Human-Computer Interaction

Assignment P4

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1 GOMS MODEL: CONTACTING A PROFESSOR

For the development of a GOMS model for the goal of contacting a professor asking them for information about a grade, first, we need to explicitly mention all the main components in such goal, which are:

- Initial situation: There is a doubt (and potential issue) related to the grade of an assignment, and a student wants to contact their professor to ask them about it.
- Selection rules: Given the nature of the goal, which is to communicate something, two natural rules come to my mind. One related to time and another one related to space. If one wants to perform some kind of asynchronous communication or is it not possible to be at the same place and time as the professor, one might opt for a method such as sending an email. Whereas if it is possible to stay simultaneously and space as the professor, one might prefer to meet in person with them. Additionally, two more rules were taken into account. The first one, assuming this GOMS model is developed only for OMSCS courses, is whether we follow the rules established by most OMSCS courses that already have a default communication channel between students and instructors, usually the course's forum. And, finally, we might also consider if there is a closer relationship between the student and the professor that allows them to have more direct communication regardless of the time/space limitations. So we have a total of four selection rules.
- Methods: based on the several selection rules previously described, here are some of the most common methods to contact a professor: i.) Sending an Email; ii.) Posting a private post on the course's forum; iii.) Go to office hours and meet in person; iv.) Contacting the professor personally through social media or their personal phone number (chat or call).

- Operators: Given the length and variety of different operators for each method, they will be explicitly shown along with their estimated execution times within a GOMS model illustration available.
- Ultimate goal: The professor gets notified about the student's request for information about their assignment´s grade.

This GOMS model and its components can be found in figure 1.1.

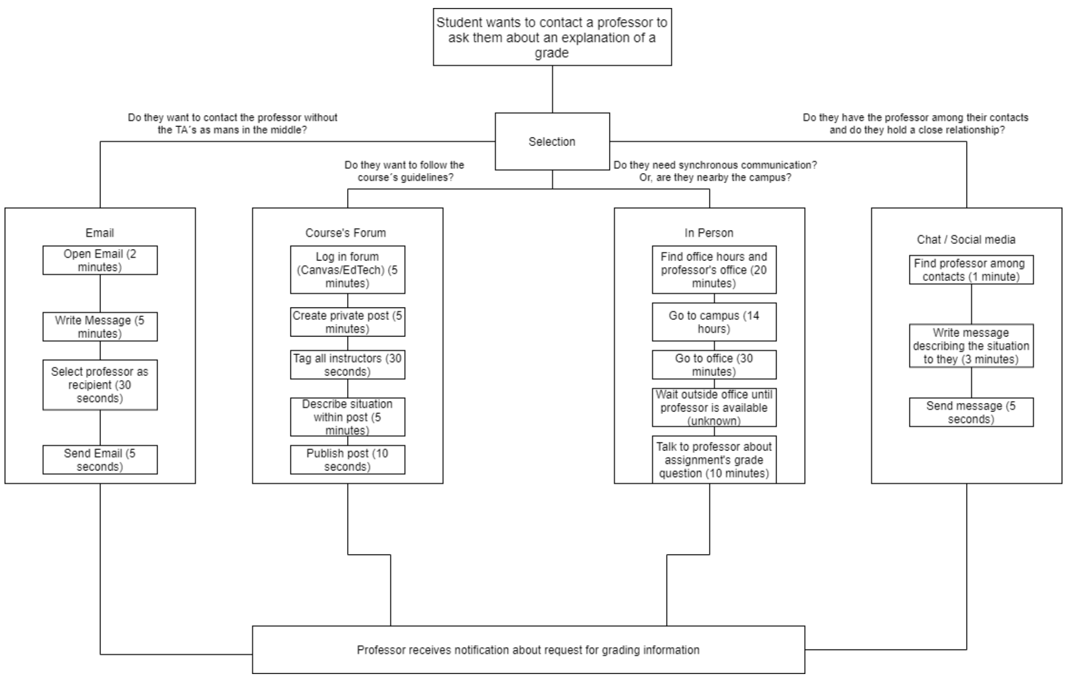

Figure 1.1 GOMS Model For Contacting A professor

2 HIERARCHICAL TASK ANALYSIS: SUBMITTING ASSIGNMENT P4

During this section, a hierarchical task analysis describing the task of submitting this assignment in Canvas and receiving its grade and feedback will be presented. According to the assignment instructions, no further explanations will be given for the model to be self-explanatory and also it will be shown using plaintext.

