CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
S0902

Project Title
Designing a More Ergonomic QWERTY Keyboard Layout by Analyzing Punctuation Frequency

Abstract

Objectives/Goals
The purpose of this project was to design a keyboard layout that was more ergonomic than the current QWERTY keyboard layout yet less time-consuming to learn than alternative keyboard layouts. Since there are fewer punctuation marks than letters (which alternative keyboard layouts primarily focus on), this design rearranged positions of punctuation marks based on punctuation frequency in 21st century texts, thereby providing a more manageable method to reducing the risk of carpal tunnel syndrome and other repetitive strain injuries in the wrist.

Methods/Materials
A Java program was coded that read in 100 open-source works retrieved from Project Gutenberg, a website that distributes free ebooks. All works selected were published in the 21st century to reflect current punctuation frequencies. The frequencies of the following punctuation marks were recorded: period, comma, semicolon, colon, exclamation mark, question mark, apostrophe, quotation mark, hyphen, left parenthesis, and right parenthesis. Punctuation marks with greater frequencies were placed in less strenuous keys while punctuation marks with lower frequencies were placed in more strenuous keys. Positions were selected based on published strain rankings and other strain considerations.

Results
From greatest to least percent frequency, the punctuation marks were as follows: comma, period, quotation mark, hyphen, apostrophe, semicolon, right parenthesis, left parenthesis, and colon. The following punctuation marks had less than 5% frequency: semicolon, right parenthesis, left parenthesis, and colon.

Conclusions/Discussion
The punctuation marks with less than 5% frequency were not given priority in the designing process. A total of five keys on the QWERTY keyboard were altered. The punctuation marks rearranged were as follows: comma, period, quotation mark, hyphen, apostrophe, semicolon, and colon. The new design can easily be implemented by manually changing the keyboard layout settings on a computer. Switching to this keyboard layout is important because the ergonomic improvement gained reduces the risk of carpal tunnel syndrome and other repetitive strain injuries in the wrist.

Summary Statement
This project designed a more ergonomic QWERTY keyboard layout that rearranged punctuation marks based off punctuation frequencies to provide an easy to learn and implement way of reducing the risk of repetitive strain injuries in the wrist.

Help Received