Final Report

Till the Cows Come Home Again

Team #35

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Executive Summary:

When our team was thinking about what our project should be about, we decided to do a revamped version of our project from the previous year. The project is called, “Till the Cows Come Home Again”, since it is an updated version of last year’s project.

We came across a problem that most livestock producers have in common with each other. That problem is the huge amount of time spent protecting their animals when those animals are about to give birth. Farmers and ranchers always hope that their livestock will be ok, healthy with nothing wrong at all, and that all goes smoothly. To check on this, they regularly drive through and check on animals. When they have pregnant animals, there is a chance that the ‘momma’ cow has problems when they are not around to help.

Timing issues are very common due to all the conditions that are possible when a pregnant animal is present. Livestock producers are always concerned when any one animal gets sick, but pregnant animals are even more important since they help create profits for the operation. One way that some producers solve this problem is by taking the pregnant animal and putting it in a barn. However, our farms are too large for this. The animal must by physically checked on in the pasture. This takes lots of time. Another possibility is the use of ‘trackers’ on the cows to alert producers about when problems arise, and give animals’ location.

From the results on the previous year of this project, we have shown that there is a way that farmers and ranchers can track their animals’ health without constantly checking on that animal in particular. We have shown how the health of the animals can be tracked by the tracker. The use of this type of device can save producers time, help them quickly find animals in need of help, and increase survival rates and thus actual farm profits. We have added a better representation of the times necessary due to possible birthing complications. This should make our model even more realistic.

Problem Statement:

There are 3 main problems that livestock producers tend to have every new year. Those problems are; time issues, profit margins, and protecting their animals’ health.

Time issues are the number one cause of losing animals because, farmers and ranchers don’t really know the condition of their animals. If the animal or animals have a life threatening condition that may cause death to the mother or offspring, and the farmer doesn’t know about it until they show up on the scene and it’s too late, that is a major loss. There must be a way to prevent this from happening without having to constantly spend time physically checking animals. This is especially true when pregnant animals leave the herd and hide as their due date approaches. It is even harder and more time consuming for the producer to find them.

The next issue is profit increase. If time management is an issue, profits then become an issue. As said before, if a farmer doesn’t know that one of his animals has health issues and gets to the animal and it’s dead, profit is lost. Profits losses are especially high if the animal was a recent show champion or has produced exceptionally good offspring in the past.

The last issue is the ability to save their animals. Normally if a farmer is aware that the cow is going to calf soon, he may do regular checks every day to make sure nothing is wrong. The problem is though that no farmer wants to go out every two hours of the day just to check the expecting animal to make sure that there are no complications whatsoever even though problems can happen at any time.

Seeing how these issues can cause great concern, there has to be a way to cut time in half to when farmers actually go out and see how their herd is doing. We propose that there should be a trend to get farmers and ranchers of all kinds to adopt the use of trackers to increase profits, save their animals, and fix timing issues.

The way we have shown it is possible to save valuable time from constantly having to search and re-search the pasture is by using a tracker to show the producers the location and current condition of animals. When the biometric monitors show increases in temperature and stress levels, this alerts the rancher that an animal might soon need assistance. These two indicators are the easiest and cheapest to monitor, while still having consistent reliable results.

There are some other factors that could be put into play. For example, the weather. Since most producers want calves in the spring time, there is a chance that spring might bring a snowstorm. Depending on where you are, this could be an accident waiting to happen. The producer might slip and slide and have dangerous travel. When the producer finally gets there, the animal has a higher need for care due to the poor weather. We factored weather out, as it is something farmers have to take in stride daily.

Problem Solution:

As mentioned previously, we have made and revised a NetLogo model of a tracker system to help our agriculturalists save valuable time finding the pregnant animals and making sure everything is okay with them. We also included a representation of the amounts of time needed for assistance. This time ranges from hours to successfully pull a calf during a difficult delivery to just a few minutes when a natural birth goes smoothly.

We have worked hard to model this using NetLogo with real life scenarios to make the model look as realistic as possible with the main variable of time to show producers the benefits of using trackers. Our program has the following:

A map showing:

Pasture- the setting of a cattle habitat

Brush and Low Spots- Possible spots where the pregnant cow would most likely

go to give birth. There are spots that the producer can use to see if there are any cattle, within (a ledge or hill).

Watering hole- Daily gathering spot for livestock and where agent starts searching for all

the animals in a pasture.

Cattle with various colors-

Brown- the cow isn’t pregnant and is healthy.

Red- the cow is pregnant and possibly needs assistance.

Black- the calf was delivered safely and momma cow is ok.

Truck- The truck is simulating a farmer on a regular day going out into the pasture and

checking on his cattle. On the 1 setting, no tracker, the farmer goes to the watering hole and starts search. If not all cows are present, he goes to the canyon and on the ledge, sees if there are any cattle and if one is pregnant and needs help. Once that is done, the farmer goes to the brushy spot, on the hill, and sees if there are any cows there. Then after doing his job, the farmer goes back to the “gate” simulated by the starting point as he enters the pasture.

