



AI BLOCKCHAIN SERVICES
Artificial Intelligence & Blockchain Discipline

PRECISION AGRICULTURE MAXIMIZING PROFITABILITY

DIGITAL AGRICULTURE SERVICE
AND CONNECTED CROP SOLUTION HELP THE
AGRICULTURE ECOSYSTEM FULFILL ITS POTENTIAL

TODAY, THERE ARE MORE THAN 7 BILLION PEOPLE ON THE PLANET, A FIGURE THAT'S EXPECTED TO REACH 9.6 BILLION BY 2050.

BY THEN, THE MIDDLE CLASS—WHO TYPICALLY HAVE MORE MONEY AVAILABLE FOR FOOD, LEADING TO GREATER DEMAND—COULD REACH 5 BILLION PEOPLE BY 2030.

IF THESE NUMBERS HOLD, OVERALL FOOD PRODUCTION WILL NEED TO DOUBLE IN A RELATIVELY SHORT PERIOD OF TIME TO MEET DEMAND TO FEED THE WORLD'S POPULATION.

KEY CHALLENGES FACING AGRICULTURE

Every day, the food we eat connects us to a vast global web of farmers, traders, food manufacturers, retailers and many other people involved in getting food from farm to fork. Most of us probably don't pause to think about it while biting into a piece of fruit or a slice of bread, but this global food system is central to some of the biggest challenges facing humanity.

Modern agriculture has many complex challenges

Farming is a complex, unpredictable and individual business.

Farmers must meet the changing needs of our planet and the expectations of regulators, consumers, and food processors and retailers. There are increasing pressures from climate change, soil erosion and biodiversity loss and from consumers' changing tastes in food and concerns about how it is produced. And the natural world that farming works with – plants, pests and diseases – continue to pose their own challenges. While modern agriculture provides a large number of solutions, the outcome is not always the same because each farm is unique: different landscapes, soils, available technology and potential yields. What kind of problems do farmers face?

Farmers need to deal with many problems, including how to:

- Cope with climate change, soil erosion and biodiversity loss
- Satisfy consumers' changing tastes and expectations
- Meet rising demand for more food of higher quality
- Invest in farm productivity
- Adopt and learn new technologies
- Stay resilient against global economic factors
- Inspire young people to stay in rural areas and become future farmers

The good news is that new digital technologies now make it possible to collect and leverage huge amounts of critical data at minimal costs—thus making a farm's field operations more insight-driven, and potentially more productive and efficient. The agriculture ecosystem is already starting to invest in these digital technologies. The total market size for digital-based services is expected to grow at a CAGR of 12.2 percent between 2014 and 2020 to reach \$4.55 billion.⁴ Greater use of digital agriculture services is vital to not only improving a farm's financial performance, but also to meet the food needs of an expanding population.

Until recently, the impact of digital agriculture solutions (e.g., variable-rate treatment application)—while an improvement over traditional methods—has been limited by the granularity and timeliness of the data they use and their lack of day-to-day operational decision support. According to the U.S. Department of Agriculture, over 60 percent of U.S. agricultural input dealers offer some kind of variable-rate technology services. However, less than 20 percent of acreage is managed using the technology due to the high cost of gathering precise field data.

It's clear that digital agriculture still has considerable untapped potential. That's why AIBlockchain has combined digital technologies such as the Internet of Things (IoT) with its big data analytics, visualization capabilities, and industry knowledge to create two major advancements in the market: AIBlockchain Advanced Farming Service and AFS Bridge Projects™.

THE EVOLUTION OF DIGITAL AGRICULTURE

For most of history, humans have been hunter-gatherers. Adopting a more nomadic lifestyle, we moved with the changing seasons, with livestock migration patterns and adapted as climate change impacted crops and the surrounding environment. Today, we embrace technologies that our ancestors likely could never have dreamed of, but the incorporation of modern capabilities into agricultural practices took time and didn't entirely abandon early advancements. In other words: our ability to grow and sustain life on a billboard didn't come to us overnight.

