

AI and Data Science Bootcamp for Women* and Minorities by FAIR Forward

The Problem

Following four years of conducting capacity development initiatives in AI across Rwanda, Ghana, Kenya, and South Africa, FAIR Forward encountered challenges in (1) achieving participating from women; and (2) where women did participate, achieving an equal gender distribution in our online and in-person courses and initiatives. This lack of both, participation and diversity of the cohorts extends its consequential negative impact to various activities in our partner countries.

Given the fact that developers of technology and policymakers in the field are predominantly male, technology applications and policies in the field of AI are shaped by male perspectives and are systemically entrenched. This often leads to biased AI-based services because the experiences of women and other vulnerable groups are not properly included during the development stages of these technologies.

Moreover, as Artificial Intelligence becomes more pervasive (e.g., job applications, security checks), the biased development of AI-based services could exacerbate if we do not do anything to change the system. It also implies that women and marginalized groups might miss the opportunity to enter one of the industries poised to generate a significant number of jobs.

Our experience in conducting such activities illuminated two key points: (1) the number of women participants in our training improved when, as a first step, this diversity deficit was acknowledged as a problem, prompting actionable measures to address the issue; and (2) specific and curated measures were needed to break the pattern of gender biases and equitable engagement.

The AI and Data Science Bootcamp for Women* and Minorities emerged from the Global Project *FAIR Forward: Artificial Intelligence For All*, as a way to enhance gender diversity in the AI field.

The Broader Challenge

The challenges faced by our project reflect a larger issue. Globally, women constitute only 26% of AI professionals, underscoring a systemic problem. Various factors contribute to this underrepresentation, encompassing unequal employment opportunities (e.g., unequal pay), barriers to meaningful engagement in AI, and external obligations that women must juggle. Additionally, obstacles to pursuing further education or upskilling, gender stereotypes, portraying AI as a male-dominated field, entrenched gender roles, cultural norms, and perceived unfriendliness towards women and other underrepresented groups further compound the issue.

To reverse this trend effectively, it is crucial to take immediate and intentional steps to attract more women and minoritized groups to the field and most importantly to create a sustainable environment for them to stay in the field. This conviction underscores our belief in the necessity of an activity specifically tailored for the individuals we aim to see thriving in the field. As artificial intelligence continues to evolve, the relevance of AI jobs becomes increasingly vital, shaping the future landscape of various industries.

The AI and Data Science Bootcamp Pilot in South Africa

In response to these challenges, we have structured an activity to account for barriers women face and mitigate or assist women* in overcoming those obstacles, to meaningfully participate and gain the most value from these activities. By offering a programme specifically designed for women we are signalling explicitly that their needs are considered and implicitly that they belong in the AI field.

The first AI and Data Science Bootcamp for Women* and Minorities was piloted in South Africa, through a partnership with the Project Data Economy (G100) and Intel. MBC Consulting executed the training part of the program from July to October 2023. Thanks to our collaboration with Intel, all content from their *AI for Current Workforce* has been incorporated into the curriculum. Consequently, students received certification upon completing the Bootcamp and the three Intel programs: Practitioner, Professional, and Producer Certificates. Furthermore, the lead trainers have received certification from Intel as instructors of the AI for Current Workforce program.

Target group:

- Women¹ and minoritized individuals with basic ICT Skills
- Between 18 and 37 years old
- No prior coding knowledge needed
- Graduate or tertiary training
- Not in employment or study programme

Duration and format:

- 16 weeks
- Approx 3 hours – 5 days per week
- Hybrid (Online & offline modules) -> Context related.
- Flexible schedule



Main differences in the course design compared to courses that do not consider gender

No coding experience required, nor IT or STEM background needed: Patriarchal structures and IT stereotypes have deterred many women from entering the AI field. To counteract this, we aimed to create a training program capable of taking participants, from any background or sector, and with zero coding knowledge to a level of proficiency in Machine Learning. We intentionally welcomed individuals from diverse fields, emphasizing the applicability of these skills in various industries to the intersectional nature of technology. This approach materialized in final projects that ranged from detecting credit card fraud to early diagnosis of diabetes, predicting breast cancer, developing a sign language visual translator, and more.

Flexible schedule and format: With a hybrid structure that primarily leveraged online lessons, we aimed to make the bootcamp accessible to participants irrespective of their geographical location and domestic situations. Simultaneously, the in-person component, dedicated to project preparation, presentations, and the closing ceremony, played a vital role in reinforcing the sense of community and network building, fostered throughout the bootcamp.

Furthermore, we collaborated with participants to determine the most convenient and efficient lesson structures. Recognizing the unique challenges faced by individuals in South Africa, especially the regular energy cuts known as load shedding (blackouts), we facilitated access to the University of South Africa (UNISA) Data Centres located across the country. These centres were equipped with the necessary resources, ensuring participants remained unaffected by power outages.

Understanding that time constraints, particularly for women, coupled with energy blackouts might hinder live online attendance, the recorded content of each class was uploaded after its conclusion. This approach allowed participants to catch up at their convenience, ensuring they didn't miss crucial learning material.

¹ Whoever that identifies in some way as a woman.

