

# Click and Clack and Vampires

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```
Are you sure you want to delete "term_paper_final?"  
Click "Y" for "yes" or "N" for "no:"
```

YN

—OS WTF [1]

## Abstract

A method is described by which computer interpretation of pointing device (such as a mouse) input may be adjusted in an organic manner, with the aim of user intent being properly carried out.

## Article History

2021-05-12 Partial Draft (description of method)

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## Prologue

Virginia was in a hurry. She furiously clicked the file icons to select which ones she wanted to attach to an urgent email response.

That's what she thought she was doing. What actually happend was that her computer interpreted the mouse input as an instruction to move a directory containing one million files into another directory.

Virginia felt personally betrayed by her personal computer.

## Definition

**vampire:** a trap door on a stage [2, 3]

## Introduction

Several widely-used graphical user interfaces (GUI's) include a facility for specifying a point. Such a specification might be associated with the intent to select an object (e.g., a file, a “No” button, or a menu) or to create a new one (e.g., whatever is associated with a particular menu item).

Some of these GUI's have a user-controlled parameter—call it *tolerance*—that defines “close enough.” In other words—suppose the user's pointing device is a mouse—between the button-down and button-up events, the mouse may move, and so there are at least two points associated with the *click* (button-down followed by button-up). If the two points are close enough, they are taken to represent a single point. If the two points are too far apart, the point might be ignored.

However, there may be something intolerable about the tolerance: the manner in which the user is able to specify it. Typically, the tolerance is specified by a *number*. How is Virginia supposed to know which number corresponds to the steadiness of her hand?

An organic method for estimating tolerance follows.

## Method

The user moves the mouse quickly, guiding the mouse cursor to an arbitrary location, then clicks. This process is repeated many times.

Each time the mouse-button state changes, the mouse position is logged. There are two positions for each click (one for button-down, one for button-up), as well as the *duration* of the click.

When enough repetitions have been performed, each of the logged pairs of positions are differenced. Each click  $k$  might be represented

$$(\Delta t, \Delta x, \Delta y)_k$$

Each of these differences represent the user's accuracy in picking a single point;  $(\Delta t, 0, 0)$  would correspond to exactness.

The differences are organized into three collections: one for each direction  $x$  and  $y$ , and one for duration.

Post-processing and statistics are computed on the three collections. Post-processing steps might include taking the absolute value, then replacing all the zero differences with the next smallest value. Post-processing might also include casting out the more extreme absolute differences.

The statistics establish thresholds of tolerance in each direction for estimating the user's intent when clicking: if the differences in position between button-down and button-up fall within the tolerance, the corresponding action might be interpreted as the user specifying a single point. If the differences in position are greater, but the *duration*  $\Delta t$  is also large, the event might be interpreted as a click-and-drag operation. Finally, if the differences in position

exceed the tolerance, and  $\Delta t$  is short (as when the user's elbow is bumped mid-click), the event might be interpreted as noise, and therefore to be ignored.

## Anecdotes

(Forthcoming. The author will present experimental results where he himself is the subject)

## Discussion

Such a method might be offered to the user upon installation of new software. The method might also be made available in a “Customize” menu.

## Conclusion

(Forthcoming.)

## References

[1] OS WTF (a fictitious operating system whose user prompts may be all too familiar.)

[2] The Free Dictionary (2021-05-12) “vampire.” therein attributed to Harper-Collins (2005) Collins Discovery Encyclopedia, 1 ed. <https://encyclopedia2.thefreedictionary.com/vampire>

[3] Wiki User (2013-12-13) “Why is a stage trap door called a vampire?” [https://www.answers.com/Q/Why\\_is\\_a\\_stage\\_trap\\_door\\_called\\_a\\_vampire](https://www.answers.com/Q/Why_is_a_stage_trap_door_called_a_vampire)

(Additional references may be forthcoming.)