

M1 Computer Science – UE Project

Logbook : behind the scenes of documentary research

The items you entered in this booklet will be scored

Full name and specialty :

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Topic :

Interaction Gestuelle

Instruction :

1. **Introduction (5-10 lines):** Briefly describe your research topic, its various aspects and issues, and the angle from which you have decided to address it.

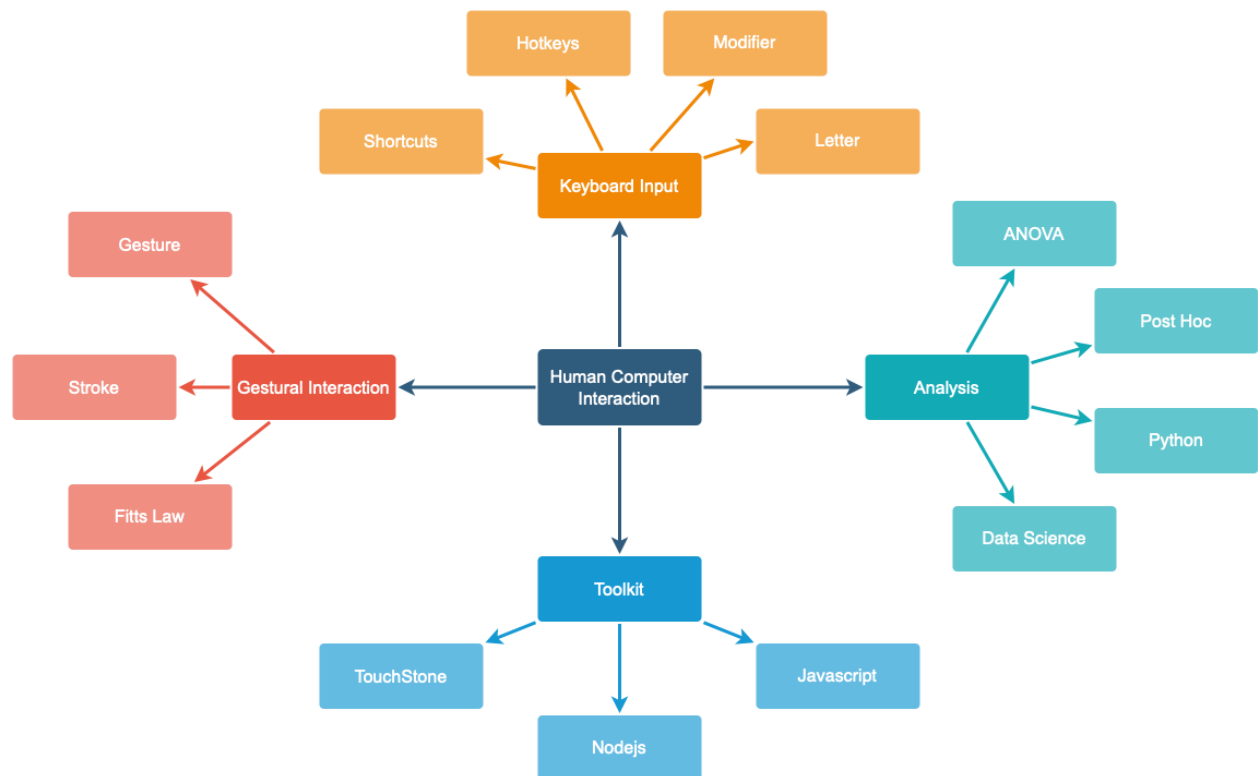
The purpose of this project is to compare gestural interaction with keyboard input. We will compare the two primarily on execution speed and learning speed. In order to do that, we will make an interactive survey to record and gather input data from users and perform analysis based on that data.

The research phase will primarily be about gestural and keyboard input, how to execute surveys for human computer interaction, and how to analyze the collected data. Several solutions will be studied for keyboard input such as using usual shortcuts, unusual ones and how we will combine them to what we call "modifiers" (CMD/Ctrl, Alt, Shift).

At the same time, we will experiment with gestural interaction to record human input in the most natural way possible with a mouse and a screen. The final goal is direction oriented action selection (North, North-West, West, South-West etc.).

Another aim of the experiment is of course to avoid compatibility issues at most and making it user-friendly for most people.

2. **Selected keywords:** List the keywords you used for your bibliographic research. Organize them in the form of a mind-map.



3. **Description of the documentary research (10-15 lines):** Describe your use of the different research tools (search engines, database, catalogs, bounce search, etc.). Then compare the tools to each other. What sources did they allow you to access ? What are their specificities ? What is the level of specialization?

We've primarily used Google Scholar as it contains the biggest database. However, we've run into resources that require payment many times. To get around this, we've tried searching the paid articles on Primo.

Primo is the search engine offered by Sorbonne Univeristé, it allows us to search through resources for free from many scientific websites such as ACM and Springer, which then redirects us to some otherwise paid resources. It has less resources than Google Scholar, but since the articles are published on official scientific websites. The authority is more guaranteed.

The professor has also given us some articles to start with, thanks to his help, we were able to derive some keywords from the articles in order to deepen our research. We've also included the documentation of a software we are supposed to use as it provides introductions to the domain as well as instructions to the software.

We found lots of useful information in those documents showing us for instance how we can use shortcuts that have no memory link to the user, or that most keyboard hotkeys are stacked on the left and rarely use digits.

Apart from the research from the domain of computer science, we've also consulted some psychological research papers (not included in bibliography since they're not relevant to Human Computer Interaction) in order to look at examples of establishing hypotheses, creating correlation charts and doing ANOVA tests from the data collected. This could be extremely helpful for writing analysis on our experiments.