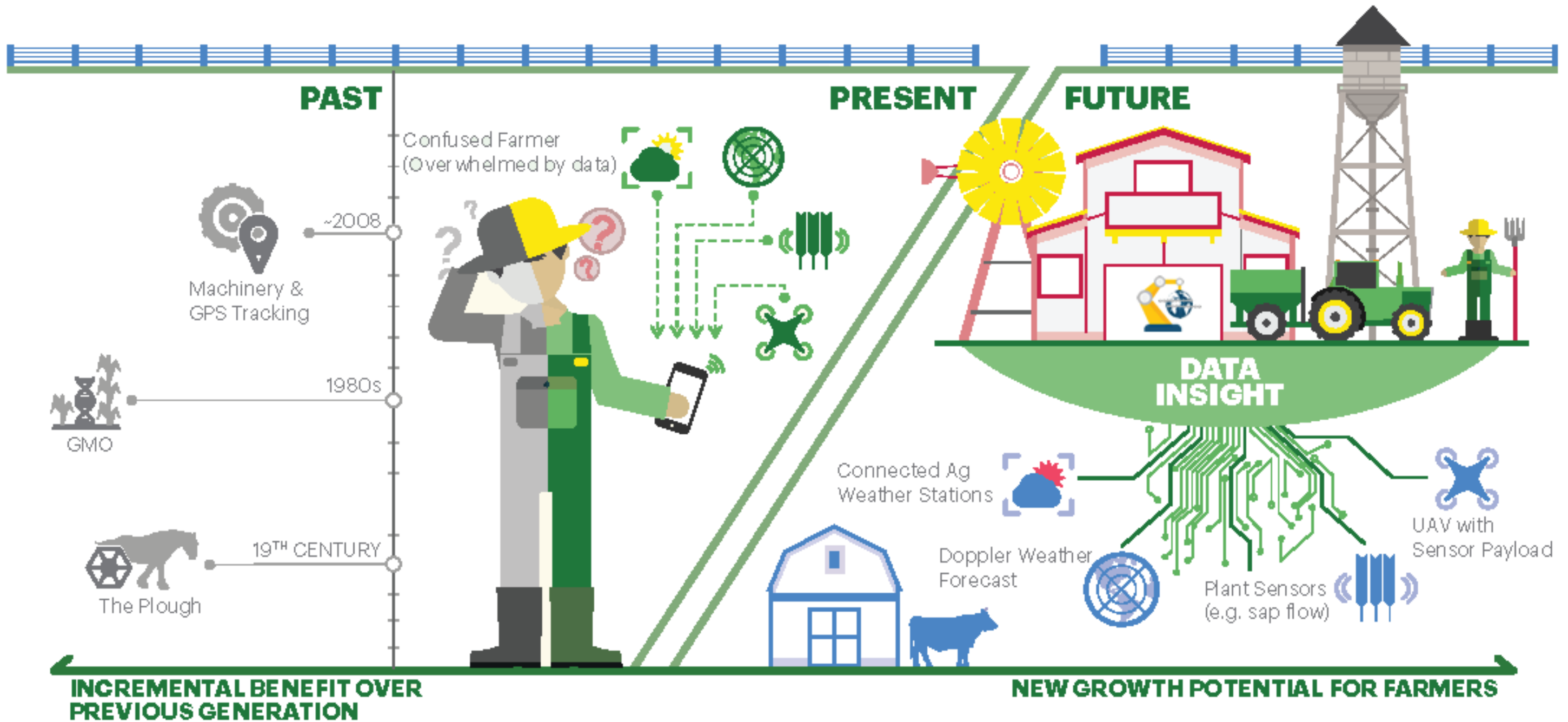


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ADVANCED FARMING SERVICE

GENERATING VITAL OPERATIONAL
INSIGHTS FOR TODAY'S FARMER

To be successful, a farm must grow as much per acre as it can, reduce the risk of crop failure, minimize operating costs, and sell crops for the highest price possible. This requires, among other things, effectively managing input resources like fertilizer, water, and seed quality and minimizing the impact of unpredictable variables (such as the weather and pests). However, achieving that objective is far from easy. Conventional methods like physical crop inspection are time-consuming and can be inaccurate, while fixed and tractor-mounted sensors alone can't provide a real-time picture of what's happening in the field. Farmers face further challenges in translating this data into operational insights that can help them understand which actions to take, when and where.

