

Digital Transformation Center Rwanda

# Quarterly Progress Report

October to December 2022

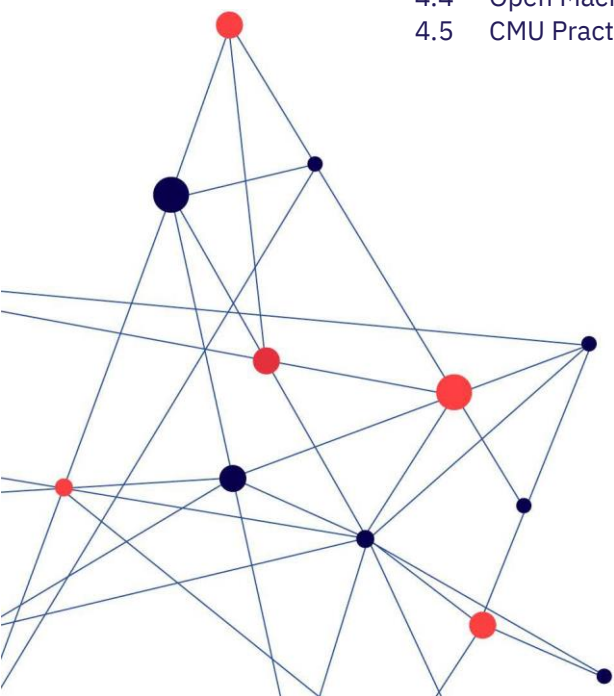


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# Introduction

Thank you for taking the time to read our quarterly update report and our successful collaboration during the past 3 months. Here we would like to list our highlights related to our four focus topics.

## **Smart Cities:**

Here we keep track of all the important activities that contribute to smart cities and communities in Rwanda. This time, we would like to highlight:

- [Smart City Lab](#)
- [Smart City Expo World Congress Barcelona](#)

## **Artificial Intelligence:**

Here we record all the important activities in the area of AI such as Machine Translation, Natural Language Processing and others. As highlights we would like to mention:

- [Landslide Monitoring Pilot](#)
- [Mbaza Chatbot Video](#)

## **Digital Inclusion:**

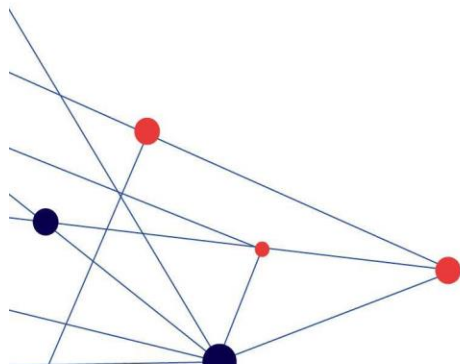
Here we record all important activities in the area of digital inclusion and digital literacy in order to contribute to the integration of vulnerable groups in the digital transformation. This time, we would like to highlight:

- [Support to the Digital Ambassador Program](#)
- [#She can Hack Cyber-security Training](#)

## **Ecosystem-building:**

Here we record all important activities in the area of building the tech ecosystem, which includes topics such as startup promotion and networking. As highlights we would like to mention:

- [Voucher System](#)
- [Supporting Hanga Pitch Fest](#)



# 1

## Policy Development and Dialogues

### 1.1 Capacity-building and awareness raising on Ethical AI Guidelines

The AI Hub, together with RURA and the Center for the 4th Industrial Revolution, is implementing an awareness raising and capacity-building programme for companies and start-ups on how to effectively use the Ethical AI Guidelines developed by RURA.

Fifteen representatives from startups, SMEs, corporates, academia, and government institutions involved in AI systems development, deployment, and policies participated in the capacity-building workshop which took place at the DigiCenter October 18-19th.

During the workshop, participants learned about key concepts related to ethical AI and AI-related risks as well as principles and requirements for developing AI systems in a human-centered, trustworthy and responsible manner. The capacity-building workshop also acted as a means for RURA to gain first-hand feedback on the Ethical AI Guidelines from the key stakeholders and users of the guidelines.

