CS6750 Human Computer Interaction
Assignment P4

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1 QUESTION 1

GOMS Model performs task analysis based on the human processor model. It focuses on the task that user needs to perform for accomplishing a certain goal. The task can be performed using a variety of different methods. Each of the methods have a set of operators for completing a series of steps. Finally, the GOMS model maintains a selection criteria to choose from the different methods to accomplish the goal.

For the task where the user has to contact the professor to ask for an explanation of a grade, the GOMS model can be established as:

- **Initial situation:** An Online Georgia Tech student needs to contact the professor to seek clarification on the grade the student has earned on a recently submitted assignment. The student is not clear on the grade and would like to understand the rationale behind the grade received.
- **Selection Rules:** There are multiple ways in which the student can reach out to the professor, hence selection rules are needed to conclude the best way for the student to contact the professor. The method will be selected on the basis of **efficiency** and how effectively it enables the student to meet the goal of the task. Here are the selection rules added for this task:
    - Can the interaction happen in presence of other students?
    - Any Office Hours Scheduled for the course?
    - Does the interaction require to and fro with the Professor?
    - Is the communication formal?
    - Direct Message with the Professor required?
    - Can the message to the Professor sent via TA?
- **Methods :** Student can contact the professor using these methods:
    - Check for Office Hours
    - Send an Email to the professor
    - Make a private post on Ed Discussion to send message via TA

- Send a direct message on Slack to the professor
- Meet the professor in person

Based on the methods and selection criteria, here is the pictorial representation