4. **Produced bibliography within the framework of the project:** Use the ACM standard.

Caroline Appert and Shumin Zhai. 2009. Using strokes as command shortcuts: cognitive benefits and toolkit support. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, Boston MA USA, 2289–2298. DOI:<https://doi.org/10.1145/1518701.1519052>

Alexander Eiselmayer, Chat Wacharamanatham, Michel Beaudouin-Lafon, and Wendy E. Mackay. 2019. *Touchstone2: An Interactive Environment for Exploring Trade-offs in HCI Experiment Design*. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, ACM, Glasgow Scotland Uk, 1–11. DOI:<https://doi.org/10.1145/3290605.3300447>

Tovi Grossman, Pierre Dragicevic, and Ravin Balakrishnan. 2007. Strategies for accelerating on-line learning of hotkeys. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, San Jose California USA, 1591–1600. DOI:<https://doi.org/10.1145/1240624.1240865>

Frederic Kaplan. 2009. Are gesture-based interfaces the future of human computer interaction? In *Proceedings of the 2009 international conference on Multimodal interfaces (ICMI-MLMI '09)*, Association for Computing Machinery, New York, NY, USA, 239–240. DOI:<https://doi.org/10.1145/1647314.1647365>

Gordon Kurtenbach and William Buxton. 1994. User learning and performance with marking menus. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '94)*. Association for Computing Machinery, New York, NY, USA, 258–264. DOI:<https://doi.org/10.1145/191666.191759>

Christof C. van Nimwegen, Daniel Burgos, Herre H. van Oostendorp, and Hermina H. J. M. Schijf. 2006. The paradox of the assisted user: guidance can be counterproductive. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '06)*. Association for Computing Machinery, New York, NY, USA, 917–926. DOI:<https://doi.org/10.1145/1124772.1124908>

Jussi P. P. Jokinen, Sayan Sarcar, Antti Oulasvirta, Chaklam Silpasuwanchai, Zhenxin Wang, and Xiangshi Ren. 2017. Modelling Learning of New Keyboard Layouts. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, New York, NY, USA, 4203–4215. DOI:<https://doi.org/10.1145/3025453.3025580>

Oliver Bau and Wendy E. Mackay. 2008. OctoPocus: a dynamic guide for learning gesture-based command sets. In *Proceedings of the 21st annual ACM symposium on User interface software and technology (UIST '08)*. Association for Computing Machinery, New York, NY, USA, 37-46. DOI:<https://doi.org/10.1145/1449715.1449724>

Frederic Kaplan. 2009. Are gesture-based interfaces the future of human computer interaction? In *Proceedings of the 2009 international conference on Multimodal interfaces (ICMI-MLMI '09)*, Association for Computing Machinery, New York, NY, USA, 239–240. DOI:<https://doi.org/10.1145/1647314.1647365>

G. Julian Lepinski, Tovi Grossman, and George Fitzmaurice. 2010. The design and evaluation of multitouch marking menus. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '10)*, Association for Computing Machinery, New York, NY, USA, 2233–2242. DOI:<https://doi.org/10.1145/1753326.1753663>

Stuart K. Card. 1982. User perceptual mechanisms in the search of computer command menus. In *Proceedings of the 1982 Conference on Human Factors in Computing Systems (CHI '82)*, Association for Computing Machinery, New York, NY, USA, 190–196. DOI:<https://doi.org/10.1145/800049.801779>

5. **Evaluation of sources (5 lines minimum per source):** Choose 3 sources from your bibliography, describe how you found them, and critically evaluate them using the criteria seen on the TD materials.

Using Strokes as Command Shortcuts: Cognitive Benefits and Toolkit Support

Provided by the professor.

Date: 2009, keyboard and gestural input were already in use in that era

Relevance: This paper is very useful for our project as it provides the information on how to implement the recognition of the gestural and how to design good input. Furthermore, as it compares gestural shortcuts and keyboard shortcuts, our project could very much base on the result drawn by the paper.

Provenance: One of the authors is a researcher in Paris Saclay, the other one is a research scientist at Google. The paper is sponsored and published by ACM.

Content rigor: All the references have been verified by the links to other papers.

Aim: The paper is from the proceedings of the SIGCHI conference in 2019. The intention of this paper is clearly to promote the use of gestural input.

Touchstone2: An Interactive Environment for Exploring Trade-offs in HCI Experiment Design

Documentation of the software.

Date: 2019, the tool is very recent

Relevance: The paper helps use Touchstone to generate user profiles and tests, it also helps us understand the general obstacles while doing tests in public.

Provenance: The authors are researchers from Paris Saclay, and University of Zurich. The paper is sponsored and published by ACM.

Content rigor: All the references have been verified by the links to other papers.

Aim: The paper aims to inform on the utilization of Touchstone.

Strategies for Accelerating On-line Learning of Hotkeys

Found by Primo in the database of ACM.

Date: 2007, keyboard and hotkeys were already popular in 2007

Relevance: The paper analyzes why hotkeys are not widely used by the general public and proposes alternative implementations in order to motivate and encourage users to learn and master hotkeys. The subject will also be discussed in our own project.

Provenance: All the authors are researchers from University of Toronto. The paper is sponsored and published by ACM.

Content rigor: All the references have been verified by the links to other papers.

Aim: The paper aims to promote keyboard shortcuts, but it does not mention the attitude toward gestural input.

You logbook must be sent at:

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Reminder : the TD materials are available at the following address:

<http://www.pearltrees.com/formationbsu/master-info/id23514400>