Input Assistive Keyboards for People with Disabilities: A Survey

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Abstract: - Any device, equipment or courseware that assists people to work around the limitations caused by their disabilities comes under the category of Assistive Technology. People with certain sort of disabilities using these Assistive Technologies can compensate a boundary caused due to their disability. Certain types of assistive technologies help people with disabilities to achieve their life goals and hence allowing them to be operative in specific fields. Several Assistive Technology devices have helped people with disabilities in acquiring their dream jobs and reducing the external support needed by them for earning a livelihood. In this paper, a survey of commercial and patented one handed input devices that are in practice in the society has been done.

Keywords: - Chorded keyboards, Assistive Technology, One-Handed Input Devices, Physically Challenged.

I. Introduction :-

The keyboard has become the quintessential input device for textual information in digital computers. Key boards have been in use ever since the very first typewriters were made, mid 19th Century. The QWERTY layout that is found in modern keyboards was originated in the 1870s: An early version of the QWERTY layout can be found in the Sholes and Glidden Typewriter, and a more refined version, similar to the modern layout which can be found in the modification to this type-writer performed by E. Remington & Sons [1].

The typewriter quickly became popular as it reduced the load on typists and made life convenient in all official environments. Typewriters were also used extensively in the field of telegraphy in the form of teleprinters, which converted keystrokes to electrical signals, similar to the modern keyboard. With the advent of computers, electromechanical keyboards similar to those used in teleprinters were used to generate input signals for early digital computers, starting with the BINIAC, in 1948 [2].

Since then, the keyboard has been used with all forms of computers as a primary input device. Most keyboards rely on a relatively simple 2-dimensional matrix of switches arranged in a particular fashion in order to receive input, a technique that has remained largely unchanged [3]. Only recently have computing devices been discarding the physical keyboard, due to the increase in size constraints, and even then it persists in the form of virtual or on-screen keyboards, where the physical limitations of keyboards can be overcome opening up new possibilities with the ability to display multiple language, dynamically customising layouts for optimal usage [4] and accepting gesture based input [5]. Virtual keyboards in a virtual reality environment also helps to re-invent and re-imagine what it means to use a keyboard to interact with digital systems by incorporating upward sophisticated technology and features to bring about a seamless experience. But in all times, while the keyboard has evolved, its general layout of keys has remained relatively unchanged. The QWERTY layout developed nearly a century and a half ago is still being used today. The QWERTY layout was chosen to keep the most frequently used characters placed as far away as possible to reduce jamming of keys in a typewriter. As such it is not the most ergonomic, nor the most efficient layout for typing, and the only reason it has persisted is perhaps tradition and familiarity. Many alternative layouts have been developed, the most popular of these being the Dvorak layout, which claims to be faster and more ergonomical than the QWERTY layout . Other keyboard layouts change the overall structure of the keyboard, by dividing a keyboard into two or more separate parts to be used by separate hands. Other key boards change the number of keys and rely on specific key-strokes to enter characters.

This paper aims to compare the viability of various alternative keyboards and input devices as an assistive technology to those with physical handicaps, focusing on hardware implementations. Chorded Keyboards are keyboards that require the user to enter a specific series of key-strokes to enter specific characters, and due to this behaviour, they can be used exclusively with one hand, making it ideal for those with extensive physical handicaps learning how to use computers, improving computer literacy among the physically handicapped.

II. Literature Survey

1. Juni

Juni is a chorded keyboard layout developed by Devine Lu Linvega, meant for keyboards having 12 keys designed in an orthogonal fashion. The