Research on the Social Role of Mobile Chinese Input Method Postprint

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Abstract

As an input device of the Internet era, the input method can trace its history back to the typewriter that emerged in the 19th century. The invention and popularization of the typewriter and QWERTY keyboard have profoundly influenced the design of computer keyboards and mobile virtual keyboards. With the rapid development of the mobile Internet, mobile input methods have gradually become an indispensable input device for everyone, characterized by features such as Pinyin-dominant encoding, convenience and efficiency, and detachment from the human body. The long-term use of mobile Chinese input methods has diluted users' cognition of Chinese character morphology, creating a knowledge gap; it has dissolved the distinctions between private space/public space and private time/life time, promoting an emotional tendency in online social interactions; this input device that is detached from subject control has brought about an endless pursuit of input efficiency and personalization from both users and the market. Future development of input methods may continue to focus efforts on voice input and intelligent input.

Full Text

Preamble

Research on the Social Role of Mobile Chinese Input Methods
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Abstract: As the input device of the Internet era, the history of input methods can be traced back to the typewriter born in the 19th century. The invention and popularization of the typewriter and QWERTY keyboard profoundly influenced the design of computer keyboards and mobile virtual keyboards. With the rapid development of mobile Internet, mobile phone input methods have gradually become an essential input device for everyone, characterized by pinyin-based

encoding, convenience, efficiency, and detachment from the human body. Long-term use of mobile Chinese input methods has diluted users' cognitive grasp of Chinese character forms, creating a knowledge gap; it has dissolved the boundaries between private/public space and private/work time, promoting emotional tendencies in online social interaction. This input device, detached from user control, has generated an endless pursuit of input efficiency and personalization from both users and the market. Future developments in input methods may continue to focus on voice input and intelligent input.

Keywords: mobile terminal; mobile input method; interaction; online socialization; artificial intelligence technology

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Since the birth of computers, text input has been a crucial component of human-computer interaction as a primary information channel. Compared to alphabetic scripts that correspond one-to-one with the 26 keyboard letters, logographic scripts such as Chinese and Japanese more urgently require a medium to connect keyboard letters with ideographic characters. This medium is the input method.

With the rapid development of mobile Internet technology, people increasingly choose to use mobile phones for communication, entertainment, and office work. In China, mobile Chinese input methods are indispensable application software for every mobile user, with most users even opting for third-party input method software [1] to meet more convenient input needs. According to data, by 2014, third-party mobile input methods already accounted for 62.6% of the domestic input method market share [2], and by 2019, the user base of third-party mobile input methods in China reached 729 million [3].

1.1 The Concept of Chinese Input Methods

An input method is a software tool used to manually input various representation symbols of human language into a computer [4]. A mobile Chinese input method is a software tool used to manually input Chinese characters and their associated graphical symbols into a mobile phone.

A complete mobile Chinese input method software involves multiple components: the Chinese character ideographic system, the Chinese character encoding system, the hardware-software operating system, and the input method software platform construction. The Chinese character ideographic system refers to the Chinese symbol system that users attempt to express and that the phone ultimately presents. Representation symbols can be divided into two forms: text

and images. The Chinese character encoding system refers to the encoding system that associates keyboard letters with Chinese symbols. The mobile Chinese input method operating system refers to the interactive system through which users operate the input method software, which can be categorized by operation method into typing input, handwriting input, voice input, etc. The platform construction of input method software refers to the multifaceted functions continuously developed by input method software to enhance user experience, such as intelligent association, voice correction, personalized lexicons, input method skins, and intelligent assistants.

1.2 Current Research Status on Input Methods

Current academic research on input methods primarily concentrates in computer science and education. Since most countries outside East Asia use phonetic scripts as official languages and have less demand for input methods, most phonetic script input methods only feature simple functions like word association. Consequently, foreign literature mostly focuses on the social impact of typewriters or the social role of typing behavior.

Domestically, although China possesses a complete mobile input method market and fully functional various mobile input methods, academic attention has mostly gathered in computer science interaction design and education fields. Only in the corners of academic research is there any mention of the social role and impact of input methods. For instance, scholars Yang Dan and Liu Zhaofa, in their article "Analysis of the Impact of Input Methods on Writing Based on the Maximal Information Coefficient," propose that long-term use of Hanyu Pinyin input methods negatively impacts Chinese character writing. Jin Zhijun from East China Normal University used Sogou Input Method as a means of corpus collection for sociolinguistic research on identity and titles, essentially presuming that input methods constitute an important component in today' s social interaction process [5].

In summary, current research on input methods by scholars both domestic and foreign has not yet formed a systematic framework. Particularly, domestic academic research on Chinese input methods has not engaged with sociology and communication studies. Therefore, this article attempts to focus on the social role of mobile Chinese input methods, paying attention to individuals' and collectives' daily information technology experiences, and exploring whether input methods have exerted some influence on users and the current media environment.

