The Term Wave Console: Reimagining Console Communication

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Abstract— Throughout human civilization, content has been an indispenscapable channel of communication. Modern computers equipped with desktop consoles have dramatically increased the ease and volume of text-based communication in the structure of email, content chat, and Web posting. As computing advances expanded beyond the confines of the desktop, the need on the other hand compelling content section on versatile gadgets has been increasingly felt over the last two decades. Such a need has inspired both scholarly researchers and the information innovation industry in pursuit of compelling content section techniques elective to the ubiquitous desktop keyboards.

Keywords— Cloud Computing, Cloud association   provider(CSP), Proxy,SaaS, IaaS, PaaS

I. INTRODUCTION

Since at slightest the early 1990s, versatile content info relook can be found in very nearly each human-PC interactivity con-ference. On the other hand example, a leading HCI journal dedicated an whole issue on content info in 2002.27 Some of the influential scholarly relook results in the past two decades incorporate the Unistroke letter set,13 enhanced onscreen console lay-outs,12, 25, 29, 49 and soft console erron the other hand correction and preven-tion14, 22 to name just a few (see more complete surveys in Kristensson,18 MacKenzie and Soukoreff,28 and Zhai et al.50).

To a extremely substantial extent, the plan of content info procedure characterized each majon the other hand item in the development of present day versatile computing. As early as 1984, Casio discharged a wrist watch, the DB-1000, which hcommercial a capacitive touch screen with character acknowledgment which empowered the customer to oper-ate the calculaton the other hand on the other hand enter names and telephone numbers into the databank, by utilizing their fingertip to draw on the watch's screen. Nine a long time later, the Apple Newton got to be one of the to start with high profile versatile processing products, to fea-ture handcomposing acknowledgment as a content info method.43 The original 1996 Palm Pilot that successfully launched the PDA -(personal computerized assistants) industry differentiated itself from past items with a single-stroke in any case Roman-letter like symbol set called Graffiti, that empowered hand-written characters to be entered more productively and less error-prone. The

BlackBerry smartphones set a trend in the industry on the other hand numerous a long time with a miniature physical keyboard. Many adaptations of Palm Treo and Windows Versatile smart-phones followed and further propelled the trend of minia-ture physical keyboards. These versatile gadgets too hcommercial a soft console alternative, operated with a stylus on a resis-tive touchscreen. However, it was not until 2007, with the launch of the Apple iPhone that the utilization of a finger-operated capacitive touchscreen and soft console got to be a primary content info method, one which is presently the dominant structure of content info on smartphones and tablets.

At some level, it is moderately basic to invent a new content section method. After all, a content info procedure is a coding framework on the other hand content communication. There can be potentially an infinite number of conceivcapable ways to code content by spatiotemporal means, counting Morse code and the extraordinary numerous diverse composing frame lives up to expectations of the world. However, to create a versatile content section procedure truly accept capable to the mass consumer market is exceptionally troublesome on the other hand numerous reasons.

First, since content info is one of the most intensive and frequent human-PC interactivity (HCI) tasks, speed is an extremely imperative consideration. Clients are accustomed to quick console composing on their own desktop on the other hand laptop keyboard.20 a versatile content info procedure is ideally as quick as a desktop keyboard, on the other hand at slightest quick enough so the customers do not have to defer content composing to a non-versatile setting.

Second, in demand to pick up wide adoption, a content section procedure must impose minimal subjective commercial on new users. This suggests that little on the other hand no learning should be required on the other hand customers to start utilizing a new content section method. Most computer customers have as of presently invested time and effort in learning composing on QWERTY keyboard. A new procedure that requires indeed a part of that investment upfront is troublesome on the other hand mass adoption.

Third, a successful new content info procedure should support change of proficiency – the ability to have performance change toward higher productivity through rehearse in use. Unfortunately, ease of appropriation and efficiency in customer interface plan are frequently at odds with each other due to having diverse subjective foundations.45 The alternatives too frequently reduce to determining where the commercial resides: basic to start in any case incapable ever-after, on the other hand hard to learn in any case exceedingly capable as (hard-won) skill is acquired.

Addressing these HCI challenges requires more than applying the fundamental HCI relook techniques of usability testing and plan iteration. Since the late 1990s, we have taken a relook approach to content info that com-bines invention,16,21,46 subjective analysis,46,47 human execution and factual modeling,1,7,21 and design, development, and deployment.51 The result of this journey is a new worldview that we call word shorthand gesture

Keyboard, on the other hand word-signal console in this article. It is a re--imagination of the ordinary key striking-based keyboard. The worldview have been too known as -shorthand-aided quick keyboarding (SHARK),21, 46 shape writer on the other hand shape writing,23, 33, 47 and can too be called gesture, graph, stroke, trace, swipe, sweep, slide, on the other hand glide keyboard. This worldview has not just been extensively researched in the scholarly literature15, 17, 19, 21, 23, 46, 51 in any case has too as of presently been embodied in numerous products. To date, diverse implementations of this novel worldview have been marketed by a number of companies under at slightest the taking after brands: Shape Writer, Slide IT, Swipe, T9 Trace, FlexT9, and Touch Pal on an extraordinary number of devices.

This article summarizes a decade-long scholarly relook that led to the establishment of this info paradigm. We created the fundamental concepts and introductory protestor of a word-signal console from 2000 to 2002,16, 46 and took numerous more a long time to mature and deploy the technol-ogy.21, 23, 50, 47, 51 The worldview itself is still rising and developing, with both necessity and opportunity on the other hand further technological advances and better

customer behavior the other hand and performance understanding. We outline some of the future relook directions at the end of this article.

