Robotics for Sustainable Agriculture

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***Abstract* – This article gives an idea of the usefulness of robotics in agriculture nowadays, considering the possibilities for its future application and implementation. The project aims to achieve an agrarian revolution, relying on modern, greener and more efficient methods of cultivation.**

Keywords – robots; agriculture; future; innovations; open source; development; ecology

Introduction:

Take a moment to imagine how much humanity has achieved in the last fifty years. Everybody knows that only three decades ago the Internet was still nonexistent. Fifteen years ago, there was neither Facebook, nor Instagram, nor YouTube. However, we do not need any sort of statistics to realize that just over the last fifty years technology has been developing rapidly. The evidence is right before our eyes.

Nowadays, we use technology to do almost everything. For instance, working, paying bills, or online shopping. However, it is not just the Internet and social media that have been put to a change. Humanity has also reached a point where constructing your own robot is not impossible anymore.

Just like everything artificial, robots are made with a purpose - to help us and make our lives easier. They are made so that a person can use them to do everything that comes to his mind. Considering that these days even our cooking machines are in fact robots, one could easily say that people refer to the help of robots pretty frequently.

We believe that further development of technology depends on the new generation. Our cause is to contribute to this development by whatever means possible. We plan to construct a robot which can help us to improve agriculture and make it more ecological thus ameliorating our environment. Our project will be open-source so that we could save resources from testing and troubleshooting and will also help us in further development of software and hardware. Although it is more than clear to us that we cannot finish the contemplation by ourselves, we want and will start off the project properly. After all, to make a rocket you have to make a firework first, right?

'Robots are the future'. Perhaps that is what people used to say in the 1970s. Thanks to the rapidly developing technologies, it is possible for us to say that the 'future' is now. Nowadays, robots are used in almost every area in our lives. For instance, in our school we use robots to learn programming and bots to check our homework for mistakes and to improve our work. Imagine the difficulties our teachers would have to go through to check what just 100 people have done if this automatic system did not exist. Another example are the automatic vacuum cleaners, which are gaining a lot of popularity lately. Those are just two of many other examples, which could be given to show the great impact robotics has on us. Because they are able to carry out complex series of actions automatically, robots can perform different activities in a more efficient way.

Apart from grading homework and vacuuming, it is possible to use them in agriculture as well. For example, they can be used for collecting seeds, water, hay, etc. With the help of robots and automated systems, we can increase our quality of life and make it even better overall.

Concept/Design:

In our country, most of the agriculture production is neither efficient, nor environmentally friendly. It is because we have witnessed the methods for harvesting and, having seen them, we want to optimize the production as much as we can.

Most of recent machines in agriculture are powered by fuel, which is everything but ecological. Someday, our planet's resources

will end and we will need to find alternative methods to power-up our machines. The thing is, we have already found them (solar panels, wind generators) but we are not using them. Or at least we are not using them correctly.
It is sad to think that such a bad thing as the disappearance of non-renewable resources needs to happen for humanity to understand that it is vital to conserve them.

To make our work better, we must power up our robots via solar panels. Firstly, because, unlike fuel, the energy from the Sun gives us is endless, and secondly, because it does not affect the environment in any possible way. The whole idea about working with solar panels revolves around decreasing the percentage of harmful emissions while saving up as much non-renewable resources as we can.

Some of our other ideas include designing robots to alarm us, for example, when it is time to harvest crops, when a natural disaster is about to happen or about bad weather conditions. Usually, in agriculture humans do these tasks. Although it has been working for thousands of years, it is very far from efficient. Also, we could use robots to harvest, to plant and gather seeds. We could also add a function so that when it detects certain weather conditions, it can alarm us and give us an option to launch a rocket, which can disperse clouds. Our robot could also check the soil and decide what agriculture is compatible in the relevant region.

When it comes to food production, we are facing many problems that could be solved pretty easily with the help of robots. We have many expenses on workers' salaries. Robots work for free and by using them we could reduce those expenses and use them for agriculture development and quality improvement. There are also many plant diseases, such as plant rust, wheat smut, etc., which a robot can detect much earlier than the human eye thus saving a bigger part of the crops.

Implementation:

We decided to create an eco-friendly all-in-one robot - AgroGod (GodMode). It should alarm us when it is time to gather the crops and inform us about the outdoor weather conditions. It should be able to harvest, plant and gather seeds. The robot should also alarm us and give us an option to launch a rocket, which can disperse clouds.

To achieve this, we will implement most of its functions with our favorite programming languages - C, C# and Java. Our team will be separated into five groups - software development, hardware development, testing unit, documentation team and project management. Each group will focus on its goals while working in synchronization. Do not get the idea wrong though. Just because we will be divided into groups does not mean we will not help each other. We strongly believe that because every single one of us desires to increase agriculture's production and improve its methods, we will be able to help each other in between our groups' tasks.

Moreover, we want to share what we have created with the rest of the world and hopefully, it will be used in the future. Volunteers will be given the chance to help us by writing code and documenting it, fixing bugs, etc. Everybody can become a volunteer in our project. It is not necessary to be a software or a hardware engineer to help us. What you need is just enthusiasm, patience and hope.

Results/Conclusion:

In addition, we would like to say that, if our project succeeds, we would make the world a better place for the next generations. Agriculture will become more efficient and eco-friendly therefore making a step closer to saving our planet. Working side by side with robots would give people the opportunity to learn more about them and their essence. Using robots would be of major help for those folks living in the countryside. They are the ones that have the biggest contribution to agriculture's production and it would make their work much easier. Furthermore, it is very helpful for the economic development around communities. If companies run well, other investors will come and set up other firms.