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CSC 315 Computer Databases

Professor DeGood

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Project Report

Throughout the semester, our group was tasked with designing, creating, and implementing two topic-based projects using PSQL and other tools to aid our client, Silvies Valley Ranch. Our stakeholder topic was to create a project that would see if birth weight correlated to sale, weaning, winter, or other important goat weights. We decided to do this by averaging the weights for each birth weight of goats in the database, and this way the client could compare the new baby goat's weights overtime to the averages present in the table. We accomplished this by creating SQL queries to find these values for each of the birth weights, and displayed it in a user-friendly GUI so the stakeholder can see these values. For our personal project, we wanted to make it so the stakeholder could see which dams and sires produce desired traits. We specifically focused on which dams and sires produced goats that had large birthweights. We did this by creating SQL queries to show a list of dams and sire tags that produce these desired traits. For the constraints of this project, this is the only desired trait we focused on, but our database and application is built to be able to support a table of any desired trait the client wants, we would just need to edit the SQL commands. This information was also presented in a user-friendly GUI.

In the beginning of our project we first created a Database model in LucidChart. This gave us the ability to see which data from the database we were given that we were going to use, and which we did not need to use. We decided to have our application center the "Animal" entity

type as this had the most information about weights. We were able to use the other CSV files to connect to “Animal” via foreign keys so we could display the data we wanted. We then began to perform the process of normalization on our data set that we derived from the database. We created views for our database as well so that we could reference a smaller amount of data when doing SQL queries. This boosted our efficiency and made our database more refined. We showed our normalization process, where we normalized the data into 1NF, 2NF, 3NF, and BCNF. 4NF and 5NF were not applicable to our database. By doing this, we were able to gain a better understanding of the interrelations between the attributes, and from this we were able to refine our SQL queries.

We then began the process of actually building the database in the virtual environment. The first step was to populate the database with the data we were given from the stakeholder. We populated the database using CREATE table commands, and dropped the old CSV file tables as they were much larger and contained more information than we needed. We also created the queries that our application would display and use. Jarron took the lead on this, and his work on the views and queries are the backbone of our project. We then began work on a basic GUI so we could connect our front end to the back end. We built off of the presented example of a python flask implementation. The example program was extremely helpful when creating our own, and we used python flask to run our database queries. The client can click buttons in the GUI to see respective queries displayed in a table. We then began to make the GUI good looking and easy to read. We attempted to use some Javascript, as is evident in the HTML files, but found that this was difficult to get working. So, we did our website decoration all in CSS. Adding javascript to make the website just a bit more polished is something we would have wanted to do if we were given the chance to do this project over.

Some challenges we faced were trying to have the website be able to take user input that did not cause security issues. We were given an example of how to accept user inputted SQL, but we wanted to specifically allow the user to input a birth weight and see the average weaning, winter, sale, and other weight categories for that specific birth weight. We found this to be difficult to implement and ultimately were unable to figure it out, so we opted to display all the possible birth weights in a table instead. This is something that we would also attempt again if given the chance to do the project over.

With this, our project was complete. We were able to use the database to create an application where the client can easily view the dams and sires that produce large goats, and which dams have had the most children in an offspring report. We presented the data in a user-friendly GUI. This data will benefit our stakeholder in a variety of ways. The stakeholder will now be able to compare the weight of their new goats to the average weight projections of their old ones. This is beneficial as they can see if the new goat is growing at the same rate as the others in its breed and weight class. This is important as abnormalities in weight growth can indicate whether or not the goat is sick. Abnormally slow or fast weight growth could indicate health concerns, such as tumors or thyroid issues. The stakeholder could then take these goats to get the proper care that they need. This project will also allow the stakeholder to see which dams and sires are producing the most desirable traits. This is important because they can then breed these goats to create stronger, healthier, and more profitable offspring which will only exponentially strengthen the herd of goats in the long run.

Being able to work on a project that will create a positive impact was something that our group very much enjoyed. Goats are much better for the environment than cows are, and their free range nature on the Silvies Valley Ranch is much more environmentally friendly than the

typical cattle CAFO (concentrated animal feeding operation. By providing the client with these tools, it will only make the ranch stronger and more profitable monetarily and environmentally. The success of this ranch may inspire others to take steps towards tackling climate change and convert their ranching operations to center goats instead. Throughout the project, we were not only able to learn valuable skills such as SQL, Github, and python flask, but also about how we can use technology to better our community and world.