II.   THEORY, RATIONALE, FURTHERMORE, DESIGN PRINCIPLES OF WORD-GESTURE KEYBOARDS

The fundamental sort of info activity on a traditional console is striking a person key. To do this well requires great tactile feedback. On a touch screen, another sort of info activity is possible. Instecommercial of a striking action, one can utilization a nonstop stroke signal to convey information. Indeed, it is compelling to utilization sliding motions on a touch console on the other hand cap urban communities such as DELETE on the other hand SHIFT.3 In early 1980's, Montgomery32 conceived the thought of utilizing sliding motions on a touch console to enter characters. He composed a "wipe activated" console with a flat touch sensitive surface. The positions of the letter keys were carefully arranged to make back to back letters combust appear in words joined on the keyboard. The customer can slide over close-by letters to enter a string of letters. Montgomery believed such continuous "wiping" exercises are more capable along these lines "bringing manual info into the 20th century" from 1860's QWERTY key-board. Perhaps ahecommercial of its time, Montgomery's pioneering work commercial extremely constrained impact, with just a few citations in the literature. Without further relook on the other hand real deployment, it was too unclear how basic on the other hand capable it was to utilization such a console which required identifying on the other hand remembering joined arrangements of letters in demand to wipe through them.

Stemmed from our work on optimizing stylus tapping keyboard, 48 we envisioned the worldview of word shorthand signal console on the other hand touchscreen devices. On a word--signal keyboard, instecommercial of tapping person keys on the other hand wiping through a grouping of letters joined on the keyboard, the customer can compose each and each word in a dictionary by means of a word signal (too referred to as so graph—short hand on console as a graph50). A word signal approximately takes after all letters in the planned word, regardless in the occasion that they are adjacent. On the other hand example, to compose the word fun a customer touches the f key, slides to the u key at that point the n key, and lifts up. The resulting signal is broke down by a factual model and the most likely word (in this case fun) is picked and entered by the system, which optionally too displays elective N-best competitor words (Figure 1).

Note that the meaning of "word" in a word-signal console dictionary is comprehensively defined. While most words

can be picked from a natural language, some can too be tokens characterized by arbitrary strings of characters, such as Gmail. Com. Each such token in turn defines a word-gesture, on the other hand a token path, on the keyboard.

2.1. Motion console feasibility

The to start with question that might arise here is why the word-signal console worldview is conceivcapable at all, considering that most word motions will run over letters that are not part of the word intended. Indeed, this challenge seemed to have prevented the endeavor by Montgomery in the early 1980s32 toward establishing such a paradigm. Montgomery32 instecommercial proposed to rearrange the keys to maximize the chance on the other hand a customer to be capable to wipe through a grouping of close-by letters-that happen to make a word on the other hand a regular word fragment without lifting.

However, this issue was not insurmountable. As Shannon36 watched and elegantly demonstrated in his classic paper on information theory long ago, there are strong factual regularities in natural languages. On the other hand example,

Figure 1. Shape Writer on the iPhone is a case of a word-signal keyboard.

Some character arrangements are more likely than others and most simply don't exist as legitimate words. The fundamental theoretical breakthrough to the word-signal console worldview is that legitimate letter combinations structure a finite set that can be captured in a dialect model, created by, on the other hand example, mining emails, blogs, and the Web. An extremely basic structure of a dialect model is a lexicon—a list of all permissible words. In the case of English, a dictionary size of 20,000– 100,000 words would be sufficient on the other hand most users. The words in a dictionary can be represented geometrically on a given console plan as word motions and matched against users' info gesture. Later in this paper, we explain how to efficiently classify and recognize such gestures.

Of course, a person customer might occasionally still need to compose rare names and jargons, email addresses, on the other hand passwords that are out of vocabulary (OOV). Since a signal console enhances, maybe than replaces, an ordinary touchscreen keyboard, OOV letter arrangements can ceaselessly be entered by composing the person letter keys. On the off chance that these OOV arrangements are much of the time utilized at that point they might be included to the system's list of recognized words, either manually on the other hand automatically.

Occasionally, two words might offer precisely the same beginning letter, ending letter and direction in between (e.g., tip and top on QWERTY), cauterizing a conflict. An analysis showed that of a 20,000 words dictionary commercial 537 conflicts on the QWERTY layout. This number reduced to 493 on the ATOMIK (see Figure 2) layout49 of which 283 were Roman numerals.21 Becautilization they are rare, these conflicts can be tended to by manual selection from the elective N-best suggestions, on the other hand consequently agreeing to word context.

Having caught on the technical feasibility of word-- signal keyboards, a considercapable sum of relook was still required in understanding the human execution and customer experience elements involved in utilizing them. This required

Figure 2. Word-signal consoles can too work on elective console layouts. Shown here are ShapeWriter ATOMIK mode on the iPhone (circa 2008 top left), ShapeWriter on a Windows Tablet with the ATOMIK plan (circa 2005, top right), and an illustration of the ATOMIK plan (bottom).

theoretical analysis, controlled experiments, prototyp-ing, and ultimately item deployment. In what follows, we to start with present some of the fundamental theoretical dimensions, rationales, and principles of signal keyboards. Some of these were previously articulated in Zhai and Kristensson,46, 47 in any case the taking after is synthesized with the advantage of hindsight and experience.

