Cattle Smuggling/ Theft Control System

1. Problem Statement

"**Cattle Smuggling: A Dangerous, Illegal and Highly Profitable Trade Between India And Bangladesh**". (source- International Business News).
The problem has been there for years in the eastern borders of India. Cattle smuggling has been a major problem in those regions where around 25000 cows were smuggled across border every day. On that around half the cows were stolen from their owners. The loss that the farming industry faces because of this is around 2 Billion rupees. The theft of cattle from their owners has been caused because of the sheer number of cattle's they manage and the lack of proper security on their property. There are efforts taken by the government to reduce thefts and smuggling in the parts by initiating think tanks. This creates a market for a proper cattle security system. The below news report proves our point.

(Source: The Telegraph Calcutta, India, on May 20th 2016)
"**Cow smuggling** has been taking place for many years now... I congratulate BSF jawans for bringing down the numbers from 23 lakhs to 3-3.5 lakh now. I would like to exhort the jawans and officers of the BSF that in order to stop cow smuggling, we will have to be more alert and vigilant. This has to stop," Rajnath said at a BSF event at Vigyan Bhavan in the capital.
The home ministry had also written to state governments on cow smuggling, he said.
Rajnath said the ministry was planning to create a national "think tank" that would work to ensure India's land borders are "absolutely safe" and "foolproof"."

2. Literature Review

http://www.icar.org/cork_2012/Manuscripts/Published/Rao.pdf

"Electronic Identification and Management System for Livestock with Ownership Interface, e-Governance and Global Supply Chain Traceability for Products of Animal Origin"

3. Existing solutions

3.1 Theft fence (using internet and Wi-fi)

- Detect the physiological condition of each animal
- Real time reports delivered to a mobile device
- Identifying any unusual cattle behavior
- Can operate in areas with or without cellular coverage

(Source: cattle-watch.com)

3.2 Cattle finder application (using internet)

1. 50g receiver collects ear tag transmission from up to 200m
2. Bluetooth connectivity between the receiver and a smartphone
3. Easy to use Graphical User Interface.
4. Dedicated counting application for smartphones
5. Able to be used in conjunction with a drone to automate counting

(Source: cattle-watch.com)

3.3 Anti-Theft and Smuggling measure in India:

1. Life stock ID system
2. Traceability using RFID tags

4. Proposed Solution:

The major issue that we focus on is cattle thieving and smuggling which leaves us with two major problems.

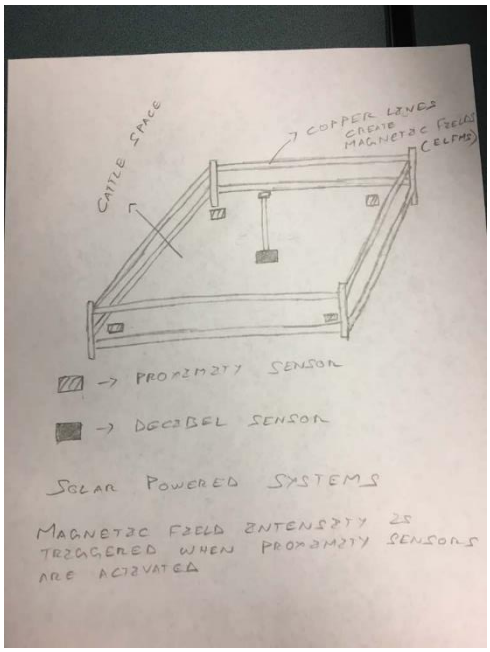
1. Tracking the activity of cattle's
2. Preventing them from getting stolen from the farms

In our solution, we used a smart cattle tracking and theft prevention system which involves the use of IoT, magnetic and solar powered system.

The sensors we propose to use are

1. Proximity sensor
2. Decibel Sensor

The solution involves using a proximity/motion sensor which is connected via Wi-Fi modem to the farmer's smartphone. When the cattle pass through the sensor fence it gives an alert to the farmer through a text message or an alarm.



The decibel sensor allows the farmer to monitor any unexpected or violent behavior of the cattle by sensing the frequency variation of the cattle's voice or cow bell. The threshold of the decibel sensor is set in such a way that whenever the cow pitch/vibration of the cow bell exceed its normal day to day pitch/vibration level, the sensor gives an alert. The sensor can also be used to monitor cattle's health.

The magnetic field enabled fences are used to prevent the cattle's from straying out of the fences. As some recent studies, has suggested that cattle tend to stay out of magnetic field areas.

5. Advantages over the existing solution

1. Doesn't require a separate sensor to monitor individual cows.
2. Well suited for small farmers.
3. No physical harm to the cows.
4. Cost effective.
5. Can be used during herding.

6. Persona

This product is focused on ranchers, farmers who are trying to use new low cost ways to track and monitor their cattle. Overall cost of the product would be very less so as the maintenance of it. The overall potential attribute to the product is that it can be used either in fence type or open land.

7. **Attributes**
    a. Cost
    b. Ease of use
    c. Power Supply
    d. Size of the farm
    e. Low usage of Internet

8. **Pitch**

    IoT and biological cattle control methods.