

Assignment A1: Essay on AI, Social impact and ethics - first draft submission

Nowadays Artificial intelligence is regarded as a superior version of human beings, at doing specific tasks. AI can do tasks humans did faster, better, and more efficiently. So why is AI not used everywhere? The issue we are going to focus on today is regarding the usage of AI in low-resourced areas such as Ghana, Malaysia, and the global south in general. We dive even deeper into the usage of AI in plant diseases detection, as this can be a major bottleneck for developing countries. One of the essentials for everyday life is food and water. Without them, we will starve to death. Farmers in the global south do not possess as much information as us in the developed countries, which results in a less efficient and poor harvest of agriculture. This is why we aim to try and use artificial intelligence to solve issues regarding the health of plants. In the future section, we also will show that we are also targeting another area with our solution.

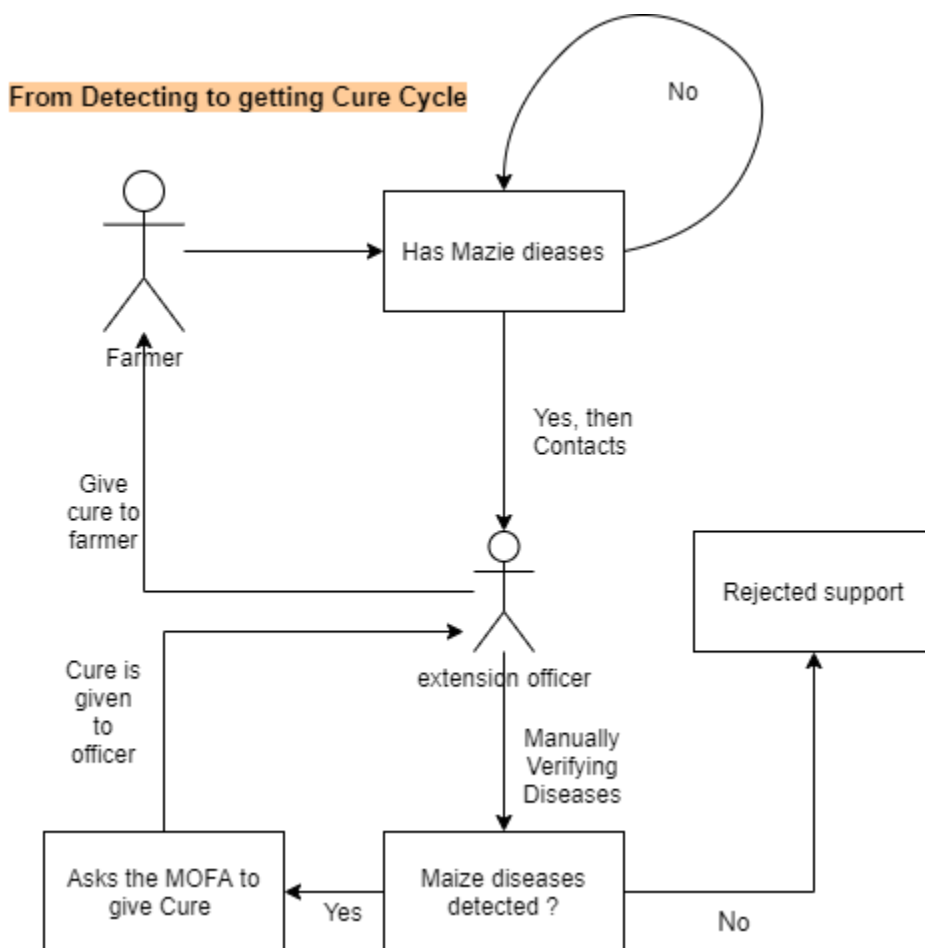
So what is AI? Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings¹. This allows us to automate specific tasks that require human attention. This in theory is a great achievement, as humans require a lot of resources and time to do a specific task, while AI would just require power and training. Even though this sounds simple, it is not usually the case, as one of the major issues with AI, is the inability to exhibit emotions. This means that in case of an issue, where you would need to make a difficult decision, AI does not take into account emotions. This led to an overhaul and backfire of AI. People started to think about the dark side of it. But fortunately, this did not stop the development of AI. Development has risen exponentially when humans understood the power of Deep neural networks.