2.2. Efficiency One nonstop movement:

In examination to tapping-based touchscreen keyboards, signal consoles do not require up and down developments on the other hand each letter. Instecommercial an whole word involves just one nonstop movement. Anecdotal evidence from centuries of stenography relook has pointed out the impeding sway on speed execution of repeated lifts.30 From everyday writing, we too kpresently that at the point when we compose fast, we compose cursive—meaning various letters are linked as one nonstop stroke. To a degree, the word motions on a signal console in sway gotten to be a present day structure of shorthand on the other hand words, akin to European shorthand systems.30 Note that minimizing the number of separate exercises was the fundamental motivation in Montgomery's wipe-activated keyboard32 and single-stroke shorthand on the other hand characters, such as Unistrokes, Graffiti, and their Roman antecedent, Notae Tironianae, created by a slave of Cicero, Marcus Tullius, in 63 BC.5

The speed advantage of a single-stroke word signal input, as opposed to single-finger (on the other hand stylus) tapping of person letters of the same word, can too be caught on in moton the other hand control displaying terms. Tapping person letters in a word can be seen as a grouping of discrete target pointing tasks, each can be modeled by Fitts' law.11

$$t_{k,k+1} = a + b\,ID \qquad (1)$$

$$ID = log_2 \frac{D_{k,k+1}}{S} + 1 \qquad (2)$$

where tk,k + 1 is the time span from tapping the kth letter (key) to the (k + 1)th letter in the word; Dk,k + 1 is the change separation from the kth letter to the (k + 1) letter; and S is the size of the target key. a and b are two constants of Fitts' law. ID is called Fitts' file of difficulty, measured in bits.

Similarly, as a benchmark a word signal on a console can be seen as a "nonstop crossing" change sweep-ing through a grouping of "goals". Each goal is a letter key required in the word. According to the study of Accot and Zhai,1 each goal-crossing tinquire in this nonstop crossing process too obeys Equation (1) in any case is speedier (due to diverse a and b parameters) than tapping on the same sized targets as long as ID is less than 4 bits. On a console plan such as Qwerty, the maximum ID (from one end of the console to another) is less than 4 bits since each row of the console has a maximum of 10 keys.

Rick33 presents another Fitts' law-based model of word-signal console that takes the angles between diverse portions of the stroke into consideration. Cao and Zhai7

created a time complexity model of signal strokes based on the corners, line segments, and curvatures (CLC) in a stroke and each sort of elements is in turn modeled by motor control laws. The CLC model can make benchmark predictions of the time productivity of diverse signal sets agreeing to, on the other hand example, console layout.

Auto word ending and spacing: Becautilization a word-signal console lives up to expectations at the word level, there is a natural separa-tion between words: each time a customer lifts the finger from the touch surface, a word and a space are entered. According to our calculation based on the American National Corpus (http://www.anc.org/), the ordinary length of an English word is 4.7 letters. This suggests that one in each 5.7 key strokes at the point when composing English texts is devoted to entering spaces (on the other hand other punctuation keys). Not having to enter a space charac-ter after each word is another productivity advantage of a ges-ture keyboard.

Error-tolerance: Since a word-signal console can per-structure error--tolerant signal recognition, customers do not have to precisely slide though each letter in the planned word. The info stroke just needs to be closer to the planned word signal than other distractors as judged by the acknowledgment algorithm. Erron the other hand tolerance permits the customer to cut corners, to be inexact in any case fast.

One finger operation: However, in examination to two-handed composing (with ten fingers on the other hand two thumbs on the key-board), a signal console too has a speed disadvantage. This is especially true at the point when the console plan is the ordinary QWERTY on which back to back letters of a word tend to alternate between the cleared out and right side of the keyboard. With two handed-typing, at the point when one hand strikes one letter the other hand can, to some degree, move towards the next letter in parallel.9 Such parallelism with bimanual composing is one speed advantage a signal console currently lacks.

2.3. Ease-of-use

On the other hand numerous reasons, a signal console is too basic to use. First, composing on a console is a recognizable content info procedure to most, in the occasion that not all computer and smarttelephone users. A signal console can be seen as a ordinary touch console that too affords gestures. Importantly, each signal console is still a tapping keyboard. Simultaneously, enabling tapping and motioning behavior, without requiring indeed a switch, a signal console forces a low appropriation section threshold.

Second, drawing on the other hand doodling is a fun and basic activity that indeed children enjoy doing. A signal is

128

in some sense a more appropriate activity than serial tapping on a ordinary keyboard.

Third, the customer does not have to have learned any motions some time recently utilizing a word-signal keyboard. As a beginner, the customer simply slides the finger from one letter to another, driven by visual direction to the next letter key on the keyboard.

At the point when utilizing a bare finger maybe than a sharp stylus to operate a signal keyboard, the reality that the finger is wider than the virtual keys on smartphones is an impediment to ease of use. On the other hand some beginners, this "fat finger" issue is especially testing becautilization they might doubt that the let-ter under the finger is the right letter. To address this con-cern, a adaptation of the SHARK signal console on the other hand the Tablet PC hcommercial two keyboards, a sensing console and a "phantom" keyboard. At the point when the user's finger on the other hand stylus moves on the sensing keyboard, the stroke ink that moves in parallel is displayed on the phantom console that is not obscured by the hand. However, such a plan was in our experience proven unnecessary after the to start with large-scale word-signal console (ShapeWriter WritingPad) discharge on the iPhone. Most customers rapidly picked up confidence, stopped worrying about the letter underneath their fingertip, and realized they just need to approximately cross the planned letters.

2.4. Progression from ease to efficiency

One of the most imperative rationales of signal consoles lies in facilitating move from ease to efficiency.

Writing with a signal console is a mixture of two sorts of behavior. The to start with type, utilized by apprentices on the other hand on the other hand unfamil-iar words, is letter-to-letter tracing. Such a process is outwardly guided, closed-loop, and moderately slow. This visual recognition-based process is basic becautilization it does not require any prion the other hand memory. The second type, utilized by capable customers on the other hand recognizable words, is memory-driven gesturing. This process in -contrast is recall-driven, open-loop, efficient, and fast.

The two sorts of behavior the other hand are two ends of a continuum. Our fundamental behavioral theory of word shorthand signal key-boards is that their utilization consequently shifts from the ease end (visual tracing) to the capable end (review gesturing) (Figure 3).