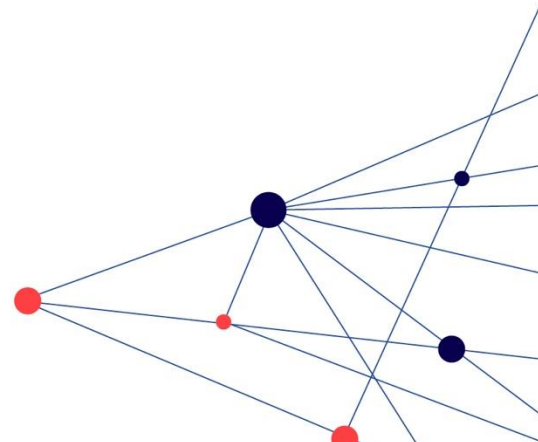
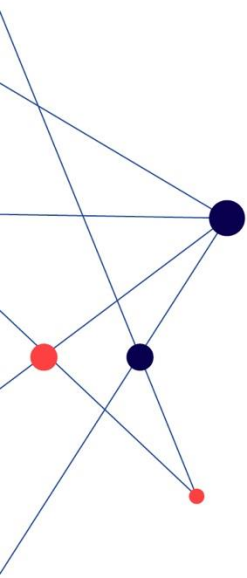
Beyond the training aspect, the programme has also promoted peer-to-peer exchange among the participants and, thereby, foster the growing AI ecosystem in Rwanda. In addition, a webinar has been organized with the aim of creating awareness about the ethical use of AI and this will be a platform for the participants of AI Ethics Applied Programme to share their practical experiences on AI Ethics and the programme.



## 1.2 National AI Policy

The AI Hub has been supporting MINICT and the Center for the Fourth Industrial Revolution in developing a National AI Policy which will enable Rwanda to harness the benefits of AI while mitigating the potential risks of this technology.

After the final validation workshops had been held in September, the AI Hub team has been working with MINICT to integrate feedback from different ministries as well as draft the final documents to be submitted to the National Cabinet. The policy is planned to be scheduled for the next cabinet meeting.



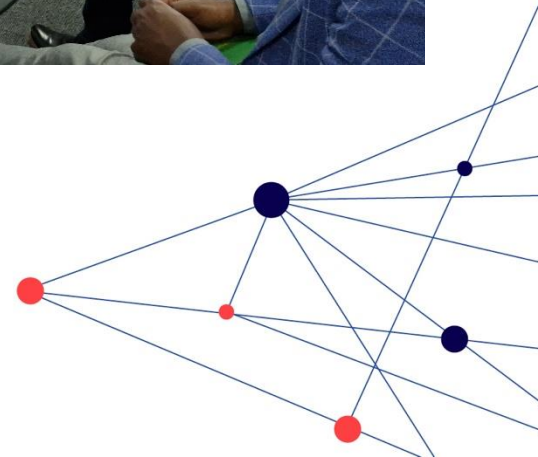
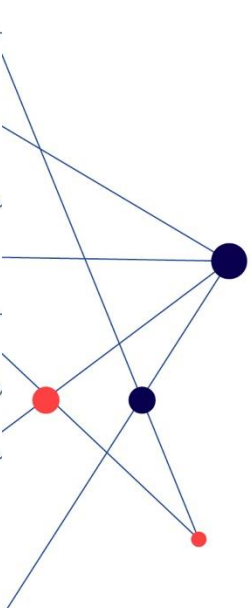
# 2

## Solutions & Innovation

### 2.1 Landslide Monitoring Pilot

The project pilots an optical monitoring system to detect landslides in endangered areas, initially focusing on a site in Nyabihu District. In cooperation with MINEMA and the Rwanda Space Agency (RSA), the project aims at providing image and other sensor data openly via the Geospatial Hub of RSA to enable further analyses by stakeholders. Finally, capacity-building and skills transfer to local stakeholders to operate the system as well as an integration in Rwanda's early warning system are facilitated.

In the past months, the analytical work on the state of the Rwandan early warning system and how to improve and integrate innovative solutions has started. For this, the team of the German company Hesotech undertook a second trip to Rwanda. Led by an early warning system expert from Malaysia, two multi-stakeholder workshops on the national and on district level have been conducted to understand the existing early warning system landscape.