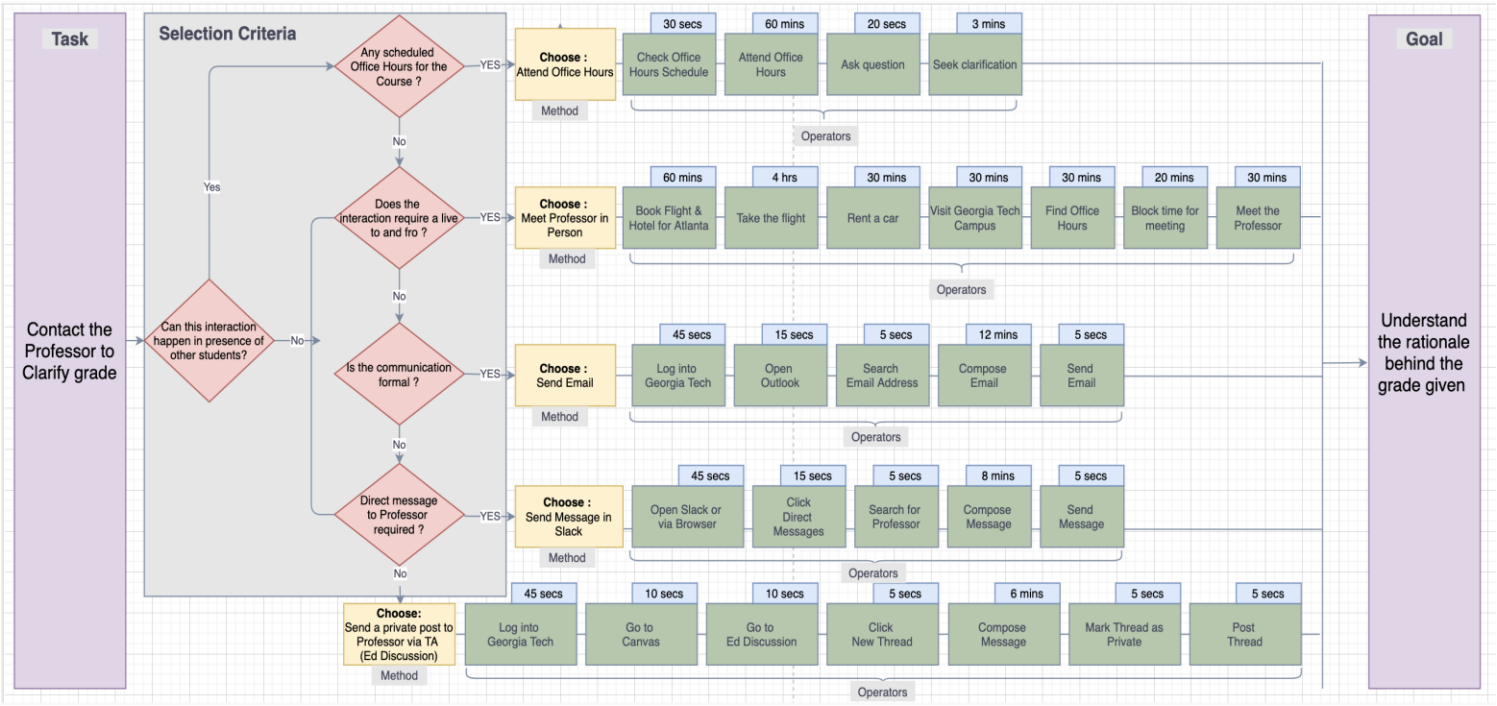

Figure 1 — GOMS Model to contact Professor to discuss grade

Assumptions: User has access to Georgia Tech Buzz port site and Canvas. Student is based in Florida and intends to take a flight to come to Atlanta for meeting the professor

2 QUESTION 2

Hierarchical task analysis for submitting the assignment to Canvas is outlined here:

Assumptions: User has credentials and Duo Mobile Installed

1. Submit Assignment
    1. Login
        1. Go to BuzzPort – Georgia Tech
            1. Open the Browser, preferably Chrome
            2. Go to the address bar located on the browser
            3. Type https//buzzport.gatech.edu/my/
            4. Directed to new page to enter GT Account, Password

2. Login to BuzzPort
    1. Left section of the page prompts to enter GT Account and Password
    2. Enter GT Account; email ID without gatech.edu
    3. Enter your Password
    4. Click the button 'Login'
3. Multi Factor Authentication (Browser)
    1. Locate a drop down labeled as 'Device'
    2. Confirm registered phone # selected by default
    3. Locate three green buttons with 3 options
    4. Confirm the 3 options listed : 'Send Me a Push', 'Call Me', 'Enter a Passcode'
    5. Click on 'Send Me a Push'
4. Multi Factor Authentication (Phone)
    1. Locate the registered phone , keep it handy
    2. Open the app 'Duo Mobile' on the phone
    3. Tap on the 'Request Waiting' message
    4. Tap on Approve to accept the request
5. Go back to BuzzPort for Georgia Tech
    1. Open the Browser, preferably Chrome
    2. Go to the address bar located on the browser
    3. Type https//buzzport.gatech.edu/my/
    4. BuzzPort homepage will be displayed

2. Assignment Section
    1. Access Canvas
        1. Locate 'Student' menu on the top l bar
        2. 'Student' option selected by default
        3. View Registration & Services section
        4. In Registration & Student Services locate Canvas icon; 1st icon
        5. Click on Canvas
        6. Directed to a new page 'Dashboard'
        7. Locate 'Courses' option on the left menu bar
    2. Access Course HCI
        1. Click on Courses from the left menu bar
        2. A bar pops with a list of courses
        3. Locate CS6750 : Human-Computer Interaction
        4. Click on CS6750: Human-Computer Interaction
        5. Directed to a Course Home Page
    3. Access Assignments section
        1. Left menu visible on the Canvas Home page
        2. Scroll to Assignments on the left menu
        3. Click on Assignments
    4. Access Assignment P4

1. Directed to new page - Assignments
2. Scroll to 'Upcoming Assignments' section
3. Locate Assignment P4
4. Click on Assignment P4
5. Directed to a New page for Assignment P4

3. Initiate Submit
    1. Start Assignment
        1. Locate 'Start Assignment' button; top right
        2. Click on 'Start Assignment'
        3. Directed to a new page for File Upload
    2. Initiate Upload
        1. Locate 'File Upload' option
        2. Scroll to 'Choose File' button under File Upload
        3. Click on 'Choose File'
        4. Dialog box to locate the Assignment file in the local drive will be presented
4. File Upload
    1. Locate Assignment File
        1. Click on drop down with the folders listed
        2. Select the folder with Assignment document
        3. Dialog box refreshed with the content of the folder selected
        4. Scroll through the dialog box to locate Assignment P4
        5. Click on Assignment P4
        6. Click on Open button on the bottom right corner of the dialog box
        7. Dialog box disappears
        8. Assignment P4 file listed next to Choose File
    2. Terms & Conditions
        1. Scroll down to check box to agree submission is an original work
        2. Click on Check box to confirm acceptance
        3. Locate Comments text box
        4. Add any additional comments if needed
5. Final Submit
    1. Submit Assignment
        1. Locate Submit Button ; bottom of the page
        2. Click on 'Submit Assignment'
    2. Submit Confirmation
        1. Directed to new page for submission
        2. Locate Submission section; top right
        3. View confirmation 'Submitted!'
        4. View Assignment P4 file listed

