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Mapping Tactile Expressions to Travel-Force Curves of Mechanical Keyboard Switches

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***Abstract*—Mechanical keyboard users often rely on subjective expressions such as *clicky* or *creamy* to describe switch feel, while manufacturers provide only objective travel-force curves. This creates a gap between user-friendly language and technical data. We present a method to bridge this gap by mapping tactile expressions to travel-force curves. A 4-axis robot arm equipped with a force sensor presses each switch under controlled conditions to record precise travel-force curves. Meanwhile, tactile descriptions are collected through large-scale web crawling and normalized to extract the five most frequent expressions per switch. The resulting dataset includes paired information for 44 switch types, offering a foundation for user-driven, expression-based switch search and analysis.**

Keywords—Mechanical keyboard, Tactile sensing, travel-force curve, human-perception mapping, web crawling

I. Introduction

When buying mechanical keyboard switches, users often rely on subjective terms from online communities—like *creamy*, *clicky*, or *thocky*—to describe tactile feel. These expressions help make up for limited technical knowledge. In contrast, manufacturers offer only travel-force curves, which are hard to interpret[1]. This creates a gap between subjective impressions and objective data.

Fig. 1. Experimental setup for generating travel-force curves. After pressing a single key, the corresponding travel-force curve is visualized on the monitor in real time.

We present a method that links tactile expressions to travel-force curves. A robotic arm with a force sensor presses each switch to collect consistent profiles. Meanwhile, web crawling gathers common user descriptions. We pair these two data types to build a mapping across 44 switch models.

II. Methods

To measure travel-force curves, we use a 4-axis desktop robot arm (MG400) with a force sensor (ATI Mini45), as shown in Fig. 1. An indenter is attached to the end-effector, with the sensor placed between the arm and the indenter. The robot presses and releases each switch at fixed speed and depth while recording force and displacement[2] to produce travel-force curves.

Tactile expressions are collected via web crawling, focusing on how users describe typing feel. Similar terms are grouped and normalized. For each switch, the five most frequent expressions are selected to represent its tactile impression. This is done for 44 switch types.

Each switch's curve and top-5 expression vector are combined into a paired data file for further analysis.

III. Demo Experience

Users can press switches to feel their tactile characteristics. Alternatively, entering a switch ID triggers the robot to actuate the switch and display its travel-force curve and associated expressions in real time.

IV. Conclusion and Future Work

This study establishes a mapping between tactile expressions and travel-force curves[3]. Building on this work, we plan to develop a switch generation model that generates travel-force curves based on user-specified tactile expressions describing the desired typing feel[4].

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