Using Placeholders for Keywords for Faster Text Input

Marco Beetz, Anton Alesik

1 INTRODUCTION

With ubiquitous computing in full progress text input on several devices is a fundamental aspect of the interaction between user and system. One may send messages from phones, computers, laptops and tablets. The unification of all use cases on each device for text input is that it should be implemented with a high usability but not necessarily with a high user experience. It has to be efficient and measuring effiency can be achieved by improving to factors, minimization of movement and language prediction (MacKenzie & Soukoreff, 2002). We present a novel system for the use case of a diary that enables the user to automatically fill placeholders if a certain word is typed. We conducted a study to compare our approach of enhanced text input with a traditional basic text input system.

2 APPLICATION

With a use case of a typical diary where the user only writes plain text and is not able to add pictures or something else we focus on text input as our primary interaction technique. We use a simple window that opens when starting the application.

2.1 Enhanced Text Input

For creating a diary the user needs the current date which we present as timestamps of the current time. If the user wants to add the current date to his entry he has to type DATE and the system automatically replaces DATE with the current timestamp in the traditional dd/mm/yyyy format. If the user wants to talk or in this case write to himself he can use NAME and the system automatically replaces NAME with a hard-coded name of the user. This method is implemented by using regular expressions and filtering them by listening and waiting for the usage of $. If $ is pressed the user can type NAME or DATE and is able to continue as mentioned above. If the user has finished writing he can press enter to create a new line. We save every sentence word by word in a CSV file which contains primarily timestamps, the word itself and the entry speed as columns. We create timestamps for the start of the test, the end of the test, the start of the word and the end of the word. Each word presents a unique row.

2.2 Scalability and Limitation

Our application is scalable to other use cases like a shopping list or another scenario where a user subsequently needs text input. By adding multiple words after the $ you can enhance the system to even more

automatically replaced text. Regarding the circumstances of our assignment, we only implemented NAME and DATE as placeholders. We hard-coded the name but this could be extended to entering the name via stdin before the window opens.

3 USER STUDY

We conducted an experiment with three participants for each condition. Our first condition is using the traditional approach for text input. Our second condition is using our novel approach to automatically replace certain keywords. Since the user is not necessarily aware of the current date and could use a placeholder for name if his name is unconventionally long, we argue that our approach of enhanced text input is more efficient than the traditional one. We chose a between-group-design with every participant using only one condition and not trying again.

To measure efficiency, we use the time needed to type a certain sentence as a common metric. The sentence is always the same:

"$DATE Lieber $NAME, heute kannst du glücklich sein. Denn es war ein wunderschöner Tag!"

To support MacKenzie & Soukoreff (2002) and their approach that faster is better we create a hypothesis:

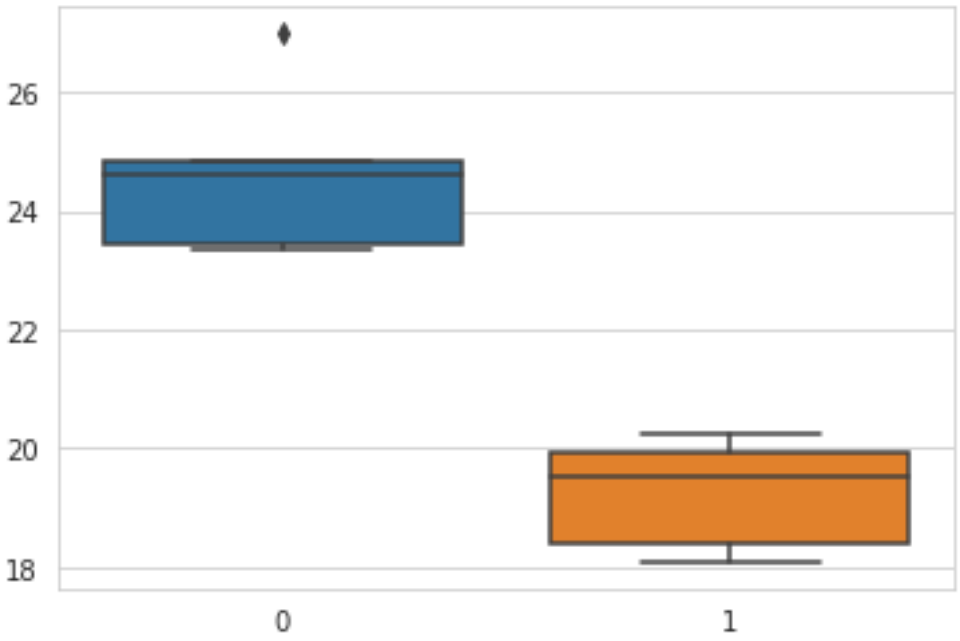
H0: Subjects that use the traditional text input method complete the sentence in less time than subjects that use the novel text input method.

H1: Subjects that use the traditional text input method complete the sentence in the same or more time than subjects that use the novel text input method.

4 RESULTS AND DISCUSSION

The first condition with traditional text input and the second condition with enhanced input was conducted with five participants per group. We consider the delta between the first timestamp (first key is pressed) and the last timestamp (enter and therefore new line is pressed) as our most important data. We collected CSV-like data and calculated the delta with seconds as unit.

The results for the first conditions are presented: The mean is 24.641 seconds, the standard deviation is 1.47, with 23.434 as minimum value and 26.981 as maximum value. The results for the second group are presented: The mean is 19.2416, the standard deviation is 0.944, the minimum value is 18.091 and the maximum value is 20.24. We visualize the data with a box plot. The blue box on the left (0) shows the first condition and the orange box on the right (1) shows the second condition.



Even though it is widely recommended to use a sample size of n=15 probands to achieve significance there are possibilities to conduct a t-test with smaller sample sizes like n>=5 (De Winter, 2013). There is a statistical significance between the first condition and the second condition (t=6.909, p=0.0001). We reject our null hypothesis and confirm our alternative hypothesis that subjects that use the traditional text input method complete the sentence in more or the same time than subjects that use our novel text input method.

We outline the fact that our novel text input method helps the user to accomplish the same task in less time. Since decreasing the number of characters needed to complete a word should go hand in hand with taking less time our goal is achieved. Further studies should consider topics like generalizability for more sentences with shorter placeholders and should include measuring error rate as another important metric for the performance of text input.

REFERENCES

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