Completing assignment P4:

1. Doing deliverable for assignment P4
    1.1. Check assignment requirements
        1.1.1. Log into canvas

- 1.1.2. Go to the HCI course´s menu
  - 1.1.2.1. Click on the “Dashboard” label on the canvas interface
  - 1.1.2.2. Click on the HCI course card
- 1.1.3. Select Assignment P4
  - 1.1.3.1. Click on the “assignments” label on Canvas
  - 1.1.3.2. Scroll down until finding the assignment P4
  - 1.1.3.3. Click on the assignment P4 text
- 1.1.4. Go to assignment instructions
  - 1.1.4.1. Click on the hyperlink pointing to the instructions
- 1.1.5. Read the instructions

1.2. Create a new document for the report
- 1.2.1. Log into Google docs
- 1.2.2. Select JDF format template
- 1.2.3. Copy template into a new file

1.3. Write the assignment report
- 1.3.1. Go to the new file previously created
- 1.3.2. Answer Question 1
- 1.3.3. Answer Q...
- 1.3.4. Answer Question 4

1.4. Download report
- 1.4.1. Click on file tab
- 1.4.2. Click on the “download” button
- 1.4.3. Click on the “PDF document” label

2. Submitting deliverable document

2.1. Login to Canvas

2.2. Go to the HCI course´s menu
- 2.2.1. Click on the “Dashboard” label on the canvas interface
- 2.2.2. Click on the HCI course card

2.3. Select Assignment P4
- 2.3.1. Click on the “assignments” label on Canvas
- 2.3.2. Scroll down until finding the assignment P4

2.3.3. Click on the assignment P4 text

2.4. Do assignment submission

2.4.1. Click the "start assignment button"

2.4.2. Attach the assignment deliverable

2.4.2.1. Click the "choose file" document

2.4.2.2. Find the deliverable document among the files on the computer

2.4.2.3. Double click the deliverable document file

2.4.3. Check the checkbox accepting the end-user license agreement.

2.4.4. Click on the "submit assignment"

3. Receiving grades and feedback for assignment

3.1. Wait until the assignment grades are published (asynchronous task)

3.2. Visit canvas frequently checking for new notifications about updates of your grades

3.2.1. Log in to Canvas

3.2.2. Click on the "dashboard" label on Canvas

3.2.3. View if the bell icon has turned yellow on the HCI course card.

3.3. View notification if available

3.3.1. Click the bell icon on the course card

3.3.2. Read the notification announcement title to verify whether grades have been posted

3.4. Check the assignment grade if available

3.4.1. Click the HCI course card

3.4.2. Click on the "grades" label on Canvas

3.4.3. Scroll until finding the assignment P4 label

3.4.4. Check the score column on the assignment record to verify the grade

3.5. Check feedback if available

3.5.1. Click on the text globes icons on the assignment record

3.5.2. Read feedback

3 DISTRIBUTED COGNITIVE SYSTEMS: SOCIAL COGNITION

3.1 Driving without GPS

A situation consisting of a married couple with a map driving could be interpreted as a distributed cognitive system consisting of the pilot as the main actor, the co-pilot as a human artifact with whom the pilot performs some social interaction. And, finally, the map which the co-pilot interacts with.

Now, getting deeper into the analysis of this system we can say that the cognitive load from the driver is greatly reduced thanks to the collaboration with the artifacts previously mentioned. Thanks to their help, the pilot can focus his cognition only on the action of driving, and of course, everything that this activity involves. Like being cautious about their surroundings, taking care of the dashboards controls, paying attention to the traffic signals, lights and all the different subtasks that pilots need to do when driving, which would be most of the perception and working / action cognition of the system. Then, the tasks of route planning (finding and selecting a path to the destination) and guidance are delegated to the co-pilot which relies on their interaction with a map. In this context, one could say that the map acts as the system's long-term memory. The co-pilot acts as the system's short-term memory since they memorize just the current route the system is going through and then exact directions the pilot follows (eg. turning right or left) acts as the system working memory which is executed by the pilot. And, finally, there is a lot of social cognition happening in this system that might enhance its overall perception. For example, once a route has been selected, the co-pilot might provide some of their cognitive power to support some of the tasks previously mentioned such as identifying traffic signals or harmful objects on the road which can enhance the system's cognition and reduce the stress on the pilot. Plus, we are talking about a married couple so it makes sense they know a lot about each other. So, for example, the co-pilot might select the best route according to their partner preferences even without communication between them, or the level of cognitive support might change based on how much trust the co-pilot has in the pilot's driving skills.

Nevertheless, this system might change and include several other actors based on the circumstances. For example, if the pilot knows in advance the best route to their destination, they won't need the co-pilot to act as their short term memory but instead they'll need to rely on their own, which opens the possibility for the co-pilot to perform some other tasks to support the system. The same might happen if instead the copilot is the one who knows the route, the map might be useless in this case. Or even more interesting, maps are hard to use, so there will be times when this artifact will be not enough and the system will have to add more artifacts through social interactions. We see this very often when we are lost and we ask random people for indications about how to get to a place.

