There's One Near You

New Mexico

Supercomputing Challenge

Final Report

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Team Number 87

Melrose High School

Team Members:

Mackenzie Perkins, Victoria Northrup

Teacher(s):

Alan Daugherty

Project Mentor(s):

TJ Boren-Employee

Valerie McDonald-MIT (Manager in Training)

David Marquez-Employee

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Executive Summary

A convenience store is one that makes some basic house hold items easy to get too. It makes for less traveling by the community, instead of going 30 min away, you can get them locally. Also, you don't have to go across a big building floor to get to the item's you need, they are already there in a few steps. Lastly, there are less people, shorter lines, and ideally you can get in and out quicker and easier with your purchases. Our project is about studying the traffic flow of a convenience store.

Allsup's is one of our community's convenience stores. There is always times in the day when the convenience store is so busy, it's hard just to get the items you need and get out as quickly as you can.

I like that we studied a project that deals with a problem that we face every day, in our case the study of traffic flow in a convenience store. It is very important to study this particular topic, because one of the team members works for a local convenience store. The traffic flow of a convenience store has a lot of effects on the people in the store. For Example: When a customer enters the store usually they have a neutral feeling. As the Customer progresses around the store the neutral feeling will start to change, thus when the change starts to happen, and the customer gets the items they need in the store and go to the cash register, depending on the mood change, this will also affect the cashier and the flow of the money (when upset they might miss count the change!).

Statement of Problem

The customer is always right……but are they always? Sometimes yes they are right but when they are upset they really aren't right. Usually a customer comes into a convenience store wanting to get in and get out, so they try to hurry to get out as fast as they can. And as they progress through the store and trying to get the items they need, and if there is another customer taking their time at one of the other customer items on their list, the customer trying to get to the item is going to get very upset. And when

you have an upset customer go to the cash register, he is not only mad but he is less satisfied because he had to wait in line, therefore, this makes the cashier upset. Due to this the cashier will probably be upset because the customer is upset and might miss count his change wrong. So our problem is we are trying to increase a more efficient and a quicker way for a customer to get around the store without making the customer upset.

Description of Method

The description of our method is very simple. We decided to use NetLogo to model this project just because some of us have a feel for this programming software. The way the store is planned out is we set the outline of the store to be white as well as the shelves in the store also. Then we selected one (x,y) coordinate in the each shelve to represent the items on the agents list and gave it a unique color. An agent to represent the customer will have a neutral feeling when they walk into the store. Then the programming will assign each customer a random selection of the items and the agent will then go to that coordinate. Once completed with their list, agents will go to the cash register. The program will also time the agents as soon as they walk through the door, timing how long it takes them to shop. Customer emotions is based on the amount of time and delays while they're shopping. Delays come about when another customer agent is at the station another agent is headed to. This information will all be jotted down on a graph. Also when agent's moods change so will the agent's facial expression.

There are several variables in our program that will affect the shopping and thus the mood changes. These are:

- Aisle width- the smaller the aisle is the longer the customer has to wait, and the wider the aisle is the quick the customer gets their item
- The number of customer in the store- the larger of number of customers in the store the longer the wait at the cash register, but, the smaller amount of customers the smaller the lines.

- The longer the item list- the longer the list the more wait at the cash register, but, the shorter the list the customer will move and get in and out of the store quicker.

Problem

The Idea of this project was originally based on that one of the team member works at Allsup's, and our teacher helped us brain storm since we couldn't come up with a project. We chose this one. Since one of the team member works there. We have based it not only on her experiences at the convenience store but on other employee's experiences to. Due to their point of views we decided to develop a programming making a faster more efficient way of traffic flow in a convenience store.

Our neighborhood convenience store, due to the fact it's the only store in a 15 mile radius that carries what a community member needs on day to day basis. So developing a more efficient way of increasing customer satisfaction will really help our convenience store out immensely.

We believe that Netlogo's environment was the best programming software. Up to date is that we are still trying to figure out some glitches in our programming but as we do have the outline and shelves and initiating spots. We have come to figure out, yes it is a simple project but, it takes a while to figure out how we are going to get agent(s) to move and how the agent's mood will change. So it is a very difficult programming.

