

KLM analyses

Karolina Zurowska

zurowsa.kar@usask.ca

Department of Computer Science
University of Saskatchewan

Svetlana Slavova

sds797@mail.usask.ca

Department of Computer Science
University of Saskatchewan

ABSTRACT

This paper is a report about two KLM analysis of a USB plug-in for MSN and the traditional desktop system. The assignment is carried out in a group of two CMPT 811 students – Svetlana Slavova and Karolina Zurowska.

INTRODUCTION

Part 1 of the assignment is an implementation of USB plug-in for MSN. In order to complete part 2 of the assignment, the USB plug-in is used to gather data about the behavior of the augmented MSN application. Two KLM analyses are performed: (i) MSN with the USB plug-in and (ii) the standard MSN.

EXPERIMENTS

KLM analysis of MSN with the USB plug-in

In order to change the user status in the MSN application, using the USB plug-in, the following actions must be done:

1. To move the hand to the slider
2. To move the slider to the position, which corresponds to the desired new status

After applying the rules of the KLM analysis (only rule 0 is applicable), the predicted time to complete the task can be calculated as follows:

$$T = T_H + T_M + T_S$$

Where T_H is the time needed to the user to move the hand to the slider, T_M is the time needed for mentally preparation, and T_S is the time needed to move slider of the phidget to the desired status. The values of T_H and T_M are known and are **0.4 seconds** and **1.35 seconds** respectively. Time T_S is not known and must be evaluated. In order to do so, the following experiment is done: It contains 66 trials, which change the status of the user, using the USB plug-in. The average calculated time is **2.06 seconds**, i.e. $T_S = 2.06$ seconds.

As a result, the total predicted time, needed to change the user's status using the phidget is:

$$T = T_H + T_M + T_S = 0.4 + 1.35 + 2.06 = 3.81 \text{ seconds}$$

KLM analysis of standard MSN application

In order to change the user status in the traditional MSN application, the following actions must be done:

1. To move the hand to the mouse
2. To point with the mouse to the MSN application
3. To activate the MSN window by double-click on the MSN icon
4. To point with the mouse to the select box, which contains the possible statuses of the user
5. To click on the select box by pressing a mouse button
6. To point to the desired status
7. To select the desired status by pressing a mouse button

After applying the rules of the KLM analysis (only rule 0 is applicable), the predicted time needed to change the user's status can be calculated as follows:

$$T = T_H + T_M + T_P + T_{BB} + T_P + T_B + T_P + T_B$$

Where $T_H = 0.4$ seconds is the time needed to the user to move the hand to the mouse, $T_M = 1.35$ seconds is the time needed for mentally preparation to activate the MSN window, $T_P = 1.1$ seconds is the time for pointing to the icon of the MSN application, $T_{BB} = 0.2$ seconds is the time needed to activate the program, $T_P = 1.1$ seconds is the time for pointing to the select box with all possible statuses, $T_B = 0.1$ seconds is the time for clicking on the select box, $T_P = 1.1$ seconds is the time needed to point to the desired status, and finally, $T_B = 0.1$ seconds is the time for changing the status.

As a result, the total predicted time, needed to change the user's status in a standard MSN application is:

$$T = 0.4 + 1.35 + 1.1 + 0.2 + 1.1 + 0.1 + 1.1 + 0.1 = 5.45 \text{ seconds}$$

Measuring the actual time of standard MSN application

In order to measure the actual time, needed to change the user's status, 19 trials in total are conducted by two participants. The observed time is measured from activating the MSN application to selecting the desired status. As a result, the calculated average time is as follows:

$$T = 5.19 \text{ seconds}$$

This time does not include the time needed to move the hand to the mouse. The reason for this is that such an experiment is hard to be controlled.

Results

The obtained results are presented in the table below. They show that using the phidget to change the user's status is faster than the standard MSN application. The predicted time for the traditional MSN application is close to the measured time.

Table 1. Results comparison

N	Experiment	Time, seconds
1	KLM analysis of the MSN application with the USB plug-in	3.81
2	KLM analysis of the standard MSN application	5.45
3	Real time of the standard MSN application	5.19

CONCLUSIONS

The results of the conducted experiments show that the phidget can reduce the time needed to change the user's status of a MSN application. The reason for this is that the phidget requires only two actions to be performed – reaching the slider & moving the slider to the desired status. Although the error rate is not observed in the experiments, it is expected that the number of errors increases when dealing with the USB plug-in. This is due to the fact that the user must remember the positions of the slider that correspond to the specific statuses. However, this issue can be solved by labeling the different positions of the slider.

The KLM analysis can be used to predict the time needed to perform a specific task. As observed, the real time and the predicted time needed to change the user's status are similar.