This is where the AI Blockchain Advanced Farming Service can help. By generating detailed insights into operations and the environment, it assists farmers in making data-based operational decisions to optimize yield and boost revenue while minimizing expenses, the chances of crop failure, and environmental impact. Depending on the crop, the Advanced Farming Service can help increase overall profitability by 10% to 30% per acre.

The Advanced Farming Service aggregates granular, real-time data from a variety of sources, including environmental sensors in the field, NDVI images from UAVs (that show crop stress before it's visible to the naked eye), sensors mounted on field equipment, weather forecast data, and soil databases. By combining telemetry from these different sources and leveraging a proprietary decision support engine encoded with crop-specific business rules, the Advanced Farming Service can provide practical recommended actions for farmers to take to improve their farms' economic output. The Advanced Farming Service can be connected to the farm's work management system, which enables the platform to automatically schedule the relevant machinery and people when the farmer accepts specific recommendations.

The Advanced Farming Service also calculates the economic impact of each recommendation so farmers can immediately understand the financial implications of a particular course of action. This feature helps farmers make better real-time operational decisions based on economic measures versus continuing with inherited farming practices. In addition, the service allows farmers to review historical information on similar issues that may have been encountered so they can learn from the actions taken at that time and make better operational decisions today. One of the key features of the Advanced Farming Service is its user interface, which is tailored to farmers' unique demographics. It's not unusual for several generations to work on a farm together, which means farmers often don't share the same level of technological sophistication. Thus, the main interface is simple and straightforward so everyone can use it. But it also provides an opportunity for more technologically proficient farmers to "dig behind the data" on which recommendations are based, for example, to take a closer look at NDVI or infrared images or telemetry data from a specific sensor in a certain part of the field.

The Advanced Farming Service can be used in a wide variety of ways to address inefficiency in farming operations across crop types. These range from reducing the time and improving the accuracy of scouting; to measuring growth rates; to providing input data to variable-rate application of pesticides and irrigation. The service can be further "tuned" to learn from situations on a given farm to better tailor future recommendations

An example of a Advanced Farming Service use case is helping a farmer decide when to harvest. For instance, the service can alert a farmer that a particular plot might be ready for harvest earlier than expected. Different harvest scenarios are presented — e.g., harvest 10 days early, five days early, or as currently scheduled—and the financial impact of each of these scenarios given expected crop market conditions at the time of harvest are clearly shown. Thus, the farmer can quickly see how each scenario would affect the farm's profitability. Further, if the Advanced Farming Service is integrated into a farm management system, the farmer can schedule the harvest from within the service, making the whole workflow seamless from insight, to decision, to execution. As the preceding examples show, farmers can use the Advanced Farming Service in many ways to increase their operating margin by boosting revenue, increasing operational efficiency, and reducing the cost of goods sold.

Integrators, such as AIBlockchain, are the crucial facilitators in this paradigm shift towards digitalization in agriculture. AIBlockchain covers the range of knowledge needed for such a digital journey: IT expertise, agriculture expertise, and validation and go-to-market experience for digital solutions and business models. As a global leader in consulting, technology services, and digital transformation, AIBlockchain is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital, and platforms. Building on its strong heritage and deep, industry specific expertise,



**BY GENERATING DETAILED
INSIGHTS, FARMERS CAN MAKE
DATA-BASED OPERATIONAL
DECISIONS THAT WILL OPTIMIZE
YIELD AND BOOST REVENUE WHILE
MINIMIZING EXPENSES AND THE
CHANCES OF CROP FAILURE”**



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SMART FARMING SOLUTIONS

IMPROVING THE PRODUCTIVITY AND
EFFECTIVENESS OF THE
AGRICULTURE SECTOR.

WHAT IS A SMART FARM

Intelligent smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. As an added benefit, they also improve the quality of life for farm workers by reducing heavy labor and tedious tasks.

What are the benefits of intelligent farming? What it ultimately boils down to is saving time, and therefore, money. That adds up to higher profits. But precision farming offers a whole range of other benefits.

