

GRANTED
PATENT

Ergonomic Arabic Keyboard

Dr. Mohamed Zaki Ramadan Osman



College of Engineering

Brief Summary

A new design of the Arabic keyboard to provide the user fast and convenient way of typing was developed. The new design is based on the ergonomics criterion which is used to evaluate and to compare the proposed keyboard design to the current ones. This criterion was formulated in a mathematical form of keyboard optimality in terms of typing speed throughout the distribution of typing effort among fingers, hand alternation, and key location. This design provides a computer industry with a new Arabic keyboard configuration that increases comfort and typing productivity, and decreases pain and occupational illness.

Aim(s)

The aim of the development of the Arabic keyboard layout was to 1) minimize finger efforts, typing errors, feeling pain, and occupational illness; and 2) maximize typing speed and productivity.

Main Features of Invention

The developed mapping figure shows the optimized keyboard layout as found by an Ant Colony algorithm. This layout has the common letters located in the comfortable home row and gives good hand alternation. The following can be noticed from the mapping of the characters in the layout:

1. The most frequent key-pair Alef "ا" and Lam "ل" are under different hands, on the middle row, and under the strongest fingers (the index and the middle fingers).
2. Most of the frequent letters are placed in the middle row and/or using the strongest fingers, as in the case of Waw "و", and Teh "ت".
3. The least frequent letters are placed in the bottom and top rows and most of them are under the pinky finger (the weakest finger), as in the case of Tah "ط" and Wow-Hamza "وْ".
4. Hands are evenly loaded, slightly lighter for the weaker left hand,
5. The loading of fingers is in a qualitative agreement with the conjectured strengths of the fingers, and
6. The proposed keyboard has attained a good low level of awkward sequence rate.

Patent Information

United States Patent : D667,414S, Sep.18, 2012

Assignee: King Saud University



Professor. Mohamed Zaki Ramadan Osman,
Industrial Engineering Department.

Commercial license

Not yet.

Applications

All computer input devices and input devices that typists use both hands' fingers.

Invention Details

Based on the drawbacks of the current keyboards, the need for a new ergonomically designed Arabic keyboard is a necessity. The first step of developing the proposed layout is to determine both monograph and digraph of the Arabic characters. The corpus is created using gathering texts from leading Arabic e-books that are available in the web-sites. Altogether 54 e-books were collected for this purpose which consisted of 7,262,260 characters. The frequency analysis has been done in both characters and among characters (i.e., monograph and digraph). The most five frequencies of the Arabic characters are: Alef "ا", Lam "ل", Ya "ي", Waw "و", and Meem "م". The least five frequencies of the Arabic characters are: Hamza "ا", Ghain "غ", Ya-Hamza "اْ", Zhao "ز", and Waw-Hamza "وْ". The percent of frequencies among pair of the Arabic characters (e.g., digraph values) is determined. It is obvious that the most frequent pair Alef "ا" followed by Lam "ل" is 6.88%, Lam "ل" followed by Nun "ن" is 1.49%, and waw "و" followed by Alef "ا" is 1.3%.

According to the method proposed by Wagner et al [2003], each keyboard is evaluated on that each pair of letter-keys has high frequency should be sited in adjacent to each other considering its execution time and the final score of the keyboard is taken as a weighted sum of these individual scores.