2. The Social Role of Mobile Chinese Input Methods

As a medium with extremely high user penetration, today's mobile Chinese input methods are characterized by pinyin-based encoding, convenience, efficiency, and detachment from the human body. Based on these media characteristics, input methods have impacted social life in multiple ways.

2.1 Pinyin-Based Encoding as the Dominant Method

Pinyin input methods dominate the current Chinese input method market, which stems from their natural advantages while simultaneously reinforcing the status of Hanyu Pinyin and expanding its popularization. The Hanyu Pinyin system encodes Chinese characters through their pronunciation, which on one hand reduces the difficulty of learning Chinese characters, but on the other hand also distances learners from the visual forms of these logographic characters. Long-term use of pinyin input methods leads mobile users to become accustomed to this encoding approach, gradually diluting their cognitive grasp of Chinese characters as ideographs centered on visual form. Consequently, modern people increasingly experience the phenomenon of "forgetting how to write characters when picking up a pen," as they no longer need to physically write to express themselves through text.

While the status of Chinese character visual forms declines, the status of character pronunciation has rapidly risen. Among newly emerging internet slang, homophonic words occupy a significant proportion, such as "和谐—河蟹" (héxié—héxiè), "大可不必—duck 不必" (dà kě bù bì—duck bù bì), and "我的天啊—word 天啊" (wǒ de tiān a—word tiān a). Regardless of how solid the Hanyu Pinyin foundation is among Chinese input method users, the highly unified pinyin encoding approach still excludes certain minority groups from mainstream social interaction. When pinyin input is "regulated" by input methods as a skill that everyone "should" master, the Other emerges. Children and elderly people are abandoned by online social interaction because they cannot proficiently master pinyin input. To alleviate this knowledge gap phenomenon, input method companies have developed handwriting input methods, enabling elderly users more accustomed to Chinese character visual forms to also use input methods. However, handwriting input speed is far inferior to pinyin input and completely unable to keep pace with modern social interaction processes that continuously pursue efficiency. The development of input methods cannot bridge the knowledge gap they have created.

2.2 Convenient and Efficient Input Process

Input methods are electronic media without consumption, volume, or weight. Compared to eras when the mouth and pen served as primary input devices, the input process in the input method era requires almost no effort and occupies no physical space, yet can transcend spatiotemporal limitations to achieve effective communication. Mobile input methods have truly realized communication to any spacetime anytime, anywhere. If typewriters and computer keyboards fixed workplaces, then mobile phones and input methods have once again liberated space. The complete integration of private time and work time, the seamless connection between private space and public space—input methods have also contributed significantly to this process.

Moreover, input methods are more energy-efficient than mouths and pens. This

characteristic is most evident in emotional expression. There has never been a period when people could express emotions so casually. Tapping the "H" key a few times with your finger allows your phone to express a day' s worth of laughter for you, not to mention how much energy would be required to depict joy with a pen. If text is insufficient to express emotion, sending an image or emoji through an input method takes only seconds. Input method users laugh and cry with their fingers—such emotions need not be expressed facially. Even if they don' t necessarily cause much inner emotional fluctuation, what appears on the screen is exaggerated emotion. This is one reason why today' s online social interaction exhibits particularly emotional tendencies. Additionally, the ease of modification in this input method approach further promotes emotional expression.

2.3 Input Devices Gradually Decoupling from User Control

In the evolution of input devices, the mouth is the most intimately connected to the subject, an organ belonging to the subject; the pen achieved detachment of the input device from the human body, but relatively speaking, the pen remains intimately connected to the body—the palm holds the pen moving back and forth on paper, with the pen controlled by the subject. Input methods, however, are input devices completely detached from the human body, belonging to the mobile phone as the dominant medium in this media environment, constituting a tool software within the mobile medium.

Users pursue two aspects of input method performance: first, the pursuit of input efficiency, and second, the pursuit of input method personalization. Users and input method companies are forever pursuing higher input efficiency, which means inputting more information with fewer clicks—minimizing the ratio of input cost to input information volume. For input method companies, the solution is continuously developing and improving input method functions. Features such as phrase and sentence input, initial-letter input, intelligent association, and classification lexicons (setting up specialized lexicons beyond the basic lexicon, such as dialect lexicons, video game lexicons, natural science lexicons, etc., which users can download to improve input efficiency) can reduce input cost. Intelligent association functions can increase input information volume, helping users find their desired text with minimal clicks.

For users, a more convenient approach is simplifying input results. Letter and number input, which requires no pinyin word-finding, represents the lowest input cost form in Chinese input methods. Consequently, a series of internet slang forms have emerged, including pinyin abbreviations, mixed Chinese-English usage, and numerical representations, such as "笑死我了—xswl" (xiào sǐ wǒ le—xswl), "你说得对—nsdd" (nǐ shuō de duì—nsdd), "支持—打 call" (zhīchí—dǎ call), and "哈哈哈哈哈哈—2333333" (hāhāhāhāhā—2333333). Such abbreviated language has developed increasingly complex rules and diverse content, ultimately becoming internal codes for various online circles. These codes not only feature high input efficiency but also possess certain exclusivity, serving to consolidate group

identity and distinguish outsiders.