## 2.2 User-centered Design Research for Machine Translation Use Cases

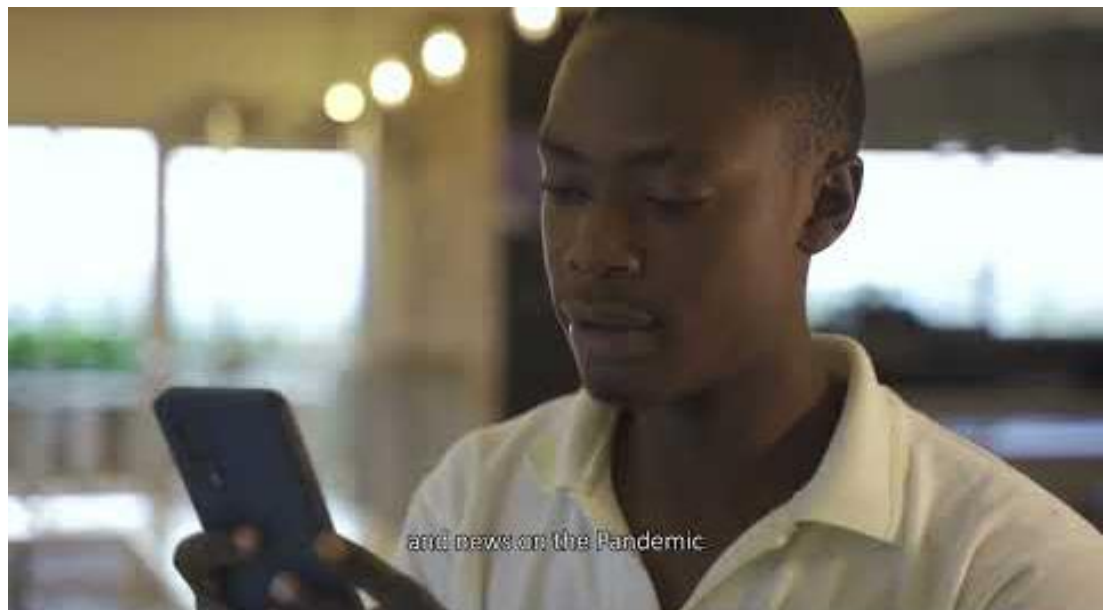
This project aims to develop practical use cases for English-Kinyarwanda machine translation. Two use cases were identified through a human-centred design process: tourism and e-learning.

Over the past months, a collaboration with CLEAR Global has kicked off to collect additional data and develop the use cases. Currently, we aim to further solidify the UI/UX elements of the end deployments for each use; Tourism suits a Mobile app (supported by RDB) and E-learning suits a web-supported plugin (supported by atingi).

Meanwhile, the NLP engineers on the team have done an evaluation of pre-existing machine translation models to assess their fit for the Rwandan context. As shown, the project shall be proceeding with the NLLB model from META research. Further efforts intend to collect in-domain parallel text to finetune the model.

## 2.3 Mbaza Chatbot Video

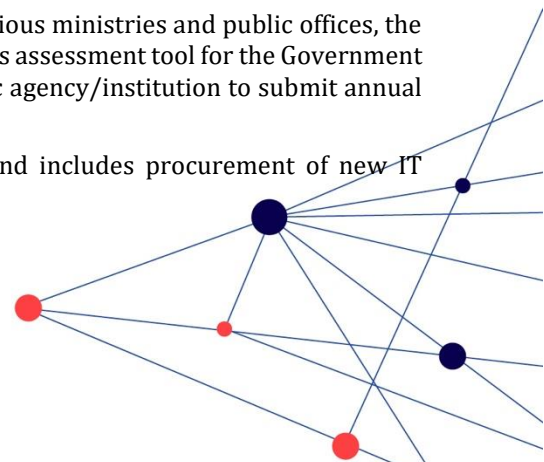
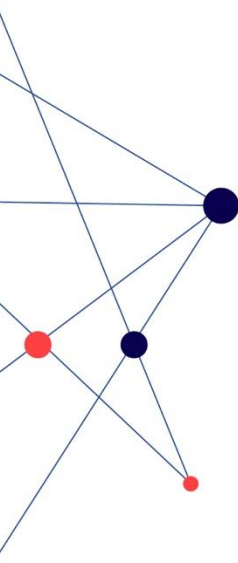
During this quarter, the AI Hub together with the videographic company Compass Creative Productions developed a video on the Mbaza Chatbot to wrap up the successful collaboration between GIZ and RBC on this project.



## 2.4 Support to the RISA Innovation Pipeline

To support the management of digitalization needs for various ministries and public offices, the DigiCenter in partnership with RISA developed an ICT needs assessment tool for the Government of Rwanda. This low-code platform is used by every public agency/institution to submit annual ICT budget plans.