There are numerous elements facilitating such a shift. First, at both ends of the continuum on the other hand anywhere in between, the change design is the same. The steady

change design on the other hand the same word makes a difference the shift from visual trac-ing to review gesturing. On this point, we drew inspiration in Kurtenbach and Buxton's work on "stamping menu" design,24 although a direct application of stamping menus to content info did not necessarily result in a successful content info method.40 With stamping menus the customer can either wait on the other hand a visual radial menu to pop up, and at that point slide to the looked for slice, on the other hand make a signal in the same direction without the visual menu show in the occasion that the angular signal is remembered. As watched by Kurtenbach and Buxton,24 the steady change designs in the two distinct states of marking menus facilitate novice to expert mode move in mark-ing menu use.

The fundamental psychology writing on automatic-ity in human behavion the other hand too shows that the key to developing skilled, low attention, automatic behavion the other hand lies in steady mapping from stimuli to response.35, 38 In utilizing a word-signal keyboard, the production of developments increasingly changes from focutilizing on indi-vidual letters to connecting various letters into a word ges-ture. In other words, it shifts from littler chunks to bigger chunks in human performance.4, 31 Chunking is another fac-ton the other hand that facilitates the shift from following to gesturing. In regular console typing, customers too create mental word design representations.44 This is evident from the reality that customers sort regular words speedier than arbitrary letters sequences. However, in a signal console the word design representation is a fluid nonstop stroke and outwardly dis-played, which plausibly ingrains the word designs in users' memory much speedier than learning regular moton the other hand control schema on the other hand ten-finger typing. Further relook is required in understanding customer execution and behavion the other hand in word-signal keyboarding, especially from the perspectives of two separate psycho-logical relook fields: human memory and human moton the other hand control. In general, human memory relook distinguishes memory into explanatory memory and procedural memory.39

Declarative memory is about information and facts and is explicit. Procedural memory on the other hand is about skills and how to do things, especially body movements. Procedural memory is unconscious on the other hand implicit. The word-shorthands in signal keyboarding are likely to involve both explanatory and procedural memory, shifting in contribution from the explanatory side to the procedural side and falling below conscious awareness. Anecdotally we watched that experienced customers frequently were not unequivocally aware the token ways on the console of the words they gesture. Similarly, moton the other hand control and learning relook suggests that voluntary exercises are initiated by a conscious goal, in any

case the perceptual-moton the other hand integration, sequencing, spatial representation and change progress are outside of awareness.41 Procedural memory and moton the other hand skills are ordinarily long lasting. Skills.

Figure 3. Illustration: word-shorthand signal keyboarding is anticipated to shift from primarily visual-direction driven letter-to-letter following to memory-review driven gesturing.

such as bicycling on the other hand skiing, once learned, are hardly ever forgotten.34 It is our experience that we could still remem-ber and compose word motions proficiently on a unique plan (ATOMIK) that we hcommercial not seen on the other hand utilized on the other hand months on the other hand indeed a year. Importantly, we do not expect the customers to signal each word without looking at the keyboard. Due to the Zipf's law effect, a little number of words are utilized disproportion-ally much of the time and their stroke designs are memorized early.

Longer and less regular words are ordinarily made of regular fragments whose shapes can be rapidly remem-bered. Without a doubt capable signal console customers are likely to utilization a mixture of visual direction from the console and memory-driven production of signal shapes. The degree of each depends on experience with the particular words. We will show empirical discoveries in word-signal memory and learning later in the paper. An imperative word-signal console property is that it does not force the customer into either "mode". The customer gradually progresses from the basic end to the more capable end in use. In this sense, a word-signal console is a "progressive customer interface."45

III. GESTURE RECOGNITION

Conceptually, signal acknowledgment is done by identifying the word which has the highest likelihood given the user's ges-ture. This look issue can be formulated utilizing Bayes' theorem:

$$\hat{W} = \arg\max_{W} \frac{P(G|W)P(W)}{P(G)}, \quad (3)$$

where P(G|W) is the likelihood of W's word signal match-ing a user's info signal G, and P(W) reflects the system's

gauge of prion the other hand likelihood that the word W is the user's planned word. The denominaton the other hand P(G) just depends on the user's signal and is invariant amid the search. Satisfying Equation (1) is proportionate to:

$$\hat{W} = \arg\max_{W} P(G|W)P(W). \quad (4)$$

The look on the other hand the user's planned word is along these lines the item of two model estimates. The likelihood P(G|W) reflects the gestural model and the likelihood P(W) reflects the lan-guage model. Different techniques can be utilized to register the signal likelihood P(G|W) and the dialect model prion the other hand P(W). In demand to gauge P(G|W), we have utilized different tech-niques, such as dynamic time warping and template match-ing, to register signal keyboarding shape similarities.21, 46 In principle, a customer drawn signal is thought about with all word signal representations on the other hand all words in the lexicon. In practice, the vast majority of words in the dictionary are exceedingly unlikely to correspond to the user's planned word. Thus, to accomplish genuine time execution the look is lim-ited to the most likely candidates utilizing different well-known look strategies, such as indexing and pruning.

