"Keyboardless Keyboard": A Virtual Typing System Using Acclerometers

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The main purpose of this engineering project is to come up with an innovative typing device useful for both disabled who are constrained with limited arm movements that a standard keyboard requires and normal user for various purposes. Device should be flexible, small size, easy to use, innovative, multipurpose with practicality in the real world. For this, the sensor used are digital accelerometers that detecting finger movements. With this, values of acceleration generated by movements of fingers are captured, and filtered to extract finger movement. These movements are then mapped to key strokes and transmitted to a laptop for display. The first phase is prototype to test the concept. After achieving encouraging results, the same is ported to a wireless battery operated smaller form factor hardware capable of being installed on one wearable glove. For testing, a test sequence of characters is typed in and outputs of those characters on the computer display are compared. This is used to optimize filtering logic and to achieve closest possible result. The current filtering logic can be expanded to implement other modes like musical instrument, "signed language interpreter" for mentally challenged persons, for use by a person with limited hand movements, gesture recognizer. The best part is all of these modes can be combined in a single device. For making it user friendly, a "movement learning mode" also can be added. With more efforts, use of this device can be expanded to many other such applications.