The portal now has over close to 900 ICT need plans and includes procurement of new IT equipment or ICT infrastructure expansions.



# 3

## Ecosystem

### 3.1 Smart City Lab



The Smart City Lab is a joint initiative by MINICT, RISA and ICT chamber with technical advisory from GIZ to set up a one-stop-shop for co-designing solutions, developing capacity and providing testbeds for actors in the smart city sector.

During this quarter, the Smart City Lab consortium has requested support from the Chief Digital Officers and hosted several workshops to align on the vision, services and focus sectors. Furthermore, MoUs have been signed with Norrsken for providing office space for the Smart City Lab staff.

Progress was also made on the Smart City Lab branding; the lab now has a logo and additional communication material. Going forward, the Smart City Lab will hire a consultant to support in mapping the current Smart City ecosystem and to validate the developed services.

### 3.2 Artificial Intelligence / Natural Language Processing Community of Practice

The AI Community of Practice hosted a meetup on “Business opportunities for NLP” with top Rwandan innovators in the field of Natural Language Processing (NLP). The Rwandan companies Digital Umuganda and ProtocX discussed on the opportunities in the NLP sector in Rwanda, different applications they have met so far during their journey, industry requirements and barriers as well as the state of NLP for Kinyarwanda at large.

In another meetup, the Mbaza NLP community conducted a data labeling for sentiment analysis exercise in collaboration with researchers from the Pan-African NLP network Masakhane in Nigeria.

The poster for the "Sentiment Analysis Kinyarwanda" event features a vibrant, isometric illustration of people interacting with digital data visualizations, including charts, graphs, and icons representing sentiment (smiley and frowny faces). The background is a mix of purple and blue tones. On the right side, there is a purple circular area containing the event title and a QR code. Below the QR code, the event details are listed: "Sign up here: hybrid event", "Wednesday, 14th December 5:00 - 8:00 PM", and "DigiCenter Rwanda".

**Sentiment Analysis Kinyarwanda**

Sign up here: hybrid event

Wednesday, 14th December 5:00 - 8:00 PM

DigiCenter Rwanda



### 3.3 Robotics Community of Practice

The robotics community of practice is an environment where enthusiasts, academia and the professionals in the robotics domain come together for knowledge sharing and community building, supporting one another.



## Robotics design process: The choice of Processors and Controllers.

Date: Friday 16th Dec 2022

Time: 5:30PM CAT

Venue: NIRDA STEM Lab Box, Camp Kigali



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REVOLUTION



As a follow up on a recent request to explore how we could strengthen the Community of Practice, the team therefore reached out to key players in the same field who could potentially partner with us. The discussions are still ongoing though the team has made some progress in securing the partners' interest.

On 16th December, the DigiCenter hosted another robotics community meetup, where over 25 members shared knowledge and experience in the Robotics design process, particularly on the choice of processors and controllers. This was conducted in partnership with NIRDA, C4IR, and Keza Education Future hub.

### 3.4 Africa Healthtech Summit

From December 12-15th, the DigiCenter hosted some of the sessions of the Africa Healthtech Summit which brought together leading public health and technology policy makers, investors, experts, influencers, and innovators around the imperative to realize aspirations for universal, affordable, and high-quality healthcare in Africa. The event provided participants and stakeholders with the opportunity to contribute to the Africa CDC's digital transformation strategy, showcase their innovative digital health solutions to inspire others, and participate in conversations that will shape Africa's Digital Health sector for years to come.

Together with RBC and Digital Umuganda, the DigiCenter hosted a panel on Healthtech Solutions made in Rwanda and put Rwanda as healthtech innovators on the map.

