Final Project - Draft

Chace Neuburger

4/27/2022

Intro

In this project I desire to create a fusion of the materials that we have been studying in this class and a pop culture reference.

In order to accomplish these goals, I will use the Death Star attack scene during the Battle of Yavin as seen in Star Wars: A New Hope – Episode 4. There are two scenarios I would like to demonstrate in using the events of this movie scene.

What

In order to accomplish these goals, I will use the Death Star attack scene during the Battle of Yavin as seen in Star Wars: A New Hope – Episode 4. There are two scenarios (described below) I will use to demonstrate concepts that have been learned in this class, and may be taught to other audiences.

Why

Using pop culture references have the positive impact of generating interest in materials that may be otherwise limited or strained at best. It also, has the positive impact of using a well know scenario or scene that allows for the concepts being taught to be more easily digested and understood.

How

First, we as the audience have it described to us before the Death Star attack from Wedge Antilles that the shot required to destroy the Death Star is "... impossible! Even for a computer." to which Luke Skywalker replies "It's not impossible. I used to bullseye womp rats in my T-16 back home, they're not much bigger than two meters." After the battle Han Solo exclaims "Great shot, kid. That was one in a million!" What we can determine from these lines of dialogue is that while not impossible, the shot that Luke took to successfully destroy the Death Star was incredibly difficult and should be expected as an extremely rare event.

Second, I will demonstrate probabilities of survival by incorporating Bayes' Theorem and tree diagrams along the lines of the two squadrons that attacked the Death Star. Red Squadron was comprised strictly of X-Wing's and Gold Squadron was comprised strictly of Y-Wings. Each squadron consists of 12 Starfighters each. I will use this data and the occurrences of the battle in order to demonstrate several scenarios and the probabilities associated with them. Will use RStudio to calculate and display findings.

Body

In order to run this RMarkdown, the following files will need to be downloaded:

DeathStarShot.csv StarfighterSurvival.png

Topics From Class

Topic 1:

Topic 2:

Here we will calculate the probabilities of survival through a few different exercises.

Insert IMAGE

First, let us explore what the chances of survival were regardless of the class of Starfighter flown during the Battle of Yavin.

```
#There were a total of two squadrons, or 24 Starfighters as each squadron is made up of 12 Starfighters

Survival <- 3 / 24

Survival
```

```
## [1] 0.125
```

```
#So we find that the probability of survival was 12.5%.
```

Next, lets compare the difference in probability of survival based upon the class of Starfighter that was being flown:

```
# Of Red Squadron, there were only two survivors. So to calculate the probability of survival across th

XWingSurvival <- 2 / 24

XWingSurvival
```

```
## [1] 0.08333333
```

```
#So we find that the probability of surviving the Battle of Yavin while flying an X-Wing was 8.3%.

#Of Gold Squadron, there was only one survivor:

YWingSurvival <- 1 / 24

YWingSurvival
```

```
## [1] 0.04166667
```

```
#Therefore the probability of survival while flying a Y-Wing was 4.166667%.
```

Let's look at this another way using a tree diagram while using the principles of Bayes' Theorem.

```
#The probability of being shot down in the Rebel fleet was the following:

ShotDown <- 21 / 24
ShotDown
```

```
## [1] 0.875
```

```
#The probability of surviving was:

Surviving <- 3 / 24
Surviving
```

```
## [1] 0.125
```

```
#The probability of being shot down in Red Squadron was:

RedSqdSD <- 10 / 12
RedSqdSD
```

```
## [1] 0.8333333
```

```
#The probability of being shot down in Gold Squadron was:

GoldSqdSD <- 11 / 12
GoldSqdSD
```

```
## [1] 0.9166667
```

```
#The probability of surviving in Red Squadron was:

RedSqdSur <- 2 / 12
RedSqdSur
```

```
## [1] 0.1666667
```

```
#The probability of surving in Gold Squadron was:

GoldSqdSur <- 1 / 12
GoldSqdSur
```

```
## [1] 0.08333333
```

Therefore, we can calculate the following probabilities via a tree diagram in R as such:

Topic 3:

Conclusion