to pursue computing and technology.
b. Introducing children into the field of data science
c. Encouraging teenagers to explore design thinking techniques to come up with solutions to common problems facing them and the society at large.
d. Introduce teenagers and children to ML and AI and help them understand this dynamic field.

## Day 1: 28th August, 2019

Day one started with opening remarks from Wayne Gakuo, who spoke on behalf of TeenInAIAfrica. He said Teens in AI in partnership with Mtoto News and Deep Learning Indaba, organised the first Teens in AI Hackathon in Africa, the mission to encourage teenagers in Kenya and across Africa to pursue computing and technology, and to promote diversity in this ever-growing field.


This was followed a safeguarding and expectations briefing for the children by Tracey Wasunna.

## Major activities

***Introduction to data science***, the session covered the basics of data, including what is data and data science, why is it important and how children can use.

I***ntroduction to coding in Python:*** The session introduced children to the unique programming language that is used to analyse data and code solutions.

***Design thinking***, the aim of this session was to help children to identify challenges in there communities and logically come up with solutions.

## Day 2: 29th August, 2019

On day two, there was a recap on the day one session followed by a continuation of design thinking. This was followed by a presentation on machine learning, where children were shown how they can use data to develop machine models. The final session of the day was an introduction to Artificial Intelligence

## Day 3: 30th August, 2019

The day started with a welcome message from the organizing team. A request from the attendees to increase hacking time was raised and approved which led to the time allocated to some of the pre-covered activities on the agenda to be relocated for hacking and pitching.

The final day of the event started with children ideating and developing solutions to the challenges that they had identified. This was followed by a short session on pitching skills. The children then presented there solutions for judging

The panel of judges was made up of

1. Philip Thigo- Data Science Specialist
2. Sarah Hooker - AI Resident, Google

3. Shakir Mohamed - Research Scientist, Google Deepmind
4. Jacqui W. Stewart - Head of Digital & Innovation at I&M Bank Ltd, Kenya
5. Jade Abbott - Senior ML Engineer at Retro Rabbit
6. Celina Lee - Co-Founder & CEO at Zindi Africa
7. Marc Deisenroth - Senior Lecturer, Imperial College London
8. Kevin Kavai - Developer at The Open Institute

# Solutions

## Group 1

**SDG focused on:** SDG 13 (Climate Action)

**Specific problem:** Air Pollution

**Brief description of the solution (also how AI is helping to solve this):**
Detect harmful levels of carcinogenic gases using smart sensors equipped with machine learning and network technology allowing us to reach our end user via texts.

The teens' end goal was to protect our lungs. Through the smart sensors, common mwananchi is to receive an alert (sms) if an area has high levels of harmful gases to allow them take precautions such as avoiding such areas / changing routes. This was to reduce cases of lung cancer

## Group 2

**SDG focused on:** SDG 13 (Climate Action)

**Specific problem:** Land use: Depletion of grazing pasture, deforestation

**Brief description of the solution (also how AI is helping to solve this):**

Using AI and ML to develop an Optimized grazing system where pastoralists adopt rotational utilisation of land. The system alerts pastoralists when a particular paddock is about to be depleted so that they can move to a new pasture. By the time they come back to the original piece after rotating through several paddocks, new grass has grown. This maintains the vegetation and prevents over grazing and subsequent deforestation and eventually desertification. It also prevents conflicts with other herders and communities.

## Group 3

**SDG focused on:**
SDG 3 **(**Good Health and Well Being**)**

**Specific problem:**
Inaccess to good healthcare services and medication.

**Brief description of the solution (also how AI is helping to solve this):**

The solution had a multipronged approach to it; we focussed on one.
The machine learning model is applied to a mobile application software that analyses the distributions, distance and medicare cost of health facilities within any region in Sub-Saharan Africa; can give the patient or person seeking medicare the best option to opt for to avoid incurring unnecessary losses in terms of time and money.

## Group 4

**SDG focused on:**
SDG 4: Quality Education.
**Specific problem:**
High student to teacher ratio.
**Brief description of the solution (also how AI is helping to solve this):**
An application software that records and predicts student to teacher ratio at the school, county and national level, based on past, present and future population data. Deep learning in this case is used to predict instances of high student to teacher ratio, and therefore make adjustments based on the needs of each county and school.

## Group 5

**SDG focused on:**
SDG 13: Climate Action

**Specific problem:**
Car fumes

**Brief description of the solution (also how AI is helping to solve this):**
Goal: recommending solutions on what action drivers should take to prevent air pollution from car fumes.
Solution: Data on details of cars and rate of emission is collected and trained on which exhaust filters type and for how long cars should use them, a recommender system of sorts. The details will be on an app.

## Group 6

**SDG focused on:** Quality education

**Specific problem:** Drop-outs from school due to long walking distances to access a school**.**

**Brief description of the solution (also how AI is helping to solve this):**

Optimization of location of schools to be built in future based population to ensure distance from home to school is never an issue.

## Group 7

**SDG focused on:**
good health: sdg 3
**Specific problem:**
death from sickle cell anaemia cases in Kenya.
**Brief description of the solution (also how AI is helping to solve this):**
Teens came up with their idea of creating an information matrix available to the doctor to predict the likely occurrence of the disease in his/her patient.
This will lead to early diagnosis and treatment thus reducing the death cases.
Blood tests like hemoglobin level, hemoglobin test; and sex, region of stay(urban/rural) were done of the variables the data set included.
The ML model would come in handy by pulling all the info into one place for analysis and prediction.

## Group 8

**SDG focused on:** Quality education**.**

**Specific problem:** Absenteeism in schools.

**Brief description of the solution (also how AI is helping to solve this):**
One of the leading causes of absenteeism is lack of funds for fees and other needs such as uniform, books. A case study was done on a child who had to be in and out of school as he was hustling for money. In the long run, his grades are down and he is unable to compete with the rest.

An App based on an AI model is made that can predict an increase in absenteeism in the future and in which regions. This assists the government and NGOs know where to focus on educational funds. Additionally, it emphasizes on the need to fund education else there will be a deficiency in trained personnel and lower the country's economy. Only

## Lessons learnt.

1. Clear communication and teamwork is crucial for the success of such an event, as it is for any other event.

## Way forward and Recommendations

AI and ML should not be a one-event thing. Due to the constantly evolving nature of artificial intelligence and machine learning, children need to be constantly exposed to the basics of AI and ML and have them come up and build their own models to solve common problems facing them.

# List of Participants