Of course, all of this development is happening in developed countries, people sometimes ask themselves, how can we use this in rural places where resources are scarce and we have a limited amount of technological advancements. Villages in places like Ghana, Malaysia, Armenia and more, lack even the simplest things like electricity, a simple phone, or an internet connection. It means that ordinary solutions that work for developed countries cannot be applied in low-resourced areas. For example, we cannot have sophisticated machines to train our AI in rural areas. This led us to think out of the box. We need a solution that a person in rural areas can use efficiently with minimal requirements. In later sections, we will talk about the ways we adapted solutions for rural areas.

As mentioned above AI can be used in different sectors of the economy, healthcare, and more. We will take a closer look at the detection of plant diseases using image recognition. Using supervised training we can train the AI to be able to detect precisely which type of diseases it has used only photography. In the research done by

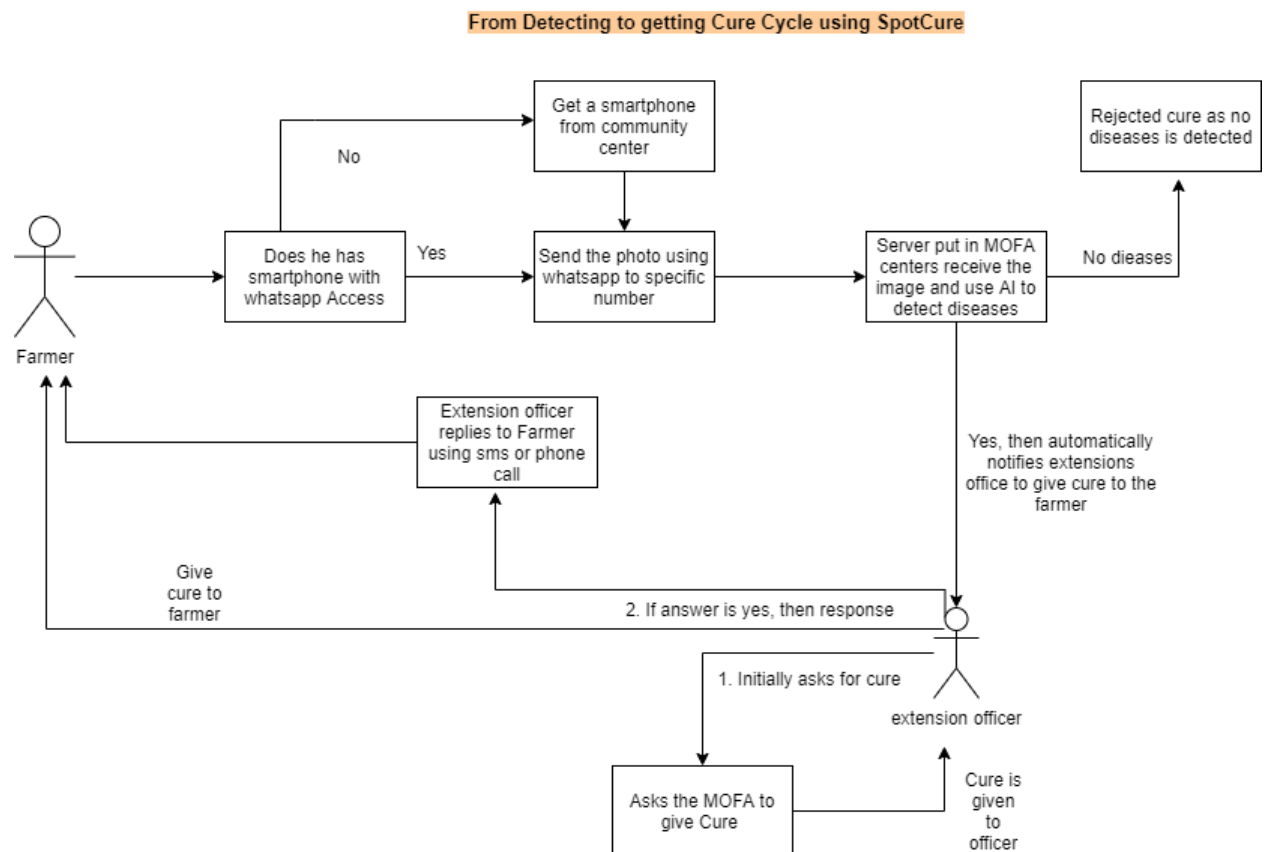
Harte, Emma,⁴ they were able to achieve 97.2% accuracy in the controlled environment. This means that we can detect if the specific plant has a disease or not by a huge margin. Unfortunately, the accuracy drops to 44% in the field. This means that if an average farmer takes a photo of the plant, we have 44% of detecting the disease or not. Of course, there are better results achieved by other scholars, but this shows the power of AI, that we can use to detect diseases in different plants. One of the major roadblocks in rural areas is the knowledge of detecting the correct diseases. We can understand that this research takes a specific scenario, and in different scenarios, it might perform better or worse. But for this to work, we write farmers to have access to smartphones, which as mentioned above is not usually the case. Farmers also lack the basic knowledge of using smartphones and how to take photos of them. These are the issue we need to address, as developing an AI for plant disease detection can be done in developed countries too.