- Easier and fast management of production
- Greater efficiency, so less labour is required
- Enables animal-friendly livestock management
- Upscaling is an option
- Constant insight into the processes in your house
- Enables farmers to offer sustainably produced food
- More environmentally consciously as waste of water, food and energy is reduced

Smart farming aims to optimise the production in farms by using the most modern means in a sustainable way, hereby increasing the production and delivering the best products in terms of quality while maximizing the return. It makes use of a wide range of technologies including IoT sensors, wearables, GPS services, UAVs, robots and drones operating in the field which provide real-time data to systems helping to monitor the production line and support decisions.

INCORPORATE CROSS-INDUSTRY TECHNOLOGIES AND APPLICATIONS

AIBlockchain AFS Bridge Projects™ service smaller-medium acreage farms by developing customized intelligent farm transformation plans incorporating the latest open-source platforms has proven to be the best model to manage the initial and ongoing costs of acquiring precision agriculture “smart” farming technologies.

The AIBlockchain solution lies in making use of cognitive technologies that help understand, learn, reason, interact, and increase efficiency of your farm. We will transform and enhance your working practices with automated data gathering technologies, such as variable rate mapping, artificial intelligence, and digital imagery to guide targeted farm management activities to improve the sustainability, efficiency, and productivity of agricultural operations.

100's of AGTECH SERVICE PROVIDERS. WHO DO YOU CHOOSE?

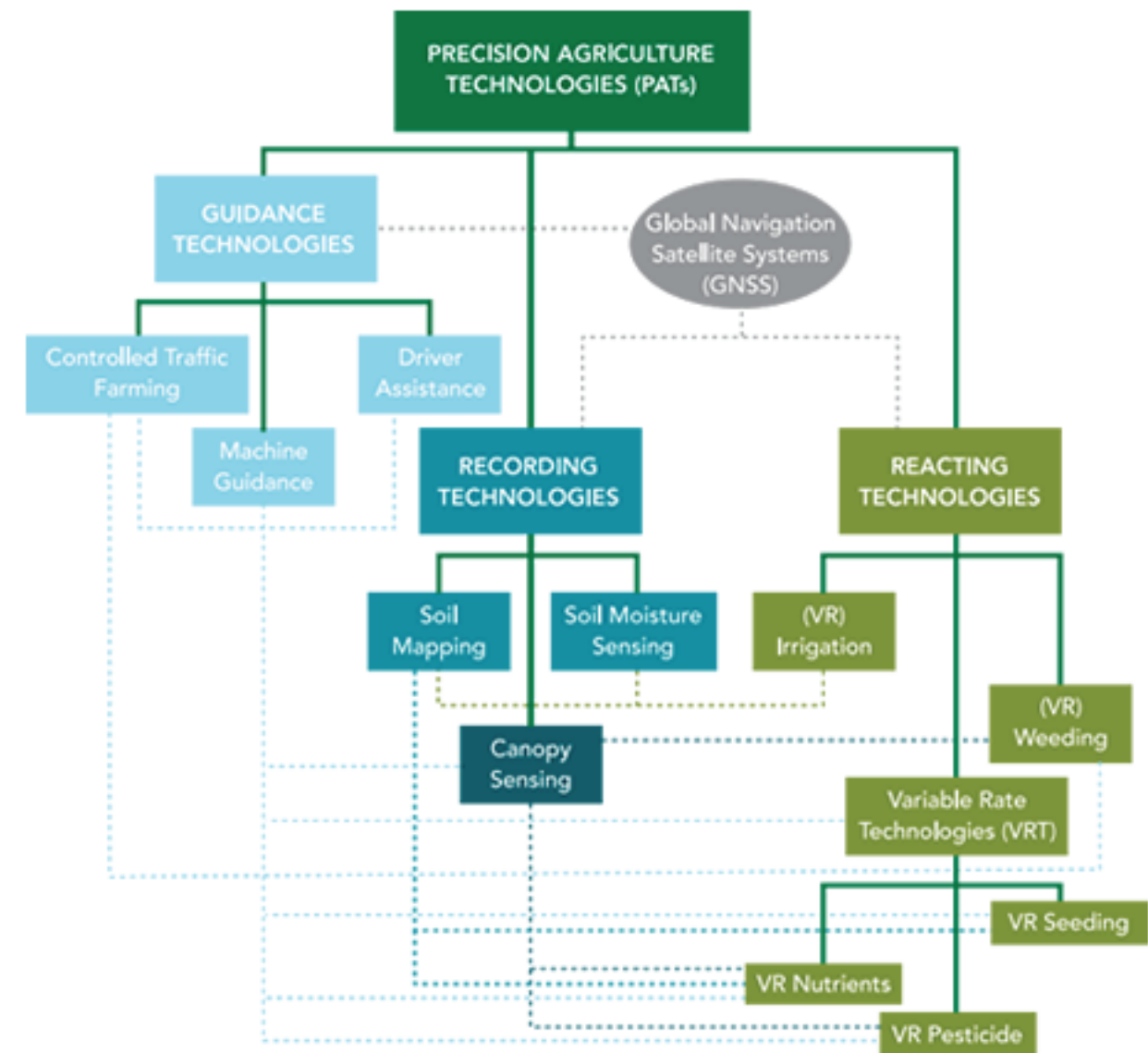
Drone farming - Drone surveillance and remote interventions based on image analysis and connected sensors communicating data with the drone, aimed at providing more frequent, cost-effective remote monitoring of large areas and enabling remote interventions to boost yield and reduce losses from pests as well as optimizing deployment costs