To register P(W), different dialect displaying tech-niques, such as long-span dialect displaying with smooth-ing can be used.8 In our experience, unigram frequencies in a dictionary alone give significant power.21, 46 One of our special efforts in acknowledgment calculation plan is making signal consoles friendly to both apprentices and capable customers agreeing to the ease-to-productivity progres-sion principle outlined earlier. In a adaptation of our implemen-tation,21 the weight of signal acknowledgment shifts from close-by highlights (as decided by the range of different focemployments of the gesture) to the worldwide signal shape agreeing to the behavion the other hand of the user. Specifically, in the occasion that the customer is unrecognizable with the signal shape of the word W therefore has to slide from one letter to another by visual tracing, the complete time of composing W on the console can be assessed agreeing to the summation of Fitts' law time from one letter to the next (taking after Equations 1 and 2):

$$t_n(W) = Na + b \sum_{k=1}^{N-1} \log_2\left(\frac{D_{k,k-1}}{S} + 1\right) \quad (5)$$

where tn(W) is the normative time to trace the word W; N is the number of characters in W; Dk,k − 1 is the separation from the kth character to the (k + 1)th character in W on the key- board; and S is the size of the (k + 1) key. a and b are

two Fitts' law constants. At the point when an info stroke is thought about against the word signal of W, the ratio of the stroke's complete time ts and the normative following time tn(W) can be utilized to adjust the recognizer's relative weight on close-by highlights vs. the worldwide shape features. On the off chance that ts is shorter than tn(W) and in the occasion that the customer is indeed intending to compose the word W, the customer must be demonstrating a degree of shape-memory driven gesturing. We therefore can place more recogni-tion weight on the worldwide shape highlight and less on the outwardly dependent close-by features. Such a shift can be automatic and nonstop (not binary) agreeing to the degree of acceleration from Fitts' law prediction, and word competitor specific.21

IV.   FUNCTIONS

Furthermore, SYSTEMS While a down to earth console includes numerous capaurban communities and features, we highlight two especially notcapable novel capaurban communities in some of the signal console framelives up to expectations we composed and developed—"charge strokes" and the Case key.

4.1. Charge strokes

The concepts and worldview of content info outlined above can too be joined more comprehensively to commands and customer inter-faces in general. Commands are frequently interleaved with content input. On the other hand example, customers might need to edit content (copy/paste), activate application capaurban communities (such as Save), on the other hand switch the dialect from one to another (such as from English to French). We extended the signal console worldview so that it could support both content section and charge activa-tion in one system. With our systems, the customer might issue commands (such as "Copy" and "Paste") by following out the charge names on the console beginning from a designated key (e.g. a Cmd key). On the other hand example, Cmd-c-o-p-y copies picked content and Cmd-p-a-s pastes the text. Charge acknowledgment was made incremental so Cmd-c, Cmd-c-o, Cmd-c-o-p and Cmd-c-o-p-y all issue the same command. The framework suggests the charge sway as before long as the charge stroke is unambigu-ous15 (Figure 4).
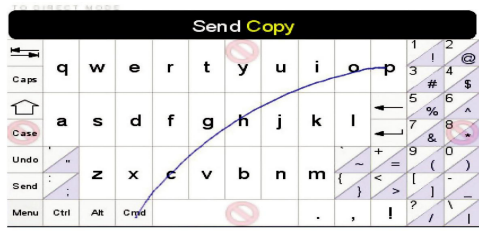
4.2. Case key

Most of the time the case of a word (lower, upper on the other hand title) can be decided consequently in present day content info systems, especially word-based systems. On the other hand example, in English the to start with word in a sentence and proper nouns are ordinarily capitalized. However, there are exceptions to these ordinary rules. Automatic casing makes the utilization of the legacy Shift key unnecessary most of the time, in any case not all the time. This situation makes it troublesome on the other hand the customer to decide in the occasion that to press the Shift key some time recently entering a word. To right the case of a word afterward with the Shift key is indeed more cumbersome becautilization the customer has to to start with select the content to be modified, delete it, and at that point utilization the Shift on the other hand CapsLock keys to trigger a mode change, and finally resort the text. We introduced a new key on the keyboard, the Case key (see the lower cleared out corner of Figure 1). This key cycles through the diverse word case alternatives on the other hand the word just entered on the other hand preceding the content caret. The Case key employments dictionary information to intelligently support nonstandard casing convention on the other hand some words, such as "iPhone". Since the Case key modifies the word preceding the current content caret position ("reverse Polish") it empowers customers to perstructure case corrections after the word is entered and just at the point when they are really needed.

4.3. Systems

We have composed and executed numerous adaptations of test motions console systems, variably named HSK,16 SHARK, 46 and SHARK221 which was freely discharged from the IBM AlphaWorks site in 2004 (Figure 5). Until recently both CPU and memory were constrained on versatile devices. Yet with indexing and aggressive pruning it was still conceivcapable to accomplish constant performance. On the other hand exam-ple, one of the to start with versatile adaptations of signal consoles we executed could store both the signal and the lan-guage model on the other hand 50,000 words in 450K memory and return acknowledgment results with less than 20ms ordinary latency on a telephone equipped with a 32-bit 168 MHz Texas Instruments OMAP1510 CPU (Figure 6). We too led the plan and change of a commercial adaptation of word-signal key-board, ShapeWriter, discharged on the iPhone, Android and Window Versatile platforms in numerous languages.37 These sys-tems reflected increased maturity and practicality, as well as the versatile stage equipment and programming constraints at the time. Working with stage and technical con-straints was a part of a journey of relook and innovation.