Sliders- One slider controls the 1 and 2 settings, 1 equals without tracker, 2 equals with

tracker. 1 and 2 setting- 1 setting is the model showing how farmers and ranchers use up the ‘valuable’ time needed to assist the animals. 2 setting is how the tracker will be able to cut the regular time in half.

Another slider controls the herd size, set to show 40 head of cattle.

Tables-

2 tables show the amount of time and total time the farmer takes on the settings of ‘1’ and ‘2’ to simulate the amount of time actually taken on a checking day.

3 tables show the count tallies of the cattle. The tables are labeled; number in pasture,

number in canyon, and number in brush.

One table shows how many of the cows are pregnant. Right now, only one is supposed

to be pregnant.

To make this model required a large amount of research. All the research we have conducted has come from websites and interviews with numerous producers around. In an interview with a dairy worker, Ronny Jack Clark, we found out that dairies do use trackers, but not in the way we are trying to simulate. They mainly use trackers for health reasons, and to monitor feed and milk levels.

Sid Strebeck, a livestock producer, said that this tracker doesn’t have to be for cattle. It can be for all animals, as in livestock wise. He even said we could test a tracker on his herd.

In another interview with a state FFA officer, Denny Atchely, we were told that normally when he searches his pastures, it takes him an hour. Then he said it also depends on the terrain other producers have on their ranches. He said his pasture is pretty smooth. He even gave us feedback on how much he liked the project. He even said that he thinks this could become something useful.

There was one interview that was really cool. Chester Nimitz is a cattle rancher that has over 500 cows, but separate herds. He has three different ranches within miles of each other in different counties. He makes it where the cows calve in the fall and spring. He tracks them, but also with keeping tabs on the cows and in his mind too. He knows when each cow is supposed to calve, or supposedly calve, from the time he begins breeding to the actual birthdate of the calve to be born.

The Grau family in Grady, New Mexico tracks how many cows there are in their pasture by seeing how many come when “feeding time” happens. If there are stragglers, Mr. Grau will go and find them. Mrs. Grau said, “The cows are trained now to know when feeding time is and will come when they hear the feed being put in the feeders.”

We have talked to the local vet, Logan Potts, about what he needs to see to know when the cow needs assistance and what the average time lengths are for the various levels of care are for a normal healthy cow.

Validation:

We based our results on what Chester Nimitz told us about how he tracks his herds. He keeps track of the herds by keeping “tabs” on his animals. He knows exactly when the cows started to get bred to when the cow gives birth. He also said that it takes him 3-5 hours to search all his pastures, with the help he has at his ranches. He also knows which calf belongs to which sire and dam based on the ear tag the dam and sire has. He can also tell based on what the calf looks like who the mother (dam) and the father/bull (sire) is. We also said that we are trying to make our model as real as possible for this to become something that could actually be done. By talking to livestock producers in the area and seeing how pastures are around here in New Mexico, we now know the possible hiding spots and where cows would most likely go to be undisturbed to calve.

The producers we have talked to and shown our project to have been very helpful in giving us advice and assistance in making our numbers more realistic.

Conclusion:

In conclusion, we hope to prove that by using this tracker, time will be saved and cut in half, the producers will be able to save more animals, and we hope that the farmers and ranchers will see the tracker as a useful product and want to use this for their ranches.

Time will be cut in half because the tracker will be able to show the cow’s location and the vitals of the cow to show the symptom indicating the start of a need for checking the animal before it is possibly too late. Since the tracker will also show the vital signs of each cow, farmers will be happy to see that there are healthy cows around and that he doesn’t have to worry. Less stress on producers is hard to measure, but it is helpful.

By using the tracker, farmers and ranchers will be able to see that time is manageable. Animals are valuable, and saving them is important for not only the producer, but also for other people in the livestock industry.

The tracker will be helpful because there will be less stress on the producers. Producers of all animals always worry that the animals they produce aren’t going to be good enough and need to be reassured that anything is possible through technology and science.

By using behavior space, we were able to show multiple runs that trackers were saving time. On the setting without the tracker, we saw that time was used in huge amounts while on the other setting with the tracker, time was cut by nearly 40% of what the first setting showed.

Achievements:

We have found a way to cut time in half so livestock producers can stay less stressed and not have to go out to their pasture as often to check on their herd. By doing a model on NetLogo, we have been able to simulate this to make a realistic setting of what a tracker would actually be doing. We have also gotten producers to work with us on making the model real. We are attempting to make a prototype of an actual tracker.

References:

Interviews:

Personal Interview: Sid Strebeck – Livestock Producer, Grady and Clovis, NM. Fall 2019

Personal Interview: Denny Atchley – New Mexico FFA Association Officer, Las Cruses, NM.

Fall 2019

E-Mail Interview: Chester Nimitz – Livestock Producer, Wichita Falls, TX. Winter 2019

E-Mail Interview: Cheryl Grau – Livestock Producer, Grady, NM. Winter 2019

Personal Interview: Logan Potts – DVM, Clovis Livestock Hospital, Clovis, NM. Spring 2020

Personal Interview: Ronny Jack Clark- Worker, Arrowhead Dairy, Clovis, NM. Winter 2019

We hope that in the future, a tracker will help farmers and ranchers stay positive and revolutionize how we can help save the many animals that are produced. Thank you for taking the time to learn about our project.