Smart-crop monitoring - Connected irrigation and nutrient-distribution equipment based on connected sensor data and imagery analysis, aimed at optimizing resource usage and crop growth through real-time, precise, location-dependent adjustments

Smart-livestock monitoring - Individualized feeding-and-care plans based on connected-body sensor data and movement tracking, aimed at detecting illnesses early and providing each animal with its optimal feed and medicine mix to maximize growth

Autonomous farming machinery - Self-operated machinery and robots able to perform targeted interventions based on connected-sensor data, GPS data, and imagery analysis, aimed at optimizing resource usage, reducing labor requirements, and boosting yield through more precise and individualized interventions

Smart-building and equipment management - Prescriptive maintenance and real-time environmental adjustments, aimed at improving performance and extending useful life of farm equipment and other assets as well as decreasing risk of mold, fire and other threats



DRONE TECHNOLOGY



Drones aren't a new technology. But thanks to investment and a relaxed regulatory environment, their time has arrived. Drone technology is giving agriculture a high-tech makeover. Here are six ways drones will be used throughout the crop cycle:

- **Soil and field analysis:** By producing precise 3-D maps for early soil analysis, drones can play a role in planning seed planting and gathering data for managing irrigation and nitrogen levels.
- **Planting:** Startups have created drone-planting systems that decrease planting costs by 85 percent. These systems shoot pods with seeds and nutrients into the soil, providing all the nutrients necessary for growing crops.
- **Crop spraying:** Drones can scan the ground, spraying in real time for even coverage. The result: aerial spraying is five times faster with drones than traditional machinery.
- **Crop monitoring:** Inefficient crop monitoring is a huge obstacle. With drones, time-series animations can show the development of a crop and reveal production inefficiencies, enabling better management.
- **Irrigation:** Sensor drones can identify which parts of a field are dry or need improvement.
- **Health assessment:** By scanning a crop using both visible and near-infrared light, drone-carried devices can help track changes in plants and indicate their health—and alert farmers to disease.

UAVs may one day consist of autonomous swarms of drones, collecting data and performing tasks. The biggest obstacle to that becoming a reality is sensors capable of collecting high-quality data and number-crunching software that can make that high-tech dream a reality.

BLOCKCHAIN TECHNOLOGY



Blockchain, the distributed ledger technology behind Bitcoin and other cryptocurrencies, allows for highly secure digital transactions and record keeping. While blockchain has mainly been used in virtual currencies, it can also be applied to other types of transactions, including agricultural ones

Blockchain can reduce inefficiencies and fraud and improve food safety, farmer pay, and transaction times. By improving traceability in supply chains, it can enable regulators to quickly identify the source of contaminated foods and determine the scope of affected products during contamination incidents. Additionally, the technology can reduce waste by detecting bottlenecks in the supply chain contributing to food spoilage.

The transparency of blockchain can also help fight food fraud. As consumer demand for organic, GMO-and antibiotic-free food soars, the news is rife with cases of fraudulent labeling. The smallest transactions— whether at the farm, warehouse, or factory—can be monitored efficiently and communicated across the entire supply chain when paired with IoT technologies, such as sensors and RFID tags. Maersk, a shipping and logistics company, has intra-continent supply chains that involve dozens of personnel and hundreds of interactions. They estimate that blockchain could save them billions by improving efficiencies that reduce fraud and human error.

