

Implementation of Artificial Intelligence techniques for increasing Revenue of the dairy farming industry

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Abstract

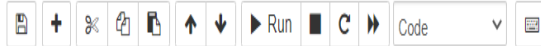
In this report, I have proposed using artificial intelligence to improve the sales and revenue generation of the dairy farming industry. Due to lockdown, most of the businesses had a negative impact and their sales are also lowered. 80% of the milk production comes under unorganized sector and only 20% is for organized sector. These businesses are mostly dependent on sales for their livelihood; they need to be looked upon and provided with some modern techniques to boost their sales. The use of AI in the livestock industry will boost their sales. This use of AI service will boost the customer purchase behaviours for farmers and also will help to achieve large production from this industry.

1. Problem Statement

The problem statement is to apply artificial intelligence to improve production in the livestock industry. Nowadays people are getting more aware of their health. Since almost 80% of the dairy industry comes under the unorganized sector, it is the need of an hour to solve the problem of this industry. I hope to create a service that can solve the problem of the dairy industry and help to increase their revenue.

2. Market/Business needs Assessment

As we know 80% of the dairy industry comes under the unorganized sector. 70% urban and 30% rural milk does not meet the standards as per FSSAI. Livestock owners face the problem of animal health, lower milk productivity and facing problems in claiming the insurance of animals, breeding of animals, trading of milch animals, also the problem of milk wastage. Therefore, by using AI technique, we aim to provide small businesses with useful insights from the available data and ways to generate more revenue.



```
In [1]: import pandas as pd
import numpy as np
from sklearn import linear_model
```

```
In [5]: df = pd.read_excel(r"C:\Users\User\Desktop\ML Internship\Dairy farm dataset.xlsx")
```

Below values are in 1000's

```
In [6]: df
```

Out[6]:

	Year	Milk_Production
0	2000	81654
1	2001	84406
2	2002	86159
3	2003	92484
4	2004	97066
5	2005	102580
6	2006	107934
7	2007	112935
8	2008	117936
9	2009	122937
10	2010	127938
11	2011	132939
12	2012	137940
13	2013	142941
14	2014	155481
15	2015	160001
16	2016	165404
17	2017	176347
18	2018	187749

```
In [8]: reg = linear_model.LinearRegression()  
reg.fit(df[['Year']],df.Milk_Production)
```

```
Out[8]: LinearRegression()
```

```
In [9]: reg.predict([[2030]])
```

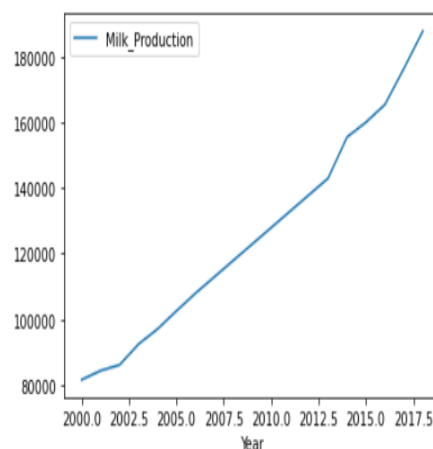
```
Out[9]: array([245444.94210526])
```

```
In [10]: import matplotlib.pyplot as plt
```

```
In [11]: %matplotlib inline
```

```
In [12]: df.plot(x = 'Year', y = 'Milk_Production')
```

```
Out[12]: <AxesSubplot:xlabel='Year'>
```



As from this we get to know that milk production will be increased by almost 50% in next 10 years hence to make it 100% we have to use modern AI techniques.

Target Specification

The proposed service will provide the farmers and the livestock owners with some techniques so that their sales boost up and they no longer have to go through an economic crisis. It will suggest they to use AI techniques to monitor cows and buffalo to detect external health problems, use neck collars to monitor the entire health of milch animals and will help to collect data of the animals. This will also help to get the best price will trading the cattle and maintaining good relations with the insurance companies. This all will help to increase the revenue of farmers and livestock owners.

3. External search

The sources I have used as a reference for analyzing the need for such a system for the dairy farming industry are mentioned below:

- How AI can help Indian dairy farmers
- Importance of Artificial Insemination in Dairy Farming
- Dairy farming and partnering with AI systems
- A prognostic model to predict the success of artificial insemination in dairy cows based on readily available data

4.1 Benchmarking

Many companies like Smart Dairy Inside, ZEPL, Agri Smart, Pharma Robotics are using these AI techniques to make dairy farming smart and to increase milk production. Also, other products from milk can be produced which will boost the food processing industry. This will help to boost the white revolution in India.

4.2 Applicable patents

- Patent 1 - Aggregating device and method for managing a herd of freely walking animals
- Patent 2 – Regulation of productive efficiency of agricultural animals

There are a lot of patents that can be looked upon, but since these two are related to most of the applications of modern dairy farming hence I have mentioned them. The first patent is about managing cattle without a fence and there is a collar around their neck so that all data can be collected about the animal, its total health data, and also location of cattle can be determined and it is not harmful to the animals. The second patent is about artificial insemination of cattle to improve the quality of breeding. It is cost-effective as no need for maintenance of breeding bulls. Natural mating can also transmit venereal diseases. The semen of the superior bull can be preserved even after the death of that bull.

4.3 Applicable constraints

- Data collection from livestock owners
- Continuous data collection and maintenance from every animal
- Lack of technical knowledge to the farmers or farm owners
- Convincing the livestock owners to implement the system in their farm
- Skilled labour is required

4.4 Applicable regulations

- Gov regulation for dairy farming
- Antitrust Regulation
- Animal Insurance claim regulation
- Employment Laws
- Regulation against false technologies

5. Business opportunities

Since the above techniques have been used by large corporate dairy farms they can also be used by small scale farms and dairy farmers. Therefore this service is a great chance for business opportunities. Dairy farmers can opt for this service as it will increase their revenue and also milk production. Hence this inclination of farmers toward the technology is thus a fairly great business opportunity for service providers like us.

6. Final Product prototype

The final product is a service that provides dairy farmers and livestock owners to increase the productivity of milk, maintain the health of milch animals, produce a healthy generation of the cattle by artificial insemination. This overall will increase the revenue of dairy farmers and also the quality and quantity of milk products in the market. This service implements Artificial Intelligence techniques on datasets collected from the various cattle shed and livestock owners.

- Use of Computer Vision-Based Lameness Detection for Dairy Cows to monitor the health
- Use of machine vision to detect whether the cattle have subclinical mastitis using the image of its udder
- Use of IOT device which will give Body Conditioning Score (BCS) by taking images from 3 different angles
- We can use an IoT device to monitor the entire health data of cattle so then it can help while trading of cattle and both buyers and sellers can be profitable.
- We can use neck collar to gather data from livestock animals
- Artificial Insemination can be done on cattle so that we can get a quality breed of cattle and also stop the spread of diseases

- All this will improve the revenue of dairy farmers and increase in production of milk which eventually boost the white revolution
- Random Forest, Artificial Neural Network, and Convolutional Neural Network models will be used in this system

7. Conclusion

More and more organizations are discovering ways of using AI to increase the revenue from the dairy farming industry. The introduction of this technology in small dairy farms or by dairy farmers will be a great business opportunity. I have hence proposed the application of this technique for small dairy farms. As I know this is not a full-fledged plan, but with a considerable amount of work and effort, it seems achievable.