Drone Technology: Digital Hawk Eye in the Sky for Precision in Field

Vaishali S. Parsania, Krunal C. Kamani , Yogesh R. Ghodasara

Abstract — In Field, farmers have always needed correct and up-to-date information on the health of their crops and the environmental condition of the land. In India, most of public depend on agriculture field but due to massive field area difficult to visit each place and government also cannot get correct information at time. Now a days, technology has intruded in our lives through social media, smartphones, computers and the internet, agriculture has remained the last upholder of convention as an inventiveness of human work and intelligence. Even though computerization, much of farming involves human work and preparation. Farmers walk down their fields checking for plant health, the presence of weeds, pets and bugs, parched soil and other overt signs of suffering. However, even with an expert view, it is tough to see weakened photosynthesis or marks of pathogen invasion timely enough to avoid big damages. It has directed to a culture of preclusion where farmers have resorted to the over use of water, fertilizers, pesticides, etc. Else, the budget of non-involvement, or even later involvement, is substantial crop failure. This paper presents the SWOC analysis of the latest buzz – Agriculture Drone. Drone Technology or Unmanned Aerial Vehicles (UAV) will give the agriculture production a high-technology transformation, with scheduling and tactic centered on real-time data collecting and processing. Agricultural drones are new latest digital device like any other user device in agriculture to for holistic agricultural development.

Index Terms — Drone Technology, Unmanned Aerial Vehicles, Agricultural drones, SWOC

I. Introduction

Unmanned aircraft are mentioned to in several diverse ways. The term "drone" devises from the military, but it is currently widely used to define citizen technologies.

Drone can aid farmers everywhere to observe their produces, fend off pests, advance land occupancy, and more. But to realize its full prospective, supervisory regimes are obligatory, while keeping natives' security and privacy rights protected [1].

A growing market

The worldwide UAV market has grown-up substantially in the previous few years, building on their established effectiveness to agriculturalists and others. An August 2015 study from Grand View Research estimated the global commercial drone market size to be $552 million in 2014 – and it's grow to $2.07 billion by 2022, with agriculture dominating other drone sectors[2].

II. Strength

A. Portability

Nowadays drone are use in all filed including agriculture also because the ease of practice, low cost and less time with more productivity which change the agriculture scenario. Drone technology more useful in agriculture which enhance the product quality as well as quantity also and nowadays labor cannot easy available so it is more suitable option for large farmers.

B. Low cost of operation

Due to larger area of field some data collection, crop monitoring, availability of time and labor problems are there.
So, using of this drone technology which less time, less labor, instant data analysis and crop monitoring which low cost as well as also reduce the future or present problem which are going during the observation of field just like weed problem. We can instant solve problem using this technology [3].

C. Ease of Use

Drone can work very ease. Farmers are not educated but the system of drone which requires some techniques so farmers can operate this drone machine simple like mobile operating.
So, drone cannot required more education for operating of that machine only simple training require for the operation.

D. Automation of analysis

Use of automation technology with drone system which less time require for the study of facts because within less time drone cover the all area and study of stastical very easy using software. Mostly farmers are not aware of calculation so use of automation which more help to farmers.

E. Productivity

Field is very vast so the use of drone which increase production by several ways like crop monitoring, irrigation, cattle herd information, natural disaster as well as other information which helps in productivity.

III. Weakness

A. Initial investment for Farmers

Drone technology require some machine tools which normally higher cost e.g. camera, motor, GPS etc. So, initial cost of these all part which high. This is the main problem for small farmer but the larger farmer can effort this machine [4].

B. Requires good signal strength of network

Drone technology require some GPS system and wireless network for controlling and data transformation so the each and every place and signal capacity of machine which factor affect the efficiency. Drone image quality is vastly reliant on ecological situations at the phase of flying and the camera settings used to report them.

C. Data overflow

Drones are used for survey also but the problem are

the less storage capacity of data some time due to higher data collection either old memory which delete or new memory cannot save by drone so, periodical save the drone data and delete interval time so drone cannot over flow of data.

D. Requires power

Drones are work based on electrical power supply. So availability of power in field for charge of this drone battery so drone can work properly it must be requiring.
If power is not available so drone cannot work. It is main weakness of drone technology because this full automation based system which operates by computer or remote.

E. Flight regulations are not advanced

Nowadays drone automation not developed properly so it can not regulate up to long distance with high accuracy of data collection.
So, it is weakness of flight regulations are not advanced as much as needed.

IV. Oppurtunities

A. Enhance the quality and productivity

Use of the drones for agriculture which do lots of operation like crop monitoring, disaster, bacterial attack as well as cattle herd attack, weed problem all these parameter control by less time with maximum area so product quality increase with productivity.

B. Increase the farmers' income

Use of drone technology which can reduce the labor cost because nowadays a labor cost is very high due to less availability and less fertility dose also reduce cost of fertilizer and increase production with better quality which increase farmers income more[5].

C. Developing new research in agriculture

Drone technology is new in agriculture field so, farmer cannot see micro level of insect in crop but the HD camera can observe more micro insect side compare to human so drone technology is new developing research in agriculture.

D. Increase public safety

It's crucial to measure crop strength and notice bacterial or fungal infections on trees. By look over a crop using both noticeable and near-infrared light, drone-carried devices can recognize which plants imitate diverse amounts of green light and NIR light. These facts can create multispectral pictures that trail variations in plants and show their health condition.

E. Reduce health and safety risk for human

Drone imagery can also be used to better appreciate the spread of disease, allowing health analysts to create high quality maps.

F. Fast and accurate output

Drone technology mostly use for government data collection of agriculture crops so, within time drone cover the all area and government got fast and accurate output with latest high speed drone with HD camera which helps in fast, longer wireless network and accurate reading give to the government for proper collection of information.

V. Challenges

A. Violation of human rights

Drones are flying over the field so, without other permission drones enter any field so it creates the violation atmosphere and breaker the human rights.

B. Hacking into software

Government data of production and analysis that data hack by some other user which can hack the software so government can get wrong data collection and survey the lend information.

C. Regulatory issues

Each country has their regulation of drone technology use so without government permission we cannot use of drone for our application. Government make some regulation for drones technology which must require because otherwise miss use that data by other person which make wrong atmosphere just like terrorist attack.

D. Public availability

Do it yourself drones can be created for criminal purposes
Just like any tool, it could be abused and used to do wrong. We need to ensure that there is limpidity and accountability with the people that use this technology.

Conclusion:

Agricultural drones are gradually becoming a device like any further customer device, and we're beginning to dialog about what we can do and how we can use them. Using drone we wants to water lesser amount, use fewer insecticide, and eventually produce improved productions in agriculture and allied field. More and improved data can decrease water usage and subordinate the chemical burden in our atmosphere and our foodstuff. Perceived with this approach, what started as military machinery might culmination up better known as a green-tech device, and our kids will nurture up used to flying robots bustling over farms like small crop dusters. As every coin has two sides, use of drone technology does have some issues which can definitely be overcome for the betterment of the farmers in particular and the nation as a whole.

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AUTHORS' DETAIL

Vaishali S. Parsania
Assistant Professor,
Department of MCA, Atmiya Institute of Technology & Sci., Rajkot, India
Email: vaishali.parsania@gmail.com

Krunal C. Kamani
Assistant Professor,
(Computer Science), SMC College of Dairy Science, AAU, Anand, India,
Email: kamanikrunal@gmail.com

Yogesh R. Ghodasara
Professor,
(Computer Science), College of AIT, Anand Agricultural University, Anand, India
Email: yogeshghodasara@gmail.com

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