### 3.5 Smart City Expo World Congress in Barcelona

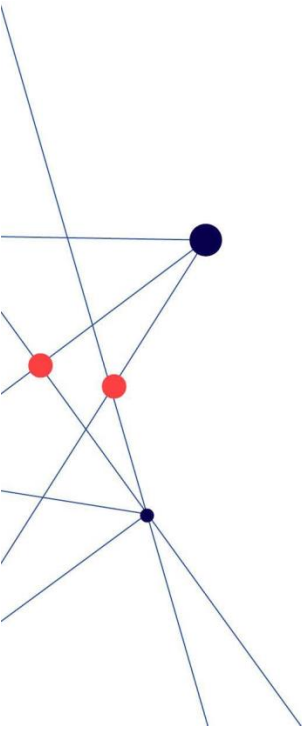
In November, the DigiCenter coordinated a delegation trip for 15 startups, 8 members of the Digital Innovation Hub and 4 policy makers to Barcelona to attend the Smart City Expo World Congress. The study trip aimed at learning new trends in Smart Cities, connecting the Rwandan Smart City Lab with other African and European Digital Innovation Hubs and exchanging on the way forward and joint challenges. In the future, the collaboration between these Smart City Digital Innovation Hubs shall be further strengthened to learn from and guide each other.

A video that summarizes the event can be found below :



### 3.6 Participation in the Mobile World Congress Africa

The mobile world congress labelled as “The African Continent’s Most Influential Connectivity Event” aimed at connecting and showcasing mobile connectivity initiatives taking place across the continent. The DigiCenter supported several startups to attend the congress and hosted a side-event focusing on the Fintech ecosystem.



### 3.7 Voucher System

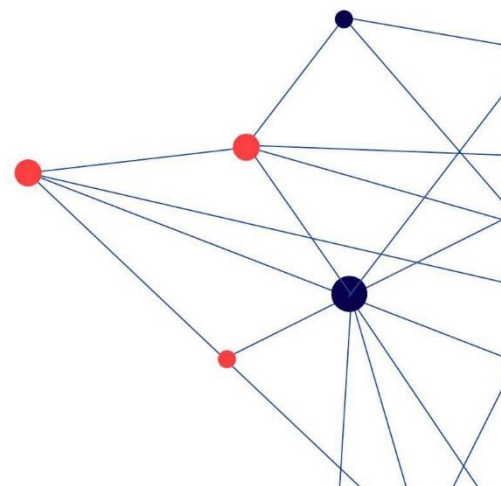
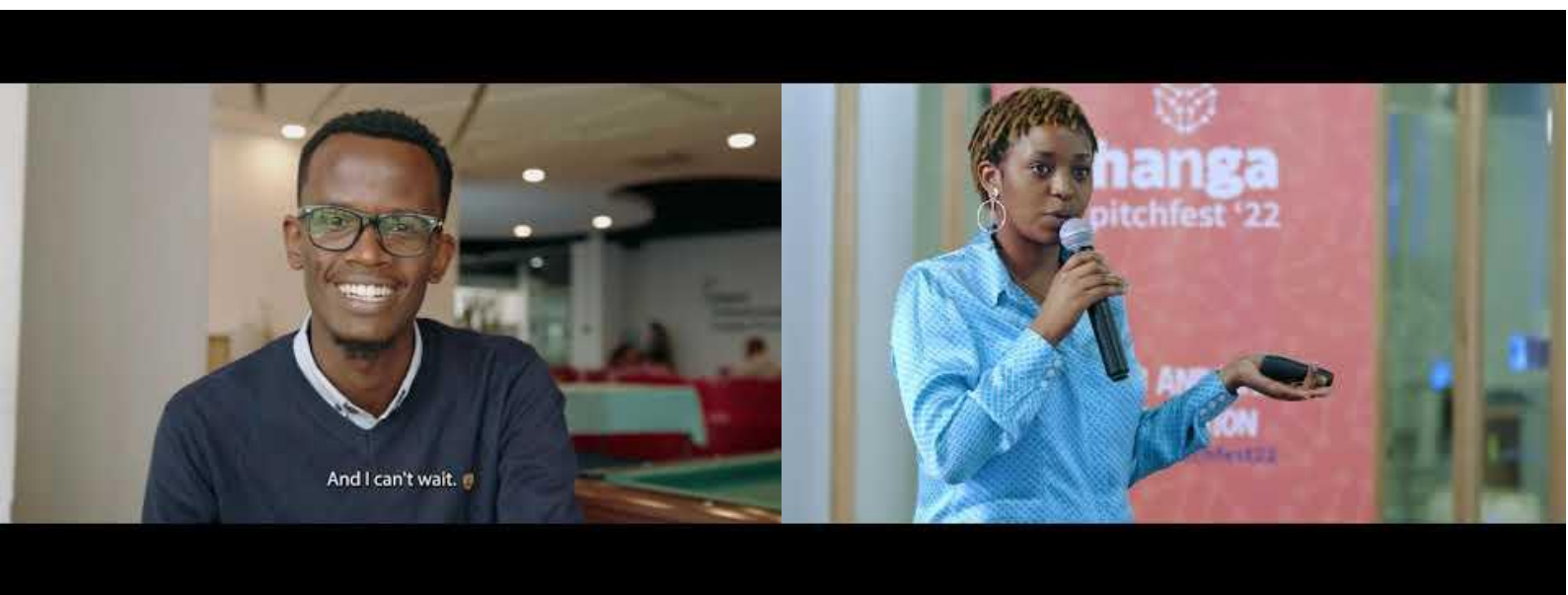
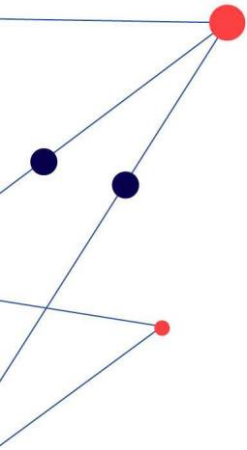
The voucher system empowers startups to approach professional consultants and market leaders with their innovation-related challenges, a move that they might not have made in the absence of such an incentive.