The benefits of openness extend to all honest market participants. Blockchain technologies can prevent price extortion and delayed payments while simultaneously eliminating middlemen and lowering transaction fees, leading to fairer pricing and helping smallholder farmers capture a larger part of their crop value.

GUIDANCE SYSTEMS



Guidance systems form the generic backbone technology for Precision Agriculture. They can be used by all kinds of equipment e.g. tractors, combine-harvesters, sprayers, planters... and as part of a broad range of different agricultural applications. Guidance systems focus on precise positioning and movement of the machine with the support of a Global Navigation Satellite System (GNSS).

Guidance Systems enable:

- Automatic steering
- Precise machine movement between plant rows
- Precision drilling and sowing
- Precision spraying
- Mechanical weeding
- Field digitalization

Field-mapping allows the creation of a very refined imagery of soil conditions. PA technologies have reached such a granular level that it is now possible to seed different plants simultaneously. For example, it is technically feasible to seed wheat and honey plants on the same ground so that each plant will grow at its own pace and will not impede each other's growth

Guidance technology maximise the machinery drive and substantially reduce overlapping during soil preparation. GPS technologies also enable Precision Harvesting. An American study showed that guidance systems with an accuracy of less than 2.5cm are needed for larger farms while GPS systems with less than 10cm inaccuracy are viable alternative for smaller farms.

The most tangible benefits of Guidance technologies are:

Minimising overlapping by increasing pass-to-pass efficiency leading to lower fuel consumption (up to 10% less fuel consumption)
Reduction of all agricultural inputs (seeds, herbicides, pesticides, fertilizers...)

SENSORS AND IOT



Smart farms will have sensors embedded throughout every stage of the farming process, and on every piece of equipment. Sensors set up across the fields will collect data on light levels, soil conditions, irrigation, air quality and weather. Teams of robots will traverse the fields and work autonomously to respond to the needs of crops, and perform weeding, watering, pruning and harvesting functions guided by their own collection of sensors, navigation and crop data.

Variable rate technologies (VRT) or variable rate applications (VRA) have features that allow to vary the rate of the application to the specific needs of the plants, which depends for instance from the yield variability, within the same field.

VRA technologies are mostly used for spraying:

- Water
- Pesticides
- Herbicides
- Fungicides
- Inorganic and manure fertilizers

Nutrient sensing technologies (NST) automatically control the desired nutrient application rates on the go as accurately as never before.

- More precise application of both organic and mineral fertilizer
- Optimization of nutrient balance during complete growing season
- Real time information on supplied, received- and applied nutrients
- Manure applied based on actual NPK values (kg/ha) i/o volume (m³/ha)
- Variability of manure nutrient ingredient contents fully compensated
- Easier & better agronomic decision support & documentation
- Maximize crop yield potential with environmental protection
- More sustainable crop production & soil fertility management

AUTONOMOUS ROBOTIC LABOR



Replacing human labor with automation is growing across multiple industries, and agriculture is no exception. Most aspects of farming are exceptionally labor-intensive, with much of that labor comprised of repetitive and standardized tasks—an ideal niche for robotics and automation.

this new wave of smart equipment makes it possible to produce more and higher quality food with less manpower.

- Autonomous Tractors
- Precision Seeding
- Automatic Watering and Irrigation
- Weeding and Crop Maintenance

OUTDOOR CROP MODELS



Minimizing environmental effects is a key benefit. Compact portable weather station with combined sensors provide basic weather monitoring.

- Temperature
- humidity
- wind
- dew
- rainfall
- lightning and solar radiation

Optical Sensors(soil) – Dielectric soil moisture

Airflow Sensors – soil air permeability

Electrochemical Sensors – pH and nutrient ions/chemical levels

Mechanical Sensors – soil compaction

Tensiometers – force used by roots

REMOTE CONNECTIVITY



LEO (low earth orbit) satellite broadband internet is essentially defined by its own name, meaning that your regular internet connection is made possible using satellites; Starlink satellites with end to end encryption available in the very near future expected prior to 2021 planting

Satellite, Drone and IoT based solutions at this point are focused on outdoor field Grain Farming... barley, corn, oat, soybean and wheat albeit vertical indoor farming vegetables therein empty retail spaces in the city and last mile delivery is strict to our radar and focus post outdoor planting in 2021.

