Database Systems Final Report

Bryan Wieschenberg, Tra-mi Cao, Praneel Pothukanuri

Our project aimed to provide meaningful insights into multiple aspects of goats health by analyzing birth weight, dam birthing age, comparing kid differences between first-year and older dams, and an assessment of birth weight differences between vaccinated and unvaccinated dams. By leveraging the vast amount of data in the provided goat databases, this project solves many important research questions involving the health of goats, allowing stakeholders to make well-informed decisions within the goat farming industry. Our project will also allow stakeholders to find correlations between healthy and unhealthy birth weights, and help identify issues regarding the resulting birth weights of goat offspring. Our research ultimately synthesized a viable method of comparisons across the large dataset we were given to counteract any possible negative correlations that were causing birthweights in an unhealthy weight range.

Ensuring that we can optimize goat health at birth is extremely important for the sustainability of our planet, especially as the population continues to increase exponentially. With this increase, resources become fewer and the search for alternatives comes in higher demand, so if we can optimize goat farms to yield more and more successful new generations, we can solve many of the key issues that other farm animals like cows bring, since goats are easily breedable, efficiently use land, and can be used to create a wide array of food products commonly used in society.

Within the given databases, there are several attributes we used during our project to display meaningful information to the user for whatever topic they wish to further research. These attributes include animal_id, tag, sex, dob, overall_adg, and dam, within the Animal table, animal_id, trait_code, alpha_value, and when_measured, within the SessionAnimalTrait table, and animal_id, activity_code, and when_measured, within the SessionAnimalActivity table. Therefore, in our final project schema, we simplified the full tables to reflect only these necessary attributes, which you can see in our final schema below:

Goat

animal_id	tag	sex	dob	overall_adg	dam

Traits

animal_id	trait_code	alpha_value	when_measured

Vaccines

animal_id	activity_code	when_measured

Using this schema, we created the necessary views and queries within PostgreSQL to answer the seven main questions of our stakeholder topic, as well as our personal topic. Our stakeholder topic was answering a variety of questions involving birth weight and correlations within them, and our personal topic was finding out if there was a correlation between vaccinated versus unvaccinated dams and their kid's birth weights. The seven questions we sought to answer were:

1. Birth weight comparisons for each year the data is available (large enough data is only between 2013-2023)
2. Lowest average, median average, high average and overall average
3. The average age of the does that gave birth that year.
4. Average wt. of twins, triplets and singles – comparison.
5. Birth weight differences between first year moms and older moms.
6. Kid number differences between first time moms and older moms.
7. Vaccinated vs unvaccinated mother differences of kid birth weights

In our final project website, we answered these questions using our views, and were able to allow extra user customization through input, which would be passed into specialized queries, allowing the user to select certain years and goat tags for sections where this input is appropriate. Originally, our schema was far too complex to allow such refined user input, but upon simplifying the schema into its final state, we now have far more user customizability, allowing the stakeholders to investigate certain years to find correlations or find certain information about specific goats if they so desire.

The research questions within our stakeholder topic encompass many aspects of goat breeding and management, and use our project to discover positive or negative correlations between birth weights. Addressing these critical factors are extremely important to the sustainability and future of the goat farm.

This project gives the farmers the tools necessary to figure out what makes for the ideal dam in terms of genetics, vaccines, age, and many other factors. In turn, this will help to optimize future goat health, as well as the production of quality goat meat in

the event that goats are sold for their meat. This will make it an accessible, sustainable, and price-efficient food source within the market, benefiting everyone involved.

Here is our final project demonstration: https://youtu.be/YdKx_sPWY0M.