Role models: we recognized the importance of gender role models in shaping the training experience and to remove harmful gender stereotypes. Having mostly women instructors and networking events with women leaders in the AI and Data science field helps shift the narrative that portrays AI as a domain exclusively for or dominated by men. By showcasing successful women in these roles, the course helps debunk such misconceptions and encourages women to envision themselves as successful professionals in the field with mentors they can connect with.

In developing the concept and terms of reference, we prioritized the creation of a Bootcamp specifically tailored for women and led by women. Consequently, the majority of trainers in this Bootcamp were women who were acutely aware of the barriers women face in the field and took proactive steps to address them. The lead trainer actively encouraged and supported participants who lacked confidence, were hesitant to be part of the training, or faced challenges with coding and issues like connectivity.

Friendly environment for mums and kids: In recognition of the caregiving responsibilities many women shoulders, which can pose a barrier to upskilling, we took proactive steps to address this issue. In the application form, we inquired about childcare obligations or any caregiving responsibilities to be aware of participants who might require special support. The predominantly online format, aligned with participant time preferences, facilitated the completion of the 16-week program for mothers. Moreover, during the onsite sessions, childcare services were provided, and mums were encouraged to bring their kids during the presentation of the projects and the closing ceremony. The mums outstanding efforts and children presence were also celebrated during the closing event.

Career development and mentorship: To enhance the holistic learning experience, we integrated mentorship and career development sessions featuring accomplished women professionals in AI, data science, and the tech field. These sessions specifically addressed topics that disproportionately affect or impact women in the workplace in the form of online webinars, by local women, addressing challenges they experienced in industry, academia, and civil society. By offering guidance and support in areas directly relevant to women's experiences, our goal is to cultivate a more inclusive and empowering learning environment. Furthermore, the programme curriculum included sessions on CV preparation, as well as communication, branding and presentation skills.

Contact with employers and project mentors: Recognizing the importance of not only attracting more women to the AI field but also ensuring that the skills imparted are in demand, participants were given the opportunity to collaborate with industry partners on AI or Data Science projects. In some instances, these projects aimed to address specific challenges identified by the partners. An illustrative example is the creation of Chat Lwazi, an AI chatbot designed for the Intranet of the government agency, SITA (State Information Technology Agency). This practical engagement with industry partners adds a valuable dimension to the learning experience, aligning the skills acquired with real-world demands.

Leave no one behind: It became evident at different points in the Bootcamp, some participants struggled with certain elements of coding concepts; therefore, additional lessons were introduced to support those who felt left behind. These lessons were from other Bootcamp participants (peer learning) as well as the trainers. Moreover, the lead trainer assisted students facing internet connection issues by helping them find some local solutions to stay connected and not become discouraged or feel left behind. Overall, participants felt confident reaching out to their trainers and peers for assistance in overcoming obstacles.

Community: the course enabled the creation of a supportive community where participants can connect with others who share their experiences. This fosters a sense of belonging from the beginning

of their AI and Data Science journey, empowering them to pursue their goals with confidence. During the Bootcamp in South Africa, participants supported each other with their projects, coding queries, and understanding the time constraints faced by participants with caregiving responsibilities.

Some preliminary results

- 35 women and 2 non-binary individuals from 8 different provinces of South Africa graduated from the Bootcamp.
- 23 AI and Data Science projects were developed.
- The programme has received attention by other partner countries and projects, as such it will be replicated and adapted in different countries.

Challenges

- Employment opportunities for sustained career development: even though not all participants are looking for a job, since the beginning of the bootcamp we have been actively seeking employment opportunities for them with relevant industry partners and agents. South Africa right now has one of the highest unemployment rates for youth rate in the world 62,1 in the first quarter of 2023. ², which has made these tasks especially challenging. Following the Bootcamp and their demonstrated ability in the field with their projects, 2 women have received offers of employment. FAIR Forward is presently working with YES4Youth and Harambee on opportunities with industry partners for the remaining participants.

The AI and Data Science Bootcamp for women and minorities as a Global activity

This content will be replicated and scaled in four different ways:

1. An e-learning course will be created out of the content developed for this Bootcamp. For this we will work in partnership with the bilateral project Digital Skills 4 Jobs and Income in South Africa and the government agency of National Electronic Media of South Africa (NEMISA). This Massive Open Online Course (MOOC) will be hosted on NEMISA's platform and atingi. Moreover, the training, when converted, will be launched with an e-learning live course in South Africa, where the course aims to train 100 participants in the first cohort, supported by 2 to 3 tutors, over 5-6 months.
2. In addition, we have developed a replication kit that includes all the learning materials and instructions. It will be openly accessible to institutions interested in replicating this content. Furthermore, we will conduct a Training for Trainers session. During this session, we will launch the replication kit and invite training institutions to participate and learn how to replicate and adapt the program in their respective countries.
3. FAIR Forward is already in the process of replicating and adapting the Bootcamp in Ghana, Rwanda and Uganda while Data Economy project will undertake the same in Kenya and Senegal.
4. Finally, the MOOC will be translated and adapted into Bahasa language in Indonesia and will target marginalised communities, especially LGBTQIA+ and women*.

The Team:

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² [PowerPoint Presentation \(statssa.gov.za\)](https://www.statssa.gov.za)

Annex: Pictures