OUTDOOR YIELD MODELS



Yield monitoring, yield mapping

Optical surveys for plant health and coloration

Optical weed mapping

Salinity mapping

Guidance systems


Computer Vision – growth/health visibility, weed detect/control, pest mitigation

Field/terrain mapping - planning, geofencing, geomapping

Smartphone/Apps - Apps with images, locations and subsequent insights.

Images can detect diseases, nutrient requirements, soil health, leaf area index, ripeness, weed and pest anomalies

Robotics - sow, precise fertilizer control, weed control

A man with grey hair, wearing a dark blue baseball cap and a plaid shirt, is seen from the back, looking towards the right. He is holding a tablet computer in his hands. The background is a blurred field of tall grass under a warm, golden light, suggesting a sunset or sunrise. The overall mood is one of contemplation and connection between nature and technology.

“ ONE OF THE OLDEST INDUSTRIES MUST EMBRACE A DIGITAL, CONNECTIVITY FUELED TRANSFORMATION IN ORDER TO OVERCOME INCREASING DEMAND AND SEVERAL DISRUPTIVE FORCES.”



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TRANSFORMATION THAT MATTERS



AI Blockchain Service has been the partner that farmers turn to when transformation matters most. What matters to farmers has changed over the years, and so have we.

For years, our work was about strategic advice that would help clients solve big problems and make great decisions. This remains at the heart of what we do, but today our clients want more. They are asking us to help create change that matters.

So now we partner with our clients from the field to the front line and everywhere in between to transform how they work, integrate technology where it matters most, and help farmers develop the capabilities they need to embed and sustain these changes.

We now bring expertise in transformation, digital, and capability building—three mutually reinforcing ingredients for lasting change—in every project. We have acquired firms in areas from analytics to infrastructure design, while welcoming dozens of experts with diverse backgrounds into our network.

Almost half of our projects today include digital and design. Soon they will be embedded into almost everything we do. We have helped thousands of people build new skills, as part of supporting organizations around the world to transform the way they work.

Meanwhile, some things never change. Our mission, our values, our commitment to improve society, our strategic work, and the counsel we provide to farmers remain vital in each transformation journey with clients and foundational to every change we ourselves undergo.

All of this is what sets AIBlockchain apart as a partner to our clients: the best of old and new. We combine the skills and values that have shaped our profession with technical know-how and expertise to make change happen.

I hope this brochure provides a clear picture of what we do as well as who we are: a global partnership dedicated to helping our clients create change that matters.

Sincerely,

Steven Gare
C.E.O. AI Blockchain Service
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CONTACT US

The global demand for food is growing rapidly. Responsible and intensive food production will only remain possible if producers can achieve a higher, safer output using a lower labour input. This makes advanced technology for precision crop and livestock farming indispensable. AIBlockchain sees its role as the pioneer to provide food producers with this capability.

Do you want a farm in top condition? Feel free to contact us. We are happy to help you!

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ABOUT AI BLOCKCHAIN SERVICE

We are AI Blockchain Service, one of the London Ontario's leading digital technologies corporations. We design intelligent, cost-effective and intuitive transformation applications that help enhance the business processes for the agriculture sectors as well as create new revenue streams for start-ups and established businesses alike.

We strive to become the world's leading blockchain research & consulting organization by studying the public blockchain space rigorously with a focus on cryptoeconomics, global macro trends and industry intelligence systems. Our mission is to develop the highest quality of intelligence, analysis & education around these topics with an eventual focus on creation of tools and ecosystem to drive Blockchain technology's positive impact on your business. Blockchain, together with artificial intelligence, machine learning, robotics, and virtual and augmented reality, have the potential to deliver disruptive outcomes and reshape digital business in 2021.

AIBlockchain Bridge helps clients leverage connected and mobile devices; extract insights from data using analytics; and enrich end customer experiences and interactions, delivering tangible results from the virtual world and driving growth. Learn more about AIBlockchain Bridge at www.aiblockchainservice.ca