Now after understanding that our major problem is not detecting the plant disease but the whole process, let's look at the process step by step.



In figure 1, we can see the steps the farmer has to take to get the cure for the diseased plant. Initially, after detection of the disease, the farmer has to contact the extension officer to receive the cure. After contacting, the extension officer has to visit the farmer and verify that the plants have diseases. After detection extension officers requested a cure from the Ministry of Food and Agriculture. Eventually, the cure is then given to farmers. This whole process can take months, while in specific cases like mentioned in figure1, Maize parasites can kill the plants in a matter of 2 weeks. This means even if we detect the disease, this will not solve our problem.

So we came up with a solution that could fasten this process to a week.



In figure 2, we can see that now instead of the whole process of going and coming back, we can use the AI to detect the extension officer immediately, and can cut the processing time of farming requesting extension officers for verification and validation. Important to note is that having a proper plant detection AI would not be enough to solve the current issue. During a questionnaire asked farmers, we found out that during good seasons when there are no parasites they would harvest 28 bags of maize, while if there is an occurrence of it, they lose half of the harvest. And from 11 participants, 90% of them said that they had encountered some sort of issues with plant health in the past year.

This shows us that to solve problems like these, we need to take into consideration contexts and the environment.

Not to dive deeper into the solutions, let's look at the ethical implication of this implementation in general. Because we require the usage of smartphones, most rural areas do not have access to it. To solve this, we need to have 1 common smartphone to be shared among users. But how can we verify that these users would not steal the device? Or how can we convince that the AI will be for their better sake, and would not introduce more problems? People in developed countries still fear the consequences of AI usage. Some argue that AI would take over the majority of the labor, and increase the unemployment rate. Others argue that AI cannot be trusted as they have no ethical decision-making. Are these issues for the global south?

The global south, at the moment, lacks an educated workforce, and the issues mentioned above, can be a problem for developed countries, but we can argue that any help from AI in this field can only benefit from the development of developing countries. The probability of AI increasing the unemployment rate is quite low, while the wrong decision-making of AI can still be outweighed by the positive effect it can bring.

Unlike other solutions, AI can be highly flexible. AI can improve the education process, automate irrigation, detect diseases in plants, and much more. Some can argue that we cannot trust AI to teach the future of our children, but then those AI are created by humans to help humans. These are some questions that are still unanswered.

In my opinion, it is really important not to focus on how AI can help the global south, but how we can use it there. Every AI solution needs coordinated implementation for specific scenarios it will be applied to. We cannot simply use the mentality of the west in other countries. Economically it does not seem feasible to create a product for the global south, as the population is quite poor. So most of the advancement is done as charity. For example, students like us would like to improve the lives of those who are unable or do not have access to education. People that lack basic knowledge of technology to improve their work. These are the goals we scholars try to achieve, as we do not seek monetary value in them, but instead the gratitude from the locals for the help.

To summarize everything mentioned above, we can see that there are multiple major roadblocks, to get AI in the global south. We cannot simply use the knowledge from western countries, and apply it there, without considering the context and environment of deployment. Of course, we also need to think about the ethical implications of AI, and how they will affect the population living there.

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