The team developed the new approach of capacitating the local entrepreneur supporting organizations (ESOs)/hubs to own the voucher services as an additional service on top of what they have been offering already. The approach still involves the DigiCenter as the sponsor of the program while the ESOs/hubs onboard the startups.

Next to the already existing consulting service on Business Assessment, Sales and Marketing, as well as Finance and Tax, three additional services have been developed during this quarter : Product Development, Management Skills, and Investor Readiness. In the past three months, 10 startups have used the consulting services.

### 3.8 Supporting Hanga Pitch Fest

As an associate partner, the DigiCenter supported the Hanga Pitch Fest 2022 hosting the bootcamp for the top 25 startups at its premises. Moreover, the team was part of the jury committee, and offered consulting services from the voucher system to the participating startups.

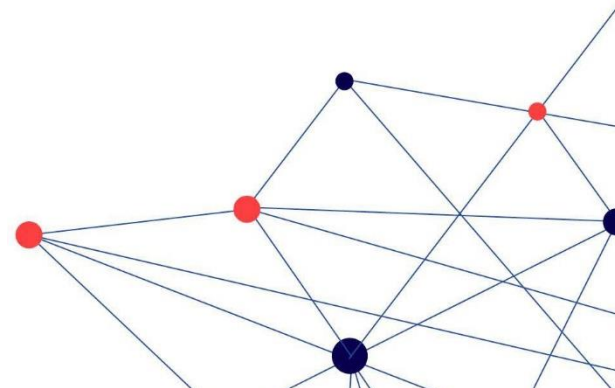
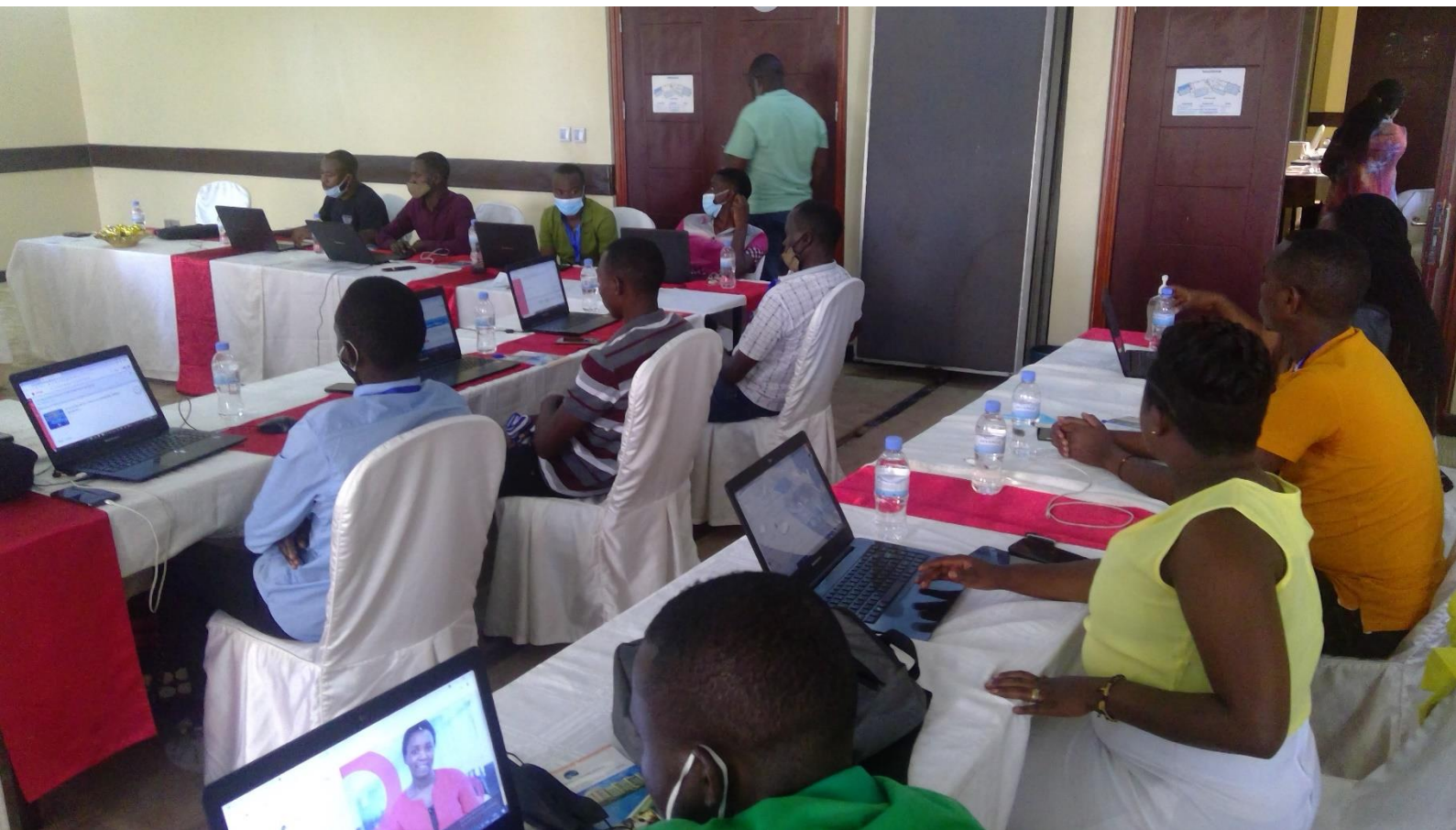