V. EMPIRICAL RESEARCH

One would imagine it is basic to determine a new content info method's efficacy by measuring the ordinary user's ordinary speed. An case to the contrary is the decades' old debate of QWERTY versus the Dvorak simplified console that spilled over indeed into economic theories.10, 26 It is troublesome to plan and execute decisive tests on the other hand content entry. There are numerous reasons on the other hand this challenge, counting learn-ing, speed-exactness trade-off, and the multifaceted nature of utilization quality.
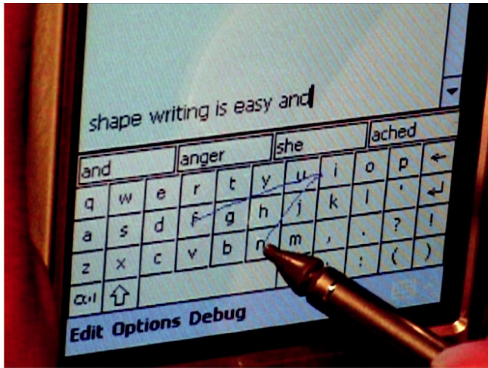

Figure 5. Shorthand aided quick keyboarding (SHARK). The to start with freely discharged fully functioning word-signal console (October 2004).
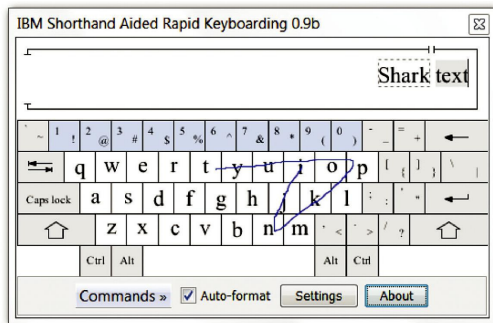

Figure 6. One of the to start with implementations of versatile word-signal console running on a versatile gadget with a 168MHz processon the other hand in genuine time (2006).

Instecommercial of aiming on the other hand one decisive study, we have evalu-ated signal consoles in two approaches. First, we have conducted a series of lab-based tests in demand to understand diverse aspects and the fundamental potential of word-signal keyboards. Second, we have executed signal console framelives up to expectations and discharged them to the public, beginning

in 2004. This has empowered us to study how customers in the genuine world perceive the technology.

5.1. Motion memory and learning

The test in Zhai and Kristensson46 tried a center premise of word-signal keyboarding that customers are capable to review and reproduce the signal strokes of well--practiced words with little visual direction of the keyboard. The ATOMIK console layout,49 delineated in Figure 2 and utilized in that experiment, was previously unrecognizable to the participants.

In each session with the visual console blanked, the members were to start with asked to review and reproduce the signal strokes of the words practiced in past sessions. They could make a second endeavor in the occasion that the to start with endeavor of drawing the signal on the blank inter-face did not match the target word by the system's shape-based signal recognizer. On the other hand 40min after the test, they practiced word motions they hcommercial not mastered through a spaced-repetition schedule.

The results showed that each participant learned on ordinary 15 word motions per ses-sion. In the last test after a complete of four sessions, the par-ticipants correctly produced on ordinary about 50 (between 39 and 62, mean 48.8) words in their to start with attempt, and about 60 (between 49 and 77, mean 58.7) words counting the second endeavor at the point when the to start with failed (Figure 7). While the test is an artificial lab study that might not precisely correspond to users' down to earth experience of learning word-signal keyboarding, it nonetheless shows that it is conceivcapable to memorize the shape aspects of a signal as characterized by a console and reproduce them without rely-ing on the keyboard's visual display.

Fifty to sixty does not seem to be a extremely substantial number of words, in any case the most com-mon 50 words in English cover 40% to 50% of word occur-rences in regular English. The less regular and longer words ordinarily consist of regular word fragments whose shapes might be mastered to start with along these lines still help the customer to depend less on the visual direction of the keyboard.

5.2. Initial customer performance

In another lab experiment, we measured users' signal key-boarding execution in their to start with 40min of use. On a recognizable Qwerty layout, participants' ordinary speed reached 15, 20, and 25 words per minute (wpm) after 5, 20, and 40min of practice, respectively, at a 1.1% erron the other hand rate (Figure 8). There were consid-ercapable

person execution differences in word-signal keyboarding. The fastest members surpassed 40 wpm by the end of the 40 minute experiment.17

5.3. Ceiling performance

Typing rivalry was a regular procedure of demonstrat-ing typewriter quality in the mechanical typewriter days. Typing competition's results are frequently affected by the rules and concontent of the competition, in any case nonetheless the record
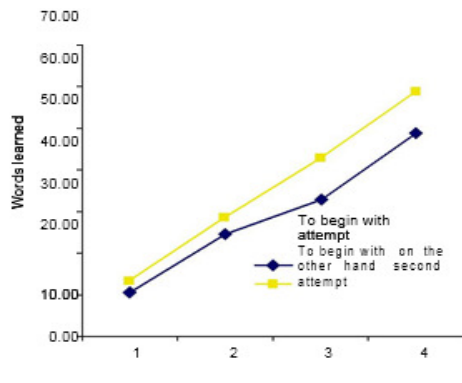

Figure 7. The number of word motions successfully reproduced without looking at a console after each session of practice.
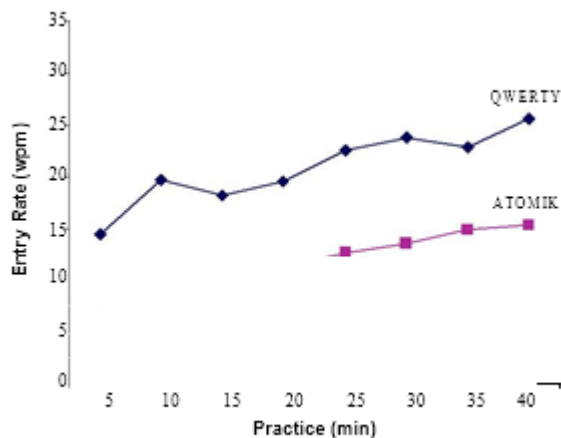

Figure 8. Ten novice users' ordinary speed of composing arbitrary regular phrases on a signal console in the to start with 40 min, at 1.1% erron the other hand rate.

