Shotgun Pellet Patterns

New Mexico

Supercomputing Challenge

Final Report

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Team 91

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Executive Summary

Our team is going to study the spread of shotgun pellets after being fired from a gun. Spread means how the pellets scatter out after being fired from the shotgun barrel. We are interested in this because we all are involved with hunting and 4H 'Shooting Sports' competitions. Our project will manipulate the number of pellets, amount of gun powder, choke size, and the pellet size. These factors are important to determine the damage done to a target. This would help hunters increase the accuracy of hitting their targets, and bring down game. Too much spread has too few pellets hitting something. Too little spread makes it harder to hit a target, even though it does much more damage when they DO hit.

Problem Statement:

Our project is attempting to discover what the correct choke, powder amounts, and pellet amounts. The variables of our project are powder, target distance, pellet amounts, and choke size. The outcome we are trying to achieve is to increase accuracy and power at the same time. Our information is worthwhile because we are helping hunters acquire valuable information about correct choke, powder amounts, and pellet amounts. We use NetLogo to make an agent based model to represent our project.

Method/ Programing

We intend to help hunters choose the right gun, correct choke, specific gunpowder amounts, and pellet size for any situation they might be in. We made a computer model that shows how the spread of pellets is affected by the variables we have identified. These variables are:

Number of pellets = If you have a lot of pellets you have a more likely chance to hit the target, a small amount has a less likely chance to hit the target.

Amount of gun powder= The amount of gun powder helps by giving the shotgun power that is needed to bring the target down and travel straight.

Choke size= The choke can give a wide spread, wich will have a better chance to hit the target, and a small spread, wich has less likely chance to hit the target.

Pellet size=if you have a large pellet it will have a more likely chance to the target,

while the small pellets will have a less likely chance tom hit the target. Also the larger the pellets the more damage there is and the smaller the pellets less damage.

As the shooter uses different types of these variables, he will discover what is needed for the gun to be able to bring down the target being shot at. This can help the hunter while hunting by letting him have the best equipment for the hunt. The following shows what our program looks like and how we will use it to make our recommendations to any hunters that will use it:

shotgun1 - NetLogo {P:\SCIENCE S	SCIENCE SCIENCE\Supercomputing\Team 92 Shotgun}	
File Edit Tools Zoom Tabs Help		
Interface Info Code		
Edit Delete Add	normal speed Continuous	
clear all	☑ ♦ ♦ ticks: 0	30
load gun		
red hits 19 15		
choke 2		
2		-

All the buttons help us draw the screen, load the gun, shoot, and clear everything on the screen when

done. The choke selection is what helps with the spread of the pellets, then we used two colored target to see how many times each target was hit.

Results and products/ Conclusion/ Achiements/ Validation

The results that we found where that when we put the full choke with the tightest constriction in the muzzle of the shotgun, is that the pellets spread more than the modified and improved. The most likely would spread more than the full and less than the improved cylinder. We saw that the improved cylinder will spread more than the full and modified. And the improved cylinder was bigger and weaker but that meant that the target would be easier to hit than the modified and full but the modified is stronger than the improved. The full is the strongest but is the hardest to make the pellets hit the target. The more powder, the pellets go straighter then less powder toward there target.

Validations

To validate our shotgun we had our parents and grandparents out and shot some shells out of three different chokes and some helpful information. We tested different charges and chokes and their names are the full the modified and the improved cylinder. We found that a shotgun DOES react the way that our model picture did. If the choke is narrow the pellets will go further and will stay closer together. If the choke is wide the pellets will spread more and will have less range. If the pellets are bird shot than they don't fly as far as the buck shot pellets. The smaller the pellets the better the chances are than the buck shot because there's only 41 pellets as the regular shell has about 1000 pellets in it. And you would want to make sure you have the right choke in so you can hit what you are aiming at. Example modified is used for small game like quail dove and rabbits. The full is used for medium games like turkey and wolverines. And the improved cylinder is for little bigger than medium game. The higher amount of gun powder will increase the velocity of the pellets, the accuracy, and the recoil. The lower amount will decrease the velocity of the pellets, accuracy, and recoil. If the gun has to much it will destroy the target, if you have to little it will not bring the target down.

Citations and Acknowledgement

The people that helped with our project are: Alan Daugherty Nelson Hollaway Rusty Roberts James Crowder Bob Byrd Neal Delk