Image input forms such as emojis represent the input form with maximum information volume in Chinese input methods. In most cases, images can convey more information than text at equivalent input cost, which is one reason for the popularity of emojis in the internet era. In addition to the eternal pursuit of input efficiency, users' pursuit of personalization is also an anxiety product resulting from the decoupling of input devices from subject control. Personalization not only affects input accuracy but also determines input efficiency on another level.

Since input methods can never operate completely under subject control like mouths and pens, users have never stopped complaining since their inception: "It' s the input method' s fault," "My input method has its own ideas" ···Yet simultaneously, after input method companies continuously developed software functions and introduced features such as fuzzy input (inputting without typing complete Hanyu Pinyin), mispronunciation correction, associative input, classification lexicons, and internet slang updates, input method accuracy has indeed improved. People have begun exploring input methods' recognition of user self-identity, with daily discussions on social platforms: "Input these two letters, what's the first word you get?""Type 'my favorite'in the input method, what will it automatically associate?" People discuss "the self in the input method' s eyes," attempting to discover themselves from the associated vocabulary displayed by input methods.

But does the input method' s association reflect a machine-personalized recognition of the self, or the structural society behind big data recommendations? Mispronunciation correction repeatedly reinforces socially prescribed language usage. Errors in speech and writing do not consume more energy than correct input, but inputting a "wrong" or uncommon word requires several times more effort to select characters than common words. Sentence input and fuzzy input result from the expansion and improvement of input method lexicons. In addition to machine memory of individual high-frequency expressions, conducting big data statistics on socially high-frequency expressions to adjust word recommendation order is also an efficient solution. Classification lexicons represent the summarization of vocabulary usage in niche groups, where each user tags themselves, categorizes themselves into a group, and then calls the resulting improvement in input accuracy a personalized outcome.

Internet slang updates imply input method companies' screening and regulation of symbols. Moreover, input methods themselves remove input personalization: gone are voice timbre and intonation, gone are handwriting fonts—input methods produce standardized system text with no personalization whatsoever. Social media discussions about "the self revealed by input methods" are merely superficial entertainment. The association produced by input methods is ultimately a machine-personalized recognition of the self, or the structural society behind big data recommendations.

3. Future Development of Mobile Chinese Input Methods

In the future development trends of mobile Chinese input methods, improving input efficiency will be an eternal pursuit. To reduce input cost and increase input information volume, input method companies have focused their attention on voice input and intelligent input assistants.

3.1 Voice Input

Regardless of how much the input cost of pinyin input methods can be reduced, given current technological levels, the input cost of typing is difficult to make lower than voice input. Consequently, input method companies have continued to invest efforts in voice input. Currently, voice recognition technology for input methods is gradually maturing, and boosted by the pandemic, numerous online communication scenarios have significantly increased users' demand for voice input, gradually cultivating user habits.

In the voice input process, the mouth and input method jointly constitute the input device, but in this combination, the mouth does not occupy the core position. Although it participates in the online social interaction process, the sound produced by the mouth must be converted into text by the input method before being input. Sound is merely a means for convenient input. (Of course, today's online social interaction also contains a large amount of direct voice communication, but compared to text presentation forms, sound presentation forms are considered informal, irrational, emotional, and easily confusing.) This "sound—input method—text" input process in voice input once again demonstrates the central position of vision since the printing era, with sound being marginalized in mainstream online social interaction.

3.2 Intelligent Input Assistant

Intelligent input represents input method companies' new attempt to introduce artificial intelligence technology into input methods. For example, the combination of AI technology with voice input functions improves voice recognition accuracy; artificial intelligence participation in the typing input process has led to the birth of intelligent input assistants. Among all intelligent input functions, the intelligent input assistant is the most "breakthrough" function.

On August 19, 2019, Sogou Input Method launched "Wangzi Assistant." Wangzi Assistant is the industry's first AI input assistant, whose main function is to provide input suggestions for users in different input scenarios. For instance, in social software chat scenarios like WeChat, it provides multiple expression methods and matching images for input text; in social media scenarios like Moments, it provides alternative copywriting materials.

The birth of intelligent assistants has expanded input information volume to an unprecedented degree, even surpassing the information volume users attempt to express. The functions of intelligent input methods have transcended the

boundaries of input devices, no longer limited to one link in the social interaction process but beginning to invade preceding and subsequent stages [6]. However, to date, the intelligence level of intelligent input assistants remains relatively low. The input suggestions they provide often fail to gain user recognition and adoption. Most users have relatively low awareness and satisfaction with intelligent assistants, and no input method companies other than Sogou Input Method have launched intelligent input assistants. Yet if this technology continues to develop and update in the future, and input methods' influence on users continues to deepen, the consequences inevitably raise concerns. Perhaps future input methods will not only fail to reveal the self but may even invade the self and influence the self. By then, presumably no one will compare them to a "silent voice."

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Note: Figure translations are in progress. See original paper for figures.