3.2 Driving with GPS

Now, if we compare the previous scenario with a system composed solely of the pilot and a GPS we could say that the effectiveness of the system increases since it doesn't need to rely on a human interpretation of a map but rather can trust the precise, real-time information provided by a GPS. Nevertheless, the interaction between the GPS and the pilots increases the pilot's cognitive load and due to the loss of a co-pilot, the system's overall perception also decreases, basically we've lost one human brain and two eyes on the road. Also, as we stated before, GPS is very precise so it's not pretty much likely that a pilot might need to ask for external assistance through social interaction. That being said, the particular social interactions we are losing in this scenario are three, i.) The interaction between pilot-copilot, ii.) the potential addition of external human artifacts and the interactions that come with them, and iii.) the complex and advanced interactions and decisions making between a couple of married people.

So, based on the previous paragraphs we can see how social cognition reveals a lot about the interactions that happen between the different individuals of the system in each situation, and we can even go as far as to check what's going on each of them individually at a cognitive level. Therefore, increasing our understanding of the system as a whole. Finally, social relationships and interactions are powerful tools that can enhance the total cognitive power of a tool. However, due to their social nature, they add complexity to the system that is not easily measured. That being said, the success or failure of the system might depend on how well these relationships are used. In the previous example, I'd say that definitely, the relationship between pilot-copilot can increase the system's overall ability to operate due to the increased perception, but given the less precise ability for route planning compared to the GPS, maybe the effectiveness measured in time might be less.

4 DISTRIBUTED COGNITION: TAKING NOTES OF A MEETING

Previously, I described the task of taking notes from my work meetings. Which consists of me attending a meeting, listening to the people on it, gathering information, and finally writing down the most important information for future usage. When performing this task, I´d usually use paper and pencil or, even better, an iPad and a Stylus, which are the main interfaces associated with the task of writing. Nevertheless, in the past, we just analyzed this task from the perspective of directness and only took care about the action of writing. I didn't go deeper and tried to analyze what happens in my mind and the cognitive load and activities associated with it. So, during this section, I will analyze this task from the perspective of a cognitive system, classifying its different components and artifacts and explaining the way they interact with each other.

Before going into that, let's briefly talk about the surrounding context of the task, it will be important for our analysis. The main task is to write some notes, so we'll need something to write and something to write on, also we´ll need a writer (in this case us) and finally, we´ll need something to write about which might come from several data sources such as electronic devices, written reports or even other meeting attendees. So with this context in mind, we can now easily list all the pieces of this system and the tasks they perform:

1. The user itself: This one should be very straightforward. Is the one responsible for executing the actions of the task, reasoning about what things to take notes of and perceiving the information from all the different data sources. It also interacts with all the different artifacts and system components described below.
2. The transmission media: It might be a stylus, a keyboard, a pen, or any other interface used to communicate the user with the recording interface. The roles of this component are, first, taking care of the actual task of writing so it is related with the cognitive task of action and, it also offloads from the user cognitive reasoning workload the task of figuring how to communicate and interact with the main interface, so it is also related to reasoning at a minor level. Additionally, we discussed previously during the assignment P2, depending on the task, this piece might change in shape, always aiming for the most directness possible in

order to build an invisible interface so the user can just focus on the task they are performing.

3. The recording interface: It might be an iPad, a sheet of paper, a computer, or any other medium responsible for keeping a record of the notes. This artifact acts as the user's long term memory because here is where all the notes will be stored. Potentially it might also reduce the cognitive reasoning load of the user if it runs some type of application that recommends templates about the best way to store certain types of information. For example, the way we take and organize notes for financial information might be different from the way we do it for a project's roadmap or a list of to-do's.
4. Meeting attendees: This is the most interesting part of the system by far. All the other individuals in the meeting are also part of the system. And their roles within the system might not be easily observed at first glance, but once we analyze their behaviors we might see how all of them enhance the user's perception and also can increase their short memory. For example, when the user comes without context to a meeting the cognitive load of figuring out what pieces of information are important and are worth taking notes is simply just high, therefore, usually we rely on the presenter to specify which parts of the meeting are important and for what reason. A good example of the previous situation is a professor giving a lesson to their students, students don't know what are the most important things and without guidance from their professor they might end up taking notes of everything and cluttering their notes with a bunch of irrelevant information (which is in fact a very common situation). Note how interesting this is, because this type of behavior is socially expected from a presenter, and, therefore, there is a lot of social cognition involved. Additionally, other attendants such as coworkers or peers can increase the user's perception and reasoning by doing questions, highlighting things the user did not figure out and also taking their own notes which the user can compare with in the future. Finally, these individuals also enhance the user's short and long term memory since if the user cannot remember something from the meeting, he can just simply ask about it to their peers or the presenter and then take notes from the information given from them, once again, this could not be possible without social cognition which makes this component really exciting.

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