# 4

## Digital Literacy & Capacity-building

### 4.1 Support to the Digital Ambassador Program

The overall goal of this activity is to close the digital divide by providing training on basic digital skills for Rwandan citizens. Therefore, the DigiCenter financed 100 additional Digital Ambassadors to increase the impact of this program. So far, 173 reports were received with an overall number of 17.300 trainees from various districts all over the country. In the upcoming quarter, a follow up with 700 trainees will be conducted to assess the impact of the training provided by the Digital Ambassadors.



## 4.2 #SheCanHack Cyber-security Training

#SheCanHack is an accelerated 3-week cyber-security training program implemented by Broadcasters of ICT (BICT) in partnership with the Digicenter. This program aims at empowering Women in the cyber-security department both in the private and public sector.

Over a period of 3 weeks, from 7th to 25th of November, 20 women cyber-security engineers from different private and public institutions received an advanced cyber-security training. The engineers learned about various levels of cyber-security evaluation, identifying cyber-threats and attacks, conducting a vulnerability assessment, and composing and penetration tests and defense reports.

## 4.3 Natural Language Processing Fellowship



In line with strengthening local technical know-how on AI, the AI Hub Rwanda together with RISA is implementing a Natural language Processing fellowship. In this NLP fellowship, the participants are expected to gain knowledge on NLP techniques particularly in machine translation and conversational AI chatbots.

Over the course of two months, the fellows have covered the following topics: NLP Tools and Setup, extracting Text Data, exploring and Pre-processing text data, converting text to features focusing on machine translation and conversation AI Chatbot and introduction to Deep Learning state-of-art models.

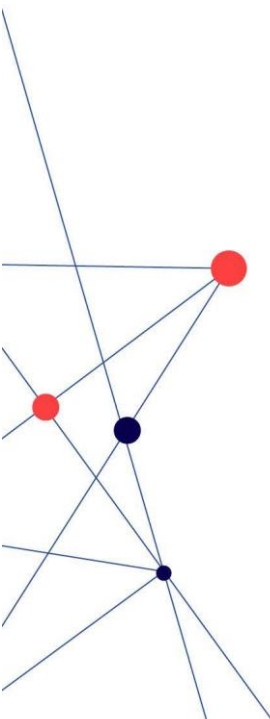
With the aim of steering the fellow's participation in the program, a monthly hackathon was organized where students were able to web scrape websites and translate them live in 100+ languages including Kinyarwanda.

