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Raising the Steaks

RFID in Cattle Tags

Introduction

With an increase in population, there has been an increase in demand of food, in response the need for farmers to track large quantities of cattle has become an issue. Farmers need a way to keep track of their growing herds and their health status. Radio frequency identification (RFID) has evolved into a cheaper technology than it was 45 years ago. RFID is a method of identification of an object through radio waves. Stored information on a RFID chip is send by radio waves from an antenna to a receiver. The receiver translates the radio waves into digital information that can be read by a computer [1]. There are international standards (ISO 11784, ISO 11785, and ISO 14223) that regulate RFID protocols to ensure data is interpretable. This paper reviews the applications and technologies currently used in cattle tags today.

Applications of RFID in Cattle Tags

On the Market Today

Currently, on the market, RFID tags are providing information about the animals all the way back to their origins making the food industry know how healthy a cow is [2]. One of the top RFID cattle tag brands on the market today is the Allflex tags. Allflex has two main types of RFID tags: the half-duplex High Performance Ultra Tag and full-duplex Lightweight Ultra Bovine Tag. Each tag is circular and has the option of also being paired with a visual tag. They cost approximately two dollars per tag [3].

Half-duplex tag

The half-duplex (HDX) tag communicates with the readers by sending a signal and waiting for a response. Inside the chip a capacitance is being charged as magnetic pulses are being sent from the reader. Once the capacitance is fully charged the RFID chip begins to send data until the capacitance is fully gone, signaling complete transfer of data. Complying with the International Standards (ISO) for RFID, this HDX tag can transmit signals up to 100cm at 134.2 kHz [4].

Full-duplex tag

The full-duplex (FDX) tag is able to communicate continuously both transmitting and receiving data at the same time up to 75 cm at 134.2 kHz [5]. The FDX tag does not discharge its capacitance, there is a continuous capacitance in the RFID chip in order to continually be able to transmit and receive data simultaneously. Both the HDX and FDX tags are passive, meaning they do not run off a battery, and are

smaller tags, creating them to operate at lower frequencies and have a smaller read range. Another big vendor for these tags is Y-tex, whom have similar pricing and specifications [1].

Interfacing with RFID Cattle Tags

Hardware and Software Interfacing

With an RFID reader, the farmers will be able to successfully receive data from the cattle tag. Current readers cost anywhere between $900 and $1,400 [3]. These readers can perform data collection only on HDX only, FDX only or both simultaneously. Allflex has a stick reader that is able to read up to 42 cm and comes with an LCD screen for visual hand held information. Software is also available to manage the cattle. Ranch Manager: Cattle Edition requires a one-time fee for the download and allows access to the software through a smart phone application, allowing portability and convenience [6]. Other programs, like CattleMax, provide monthly subscriptions.

Future

With the growing demand of food, cattle sizes are steadily increasing, causing farmers to struggle with management of their herd. RFID has become the system of farms of the future. Michigan has already implemented a mandatory RFID tagging system for all cattle [7]. Texas Instruments has already developed the smallest HDX RFID chip on the market at 12mm x 2.12mm [8]. Although this chip is small, improvements on readable distance need to be implemented because the small chip is not currently capable of creating strong, high frequency signals. Companies are striving to increase readability distance without compromising the size of the tag and signal strength.

References

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