Federated Grassroots Community Model for Catalyzing Artificial Intelligence for Common Good

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Federated Grassroots Community Model for Catalyzing Artificial Intelligence for Common Good

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Abstract
The methodologies used in implementing and developing Artificial Intelligence initiatives and solutions for the common good are mostly deficient in achieving the true essence of the phrase "AI for Common Good". In this paper, we are proposing a methodology for developing Artificial Intelligence solutions that adopt a grassroots federated community model involving a rare collaboration between problem solvers, end-users, and other stakeholders in identifying problems and conceptualization and development of Artificial Intelligence solutions in such a way that they can be accessible, reproducible, contextualized and incrementally enhanced across different locations making the possibilities of AI truly available to anyone, anywhere (AI for Common Good).

Introduction
The possibilities with Artificial Intelligence (AI) are immense and transformational (Liu *et al.,* 2018). Unfortunately, it is still majorly a black-box model, which is difficult to access, reproduce, contextualize or enhance especially in poor and developing countries in Africa preventing these regions from truly benefitting from the possibilities and economic dividends that AI provides (Morris, 2020). AI initiatives and solutions developed by various experts and organizations to address this problem are often categorized or described as "AI for Common Good" (Berendt, 2019). Berendt (2019) identified the pitfalls and challenges of AI for Common God in the areas of problem-identification and solutionism mindset of the problem solvers, the difficulties of integrating different stakeholders, the role of knowledge, and side effects and dynamics after an exploratory study of 99 contributions to conferences on related fields. In this paper, we propose a new methodology for identifying and solving real and prevalent problems with AI and developing solutions to be made available to anyone, anywhere.

Methodology
The methodology adopts a federated grassroots community model that involves all stakeholders in the collaborative identification of problems and conceptualization and development of AI solutions via rapid prototyping. The problems and solutions are thoroughly documented, including the processes and learning to facilitate accessibility, reproducibility, and cross-border adaptation and enhancement of the solutions or datasets for incremental value creation through expanded collaboration networks.

The proposed federated architecture is a method of solving complex problems by allowing interoperability and information sharing between autonomous or decentralized entities (Wikipedia, 2019). It has been implemented with outstanding results in crowdsourcing, crowd solving and gamified crowdsourcing models for problem-solving and driving innovation in business and other domains (Savage, 2020; Brabham, 2008; Geiger et al., 2011; Morschheuser et al., 2017) allowing for cross-fertilization of ideas and solutions from contributors from different locations and sectors (Gimpel *et al.,* 2020)

The proposed new AI for Common Good solution development methodology is currently being implemented by AI Commons in partnership with Data Science Nigeria, Idea Labs, Superfluid Labs, and Sahara ventures across 3 countries: Nigeria, Tanzania, and Ghana. We reveal some impressive outcomes of the methodology even in the difficult National lockdown caused by the COVID-19 pandemic demonstrating the effectiveness of the methodology even without any physical contact or collaboration. The project aims to demonstrate how the global community of AI experts can learn and co-create mutually beneficial solutions with the opportunity for incremental enhancements.

First, existing AI open-source solutions in the location and sector/problem area of interest were identified and thoroughly documented. Implementing the grassroots community models, local problem owners were brought in to evaluate the solutions and to identify strengths, weaknesses, and possible improvements of the solution as it applies within their context. Problem owners as defined in this context are the local people who experience the challenges and inadequacies of the health and wellbeing sector on a regular basis and those who are actively involved in championing the problems or solving them e.g. activists, health workers/students, academic researchers, technical experts (AI experts), solution developers, etc. The problem owners also help in identifying and documenting real and prevalent problems using a template developed to capture as many details as possible to guide solution builders/developers on how to build solutions or address the problem using AI. This was done with the understanding that AI is not a silver bullet; without understanding and systematic characterization of the problems in the context of the end-users, solution developers would only be grasping straws.

The problem documentation and the solution evaluation were translated into hackathons with the hackers/solution developers required to evaluate and provide suggestions for improvements of the documents to guide them to develop precise solutions to the problems. After the hackathon, all solutions and solution documents submitted were fed back to the problem owners to evaluate and critique to further improve and enhance the solutions.

All problems and solutions (including documentation) are then put into a coordinated and collaborative global cloud-enabled platform (knowledge/community hub) in a searchable and interconnected format. The knowledge/community hub will attract, incentivize and coordinate contributions from everyone in such a way that they can complement each other in the *spirit of et Pluribus Unum* (out of many one) towards the development of scalable AI solutions. This will facilitate the collaboration with a global pool of problem solvers working in concert with local developers and problem owners in the community hubs to build high impact and scalable AI solutions.
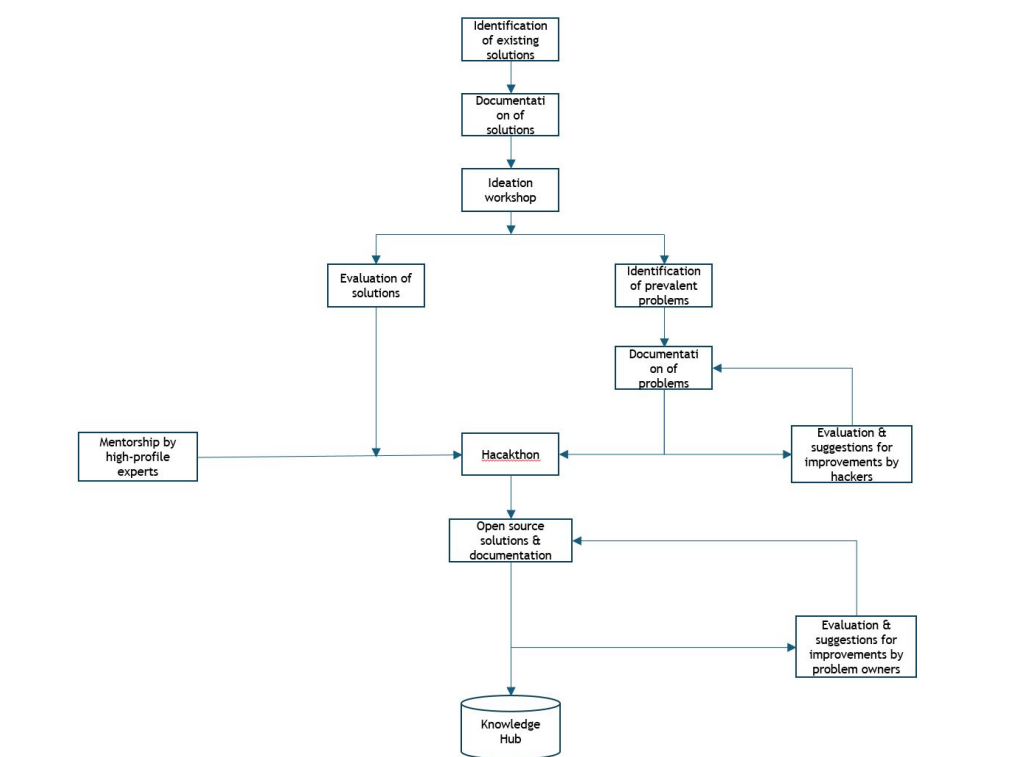
AI Commons Flowchart/Methodology

Conclusion

To replicate and scale effectively, documentation and new process roadmaps are the game changers. The methodology proposed is not just theoretical but has been executed and finessed based on real user feedback.

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