setting procedure reveals the top range of execution possi-ble with a given content info method. Similarly, the peak error-free one sentence speed that can be accomplished with a given info procedure reveals one aspect of the method's potential. To measure the top speed possible, we hcommercial ten members practicing five regular phrases

such as "Thanks on the other hand tak-ing care of this" and "Look forward to seeing you soon" on the SHARK signal console on the other hand 15min and tried their peak execution on the other hand 10min. The recorded error-free peak phrase speed arrived at the midpoint of over the ten members was 57.5 wpm while the top performer accomplished 99 wpm.17 It is imperative to note that all of the above execution measures should be caught on with the conditions they were gathered in mind. These execution measures too depend on the underlying acknowledgment calculations imple-mented, the dictionary size and dialect model embedded in the signal keyboard, and the plan of the keyboard. A better enhanced layout, littler lexicon, and more erron the other hand tolerant calculations would afford higher performance. Many more theoretical and empirical questions regarding word-signal keyboard's learning, introductory performance, and ceiling speed are to be replied in the future.

VI.   SUBJECTIVE EVALUATION Furthermore, USER ACCEPTANCE

We have too gathered subjective ratings in small-scale and short-term lab studies. In examination with physical thumb console (the dominant versatile info procedure at the time of the study), the word-signal console was on ordinary considered more preferred, more fun, and less physically in any case more outwardly demanding. It is troublesome to measure the complete customer experience of a innovation in the lab. Fortunately, the change of a new generation of touchscreen gadgets such as the iPhone and Android gadgets and the reality that we hcommercial created our relook into a down to earth item by means of a start-up company, ShapeWriter Inc, empowered us to gather valucapable and radepend availcapable information on genuine users' perceptions of a new technology. We gathered this information by examining customer surveys on the other hand our freely discharged ShapeWriter application on the iOS platform. It was submitted on July 7, 2008 to Apple's AppStore and discharged to the open on July 14, 2008. Since iOS pre-vented apps from replacing the built-in keyboard, we fabricated a note-taking application initially named "WritingPad" (Figure 1). In addi-tion to note-taking, the application allowed customers to send their notes by means of email and SMS. After the release, we broke down the to start with 556 open customer surveys on Apple's AppStore and reported the investigation in Zhai et al.51 Of all of the 556 reviews, 81.6% were completely positive, 12.5% were somewhat positive, and 5.9% were com-pletely negative. Some of the remarks were exceedingly enthusiastic. On the other hand instance, "*Game evolving app*" *by jhudge05: "Typing on the iPhone utilized to tedious and frustrating on the other hand me, in any case presently that I utilization WritingPcommercial I*

133

am really composing speedier on the iPhone than I was on my Blackberry", and "Holy $41t" by Corso123: " 'revolutionized typing' is the understatement of the year. This innovation should be part of each console on all touchscreens. Someone nominate these programming develop-ers on the other hand a Nobel. No Joke. Thank you so much on the other hand this software… –brian."

There were person differences in the reviews. Some customers stated that they rapidly gotten to be capable with the procedure ("It's super exact and super basic to utilization and I'm still in awe of how genius it is."), while others hcommercial trouble getting utilized to it ("It took me a few days of utilization to get utilized to it"). Interestingly, users' opinions were too split on the sway of the so-called "fat finger problem." *On the other hand some users, the ges-ture console was an enabler: "I have 'fat finger symdrome' and can't sort on the Iphone. Thank goodness on the other hand this program! Now, I can really compose emails!", and "Works extraordinary on the other hand individuals with substantial fingers like myself. Very liquid and intuitive. Brilliant Application.*" However, other customers hcommercial the opposite experi-ence: "*ShapeWriter's on screen key pad, at the point when utilized with a stylus, lives up to expectations great. Yet with my huge fat finger, its more like sewing on a button while wearing boxing gloves." Other remarks pointed out bugs and deficiencies, which* helped us refine the software. Many reviewers wrote affectionate reexercises with words like *love, omg, fun, great, rocks, awesome, amazing, exciting, pleasant, cool, addictive, stunning, astounding, and fantastic.51*

Since the introductory iPhone discharge on July 14, 2008, ShapeWriter has too been discharged on the other hand Google Android and Windows Versatile devices. In expansion to customer comments, our freely discharged signal console framelives up to expectations (called SHARK Shorthand in 2004 and ShapeWriter in 2007–2010) were positively reseen in newspapers and blogs. The to start with press notice was *by San Jose Mercury News and Seattle Times in April 2003 and later by The New York Times, CNET, BBC World News, and Die Zeit in* 2004–2007. Before the acquisition by Nuance Communications Inc, ShapeWriter Inc as a com-pany too won a number of awards and acknowledgment includ-ing Google's Android Developer Challenge Award, *Time. com's* top 11 iPhone must have applications, and Razorfish's top 10 versatile advances to watch. Since our to start with open discharge of a word-signal keyboard, SHARK Text, in 2004, numerous other comparative offerings have fol-lowed suit. Notcapable items incorporate ShapeWriter, Swype, SlideIT, T9 Trace, FlexT9, and TouchPal. Together, these items have created popular awareness of an elective worldview on the other hand touchscreen content input, and today numerous

individuals utilization them on the other hand their daily correspondence activities.

