



# Modeling Murders: Following the Yorkshire Ripper

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## Introduction

Peter Sutcliffe, also known as the Yorkshire Ripper, was a prominent serial killer in the 1900s who mainly targeted women from red light districts<sup>1,3</sup>. Our goal was to create a simulation to model how a killer might choose and attack their targets based on a preferred victim type in hopes of locating the killer's home.

## The Model

1. Our model was made in NetLogo.
2. Citizens (green) were assigned victim types with daily schedules. The killer (blue) was assigned a preferred victim type.
3. A "comfort radius" was created so the killer only attacked around his home (between red and light blue circles).
4. The killer could not attack inside buildings or near other living victims.
5. If a victim encountered a dead body (red), they would enter "panic mode" (orange) and run to the police station before resuming their daily schedule.
6. Bodies are 'cleaned up' (yellow) after a half day has passed.

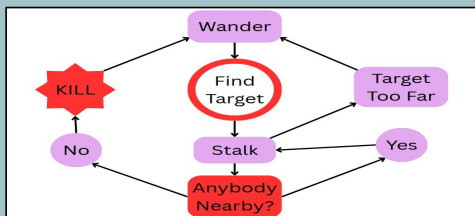


Figure 2: A flowchart representation of the decision-making of the killer.



Figure 1: A visual representation of the simulated model which includes a town map and the people. Buildings are indicated by colored rectangles or house symbols. The town includes a school (orange), police station (violet), entertainment (pink), a market (magenta), and a park (green).

## Results

An estimation for the killer's house was made by finding the centroid of all kill locations, and the accuracy was determined by calculating the Euclidean Distance between the estimation of his home and its true location. As shown in Figure 3, the data leads to an accurate prediction of the killers house.

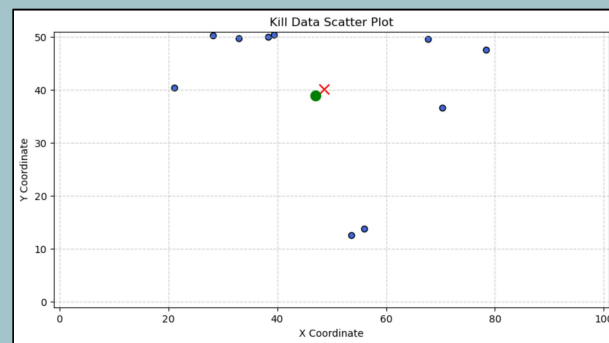


Figure 3: All kill locations (blue) and the estimated house location (red) compared to the true house location (green). This run's euclidean distance between estimation and true location is 1.95 units .

## Discussion

This model is effective at generalizing the location of a killer's home based on the locations of victims, but more work would need to be done to increase the model's accuracy for better predictions (especially on a larger scale).

This model makes some assumptions such as assuming victims do not deviate from their set schedules, the killer won't deviate from their M.O., and that all victims move independently of each other.

## Future Iterations

We would like to calculate the accuracy of the model by taking the average distance of the prediction from the actual location over many runs. Additionally, we'd like to add more intricate citizen routines, areas the killer avoids out of fear of being caught, and having the killer return home after killing.

## Acknowledgements

We are incredibly grateful for the guidance and support of Dr. Kamila Larripa on this model, which was designed for a class project in Mathematical Modeling (MATH 460) at Cal Poly Humboldt.

## References

- <sup>1</sup>Brannen, K. (2000). *The Yorkshire Ripper*. The Yorkshire Ripper Website. Updated 2025
- <sup>2</sup>MCM 2010 Problem B
- <sup>3</sup>Norfolk, A. (2010, July 16). *Peter Sutcliffe, the bullied Mummy's boy who gave millions nightmares*. The Times & The Sunday Times.