**SHORTEN**

**Write-up for finger experiment**

It is important to distinguish that the vibration caused by the tap is dependent on the key that is tapped, not finger that tapped it, so that the taps can be uniquely identified by the keys, not fingers. We conducted an experiment where an individual tapped each key on the key pad 30 times with their index, middle, and ring finger. For each finger-key combination, we calculate the average vector, then calculate the average Euclidean distances of the samples of the same key but of the other fingers. For example, when working the index finger, 0 key combination, we find the average distance of the samples of the middle finger, 0 key combination from the average vector of the index finger, 0 key combination. This is similarly applied to the ring finger, 0 key combination. This was done for each key (0-9). These average distances are indicated by the red points in the figure. The grey values are the average Euclidean distances of samples of keys and fingers other than the specified combination. For example, when working with the index finger, 0 key combination, we find the we find the average distances of the samples of the other key (1-9) and finger (middle, ring) combinations from the average vector of the index finger, 0 key combination. These experiments produced 10 figures, one for each key, Figure (X) displays one of said figures. Each figure displays the results from one key’s combinations (ex: 0-index, 0-middle, 0-ring). Since the average distances of a key press by different fingers are similar, and the closest to the average of the key (indicated by the red points), we know that the finger used to tap does not affect the uniqueness of the vibration

**Write-up for person experiment**

It is important to distinguish that the vibration caused by the tap is dependent only on the key that is tapped, not the person that tapped it. By showing that the person who tapped the key does not affect the uniqueness, we can uniquely identify the taps solely by the key. We conducted an experiment where 5 participants tapped each key 30 times. For each person-key combination, we calculate the average vector, then we calculate the average Euclidean distance of the samples of the same key but of the other people. These average distances are plotted as red points on the graph. The grey values are the average Euclidean distances of samples of keys and people other than the specified combination. For example, when working with the Person 1, 0 key combination, we find the we find the average distances of the samples of the other key (1-9) and Person (2-5) combinations from the average vector of the Person 1, 0 key combination. These experiments produced 10 figures, one for each key, Figure (X) displays one of said figures. Each figure displays the results from one key’s combinations in (ex: 0-Person 1, 0-Person 2, 0-Person 3, 0-Person 4, 0-Person 5). Since the average distances of a key press by different people is similar, and the closest to the average of the key (indicated by the red points), we know that the person tapping the key not affect the uniqueness of the vibration.