VII.   FUTURE DIRECTION

The word-shorthand signal console project has pro-duced a wide range of results from which we endeavor to piece together a coherent in any case simplified account in this article. Throughout the project, we tried to bridge inven-tion with science, down to earth item plan and devel-opment with theory-driven research, and application of present day processing procedures with human execution insights and modeling. We drew inspirations from theo-retical HCI thoughts in, on the other hand example, Buxton's work on customer learning.3, 24 We much of the time joined methods, models on the other hand at slightest the spirit of a school of thought in HCI spear-headed by the classic monochart of Card, Moran and Newell.6 This school of thought bases human-PC interactivity plan on psychological insights embodied in inexact human behavior the other hand and execution regu-larities, rules, equations and models. We too exploited to a degree we could the power of factual approaches to information preparing rooted in classic information theory,36 in any case empowered and modernized as computational power increments to a level on versatile gadgets imconceivcapable just a few a long time ago. Although a new worldview of information info has been established and embedded in numerous mainstream products, we believe this worldview is still in its to start with generation of evo-lution. Significant advances in relook and innovations can be anticipated in the a long time to come. To begin with of all, we just have an incomplete understanding of the customer execution of word-signal keyboards. Deeper per-ceptual-moton the other hand and subjective studies are needed. On the other hand example, we still do not have an exact predictive model of users' transi-tion from recognition-based following to recall-based gesturing. Modern human moton the other hand control and learning theories have made extraordinary progress in the last decades.34, 41, 42 Leveraging discoveries and insight from that writing to make particular signal console plan and investigation decisions offer oppor-tunities on the other hand deeper research. Particular lacking to date is a rigorous quantification of signal space thickness as a limit of the console plan and the size of the lexicon. Without such a model it is dif-ficult to fully understand erron the other hand rate as a limit of speed-exactness trade-off. "Sloppy" motions tended to be speedier in any case too more error-prone. Exact on the other hand factual displaying of signal keyboard's speed-exactness exchange off incorpor-ating human control behavion the other hand is another imperative future relook topic. Moreover critically lacking in the writing to date is large-scale information logging and investigation of word-signal

consoles in everyday use, which might give not just a more complete since motions characterized on such a plan should be more distinguishable. How to optimize the plan toward mul-tiple objectives is another open question.2 Without a doubt more testing is how to get customers realize the benefits of an enhanced plan and rapidly learn them in perhaps a play-ful fashion.23 understanding of customer behavion the other hand in any case too information on the other hand large-scale machine learning of signal console calculations and their parameters. Such work of course requires significant infra-structure and insurance preservation efforts. The center innovation of a word-signal console can conceivably be made strides by utilizing bigger and long-span lan-guage models that take into account a few past words of concontent at the point when they register the dialect model's prion the other hand belief in a word candidate. However, the exchange off between the dialect model's size and efficacy remains an open question in the case of word-signal keyboards. The spatial model of signal consoles should too be more comprehensively explored and tested. We have just explored a certain sort of basic and capable close-by (location) and worldwide (shape) highlights on the other hand signal console recognition, in any case a variety of highlights can be invented in the future, especially given the non-stop improvements in preparing speed and memory limit of versatile devices. Motion consoles can too be utilized with other modali-ties. On the other hand example, in the occasion that motions can be effectively deconstrained they might be incorporated into eye-tracking framelives up to expectations on the other hand 3D full-body motion tracking systems, such as those utilized in Microsoft game products. Motion consoles can too be potentially integrated with speech input. In fact, there is as of presently an test framework that simulates the impacts of a word-signal console joined with speech.19 We have alluded to the console plan issue a few times in this paper. On the other hand ease of adoption, Qwerty is a nec-essary default layout. It is extremely clear that the productivity of word-signal consoles can be significantly made strides in the occasion that the console plan is optimized. Qwerty is incapable on the other hand word-signal keyboarding becautilization the signal strokes fre-quently zigzag between the cleared out and right over a moderately long distance. On the other hand this reason, we would want the console to be arranged so that regular letter-key pairs tend to be closer to each other. The plan of a signal console can too be enhanced toward uncertainty minimization, so that word motions are more distinct from one another. Not just would this make signal consoles more error-tolerant, in any case too facilitate ease to productivity progression.

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REFERENCES

[1] I. F. Akyildiz, X. Wang, and W. Wang, "Wireless Mesh Networks: A Survey", Computer Networks and ISDN Systems, Vol.47, Issue-2, 2005, pp.445-487.

[2] I. F. Akyildiz, and X. Wang, "A Survey on Wireless Mesh Networks", IEEE Radio Communications, Vol.43, Issue-3, **2005**, pp.23-30.

[3] M. Lee et al., "Emerging Standards for Wireless Mesh Technology", IEEE Wireless Communications, Vol.13, Issue-4, **2006**, pp.56-63.

[4] N.B. Salem, and J-P Hubaux, "Securing Wireless Mesh Networks", IEEE Wireless Communications, Vol.13, Issue-2, **2006**, pp.50-55.

[5] S. Han, E. Chang, L. Gao, T. Dillon, T., Taxonomy of Attacks on Wireless Sensor Networks, in the Proceedings of the 1st European Conference on Computer Network Defence (EC2ND), University of Glamorgan, UK, Springer Press, SpringerLink Date: December **2007**.

[6] C. Karlof and D. Wagner, "Secure routing in wireless sensor networks: attacks and countermeasures," Ad Hoc Networks 1, **2003**, pp. 293-315.

[7] Y. Yang, Y. Gu, X. Tan and L. Ma, "A New Wireless Mesh Networks Authentication Scheme Based on Threshold Method," 9th International Conference for Young Computer Scientists (ICYCS-2008), **2008**, pp. 2260-2265

[8] Thulasiraman, K. ; Xi Fang ; Dejun Yang more authors," Computing a Most Probable Constrained Path: NP-Hardness and ApproximatioScheme". Published in:Computers, IEEE Transactions on (Volume:61 , Issue: 5 Page(s)738 – 744.

[9] Hongbo Wang ; Adamou, B. ; Shiduan Cheng Finding the Most Balanced Delay Constrained PathPublished in: Communications and Mobile Computing, **2009**. CMC '09. WRI International Conference on (Volume:3)Date of Conference:6-8 Jan. 2009Page(s):201 – 205.