Results

Our results match with common sense that if we wait on several things when we are trying to get in and out of the store as quick as possible it is going to make us upset. Faster shopping increases customer satisfaction at one of our local convenience store.

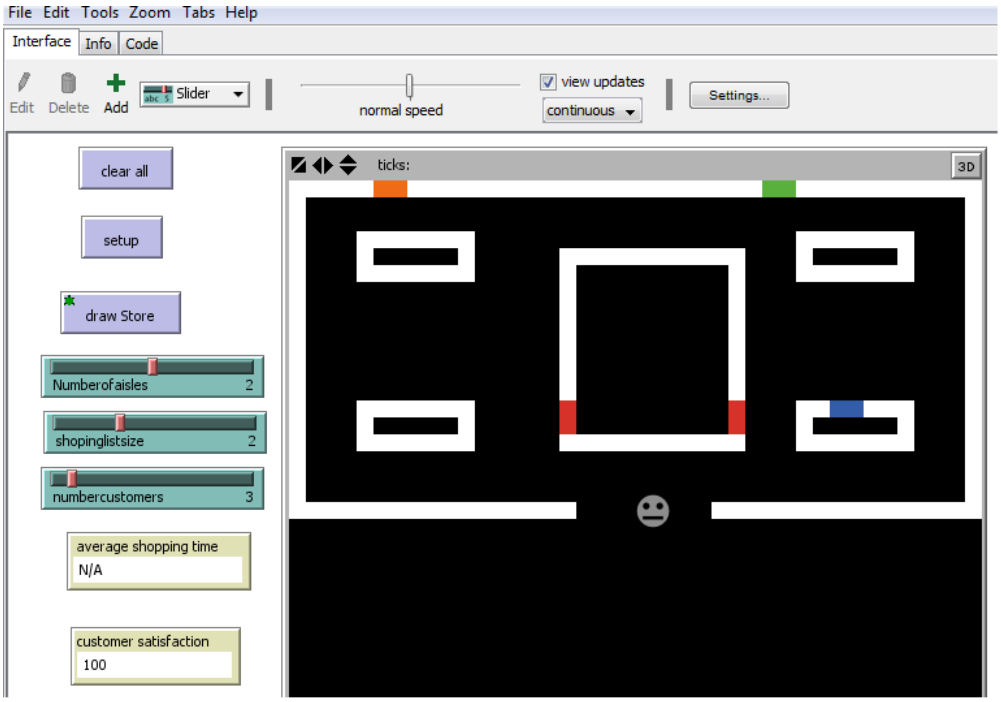
We have figured out it's not only stressful to the customers but also to the clerks as well. If there is an upset customer at the cash register then, it is going to make the clerk upset and thus affecting the cash flow by, the clerk getting upset might miss count the change, giving the customer an extra dollar or less change then the customer needs.

Conclusion

In conclusion we have modeled a convenience store and took data from the agents. But, we have also learned it takes time, effort, and hard work to program this model. It maybe be a simple project but the coding was very difficult to program and understand. And we have also learned that it takes team work and time to get everything together and make it outstanding.

Software

We used Netlogo to program our model. It was fit for programing this particular subject than StarLogo TNG. Also, the Supercomputing Challenge trains us on Netlogo at the beginning of the year. And we had some more experience with Netlogo before so it is understanding to us was it going on.



The picture above show what the program looks like:

- The colored sections represent different items on the customer/agents list; the blue is the candy aisle, green is the milk, orange is the soda fountain, and the red is the cash register.

The button's to the side is what run the program there's:

- Clear all
- Setup
- Draw store- which the turtle draws the outline of the store
- The number of Aisle bar- decides the number of aisles in the store
- The Shopping list bar- decides the number of items on the agents list
- The number of customer slider- decides what number of customers will enter the store.
- The Graphs
    - Average Shopping Time- shows the time it takes the customers to enter and exit the store
    - Customer satisfaction- takes the average satisfaction of the customer due to what time is spent in the store.

Citations/ Acknowledgements

Interviews with Allsup's staff in Melrose, Ft Sumner, and Clovis- Tj Boren (clerk), David Marquez (clerk), Valerie McDonald (MIT), Anna Cortina (Manager), Shelly Coleman (Area Supervisor).

Store Visits- Melrose, Clovis, Ft. Sumner

Interviews with Allsup's Customer's

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