The next phase of the fellowship includes the completion of the training phase where students will complete the module on advanced text processing with deep learning models focusing on machine translation and conversational AI Chatbot. Another hackathon will be organized on the development of conversational AI chatbots.

## 4.4 Open Machine Learning for Earth Observation Training

Together with the Rwanda Space Agency and the German Aerospace Agency, the AI Hub is implementing an Open Machine Learning for Earth Observation (ML4EO) Training Program which aims at providing the necessary skills for young professionals in Rwanda to make use of machine learning techniques with earth observation data. In addition, it aims at enabling participants to build their own use cases and business models in the upcoming ML4EO space.

Over the past months, the first course contents have been developed. Moreover, the AI Hub and the consulting firm GFA entered into partnerships with the University of Rwanda and CMU Africa to develop and conduct the training.

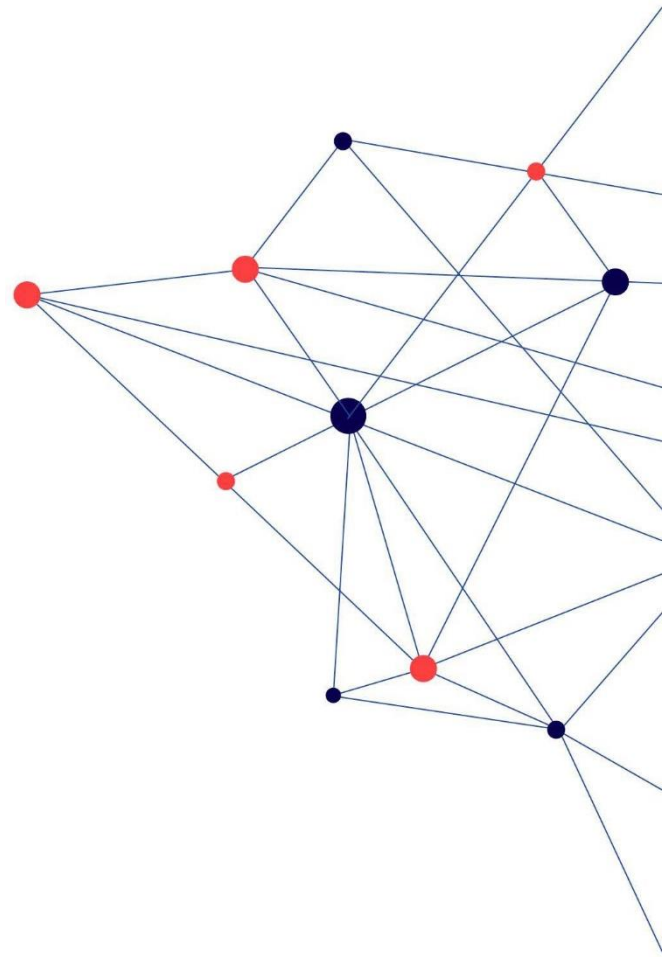
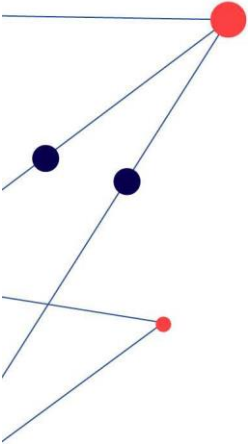


## 4.5 CMU Practicum on Speech-to-Text Technology

Following the successful reception of the AI Hub's project proposal to CMU-Africa for their capstone phase, we worked with a team of three students to finetune existing speech-to-text models for Kinyarwanda.

Thanks to the availability of researchers from NVIDIA to support the team, the team managed to re-train the speech-to-text model and acquire a lower word error rate than previous work. The team also trained their own model in a low-resource setting.

In short, the practicum has proved to be a resource-efficient and speedy instrument to develop proof-of-concepts and other prototypes, in addition to building the capacity of students. The [speech-to-text model](#) can be found on the NLP community's Hugging Face account.



# Imprint

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