5. Assignment P4 file listed confirms a successful submission of Assignment

*Assumptions: A week has passed since the submission, Outlook is installed and user has the login setup. Alternatively, the user can also view the feedback by directly going to Canvas. The steps here cover the access via Outlook

2. View Grade and Feedback
    1. Check Email
        1. Go back to BuzzPort for Georgia Tech
            1. Open the Browser, preferably Chrome
            2. Go to the address bar located on the browser
            3. Type https//buzzport.gatech.edu/my/
            4. BuzzPort homepage will be displayed
        2. Access Outlook
            1. Locate 'Student' menu on the top bar
            2. Locate Registration & Services section
            3. Locate Office 365 (Email) under Registration & Student Services
            4. Click on Office 365 (Email)
            5. Directed to new page for Outlook
    2. View Email
        1. Access Inbox
            1. Scroll to Inbox listed; left panel
            2. Click on Inbox
            3. Locate email from CS6750 : HCI Course
            4. View Subject Assignment Graded : Assignment P4'
            5. Scroll to email received
    3. Review Email
        1. Access Email
            1. Click on the email received
            2. View email content on the right panel
            3. Scroll to link- You can view the assignment here
            4. Click link- You can view the assignment here
        2. View Grades and Feedback
            1. Review graded assignment
                1. Directed to new page for grades
                2. View Grade on the top right section
                3. Review feedback on the right panel

3 QUESTION 3

Prior to GPS, passenger played the role of a navigator using a copy of the map for directions. In this example, we will consider a married couple traveling in a

car, where one spouse is driving, the other is helping with navigation. The system here includes the married couple, map, road signs and car dashboard.

Distributed cognition is where actions, processes, senses are extended beyond the human brain and the entire system comprising of the artifacts, system and human works together to accomplish a goal. Driving is a high cognitive load activity, as it involves the driver to focus on the road, listen to the navigation instructions, read the road signs and also attend to the passengers in the car. In our example, the cognitive load of driving is distributed between couple, map, road signs and car dashboard. The different parts of the system performs the various cognitive activities

- **Perception:** Cognitive perception allows us to organize the information received from the different senses like hearing and seeing. In this scenario, there is audio feedback from the passenger giving instructions to the driver, car dashboard and road signs are providing visual feedback on the speed and gasoline. Similarly, map is providing a visual feedback to the passenger on the route. The driver is utilizing the audio feedback from the passenger and visual feedback from the dashboard and road signs to stay on route.
- **Memory:** The hard copy of the map with the passenger keeps track of the directions, the task to remember the route is offloaded to the map. Driver uses working memory to hear, interpret and execute. The passenger has short term memory to hold more details so that the passenger can remind the driver slightly ahead of time to avoid any sharp turns and immediate breaks while driving. The road signs are also part of the working memory as they help the driver to reconfirm the directions to stay on track.
- **Reasoning:** The driver is getting information from the passenger, road signs and the dashboard. Hence, driver performs reasoning by constantly evaluating the information fed. The passenger is performing reasoning by comparing the directions from the map with the road signs, this helps the passenger to give timely instructions to the driver. The map, road signs and dashboard are not necessarily performing reasoning here, however they are providing data points for the driver and passenger
- **Acting:** The cognitive process for acting is performed by the driver, passenger and dashboard. The driver is getting inputs from the passenger, road signs, to perform actions. The passenger is interpreting the map, understanding the progress they have made on route. Based on this data

points, the passenger is performing the action to give directions to the driver. Map is acting as a repository of the route instructions, road signs and dashboard are providing additional directions to stay on track with the route. The cognitive load of checking the car speed and gas is offloaded to the dashboard, so it is also acting by providing this data to the driver.

Comparing this when there is a lone driver with a GPS, the cognitive load of navigation is offloaded to GPS. The driver interprets the navigation details, road signs, car dashboard and acts accordingly. In the earlier example, the interpretation was shared with the passenger, as the passenger was reviewing the map and the road signs while giving the instructions. In case of a wrong turn, the passenger in an earlier example didn't have the ability to re-route. However, with GPS re-routing is doable. Audio feedback in a car is easily interrupted with a phone call or if it's an open roof car, then listening is harder. In these scenarios, human navigator may have limitations if expected to constantly repeat or asked to raise the volume of instructions.

However, the social component is high, as the human navigator acts as a morale support or companion for the driver. Also, if there are kids in the back seat, then the human navigator can share that load with the driver and attend to the kids. The social cognition reveals the emotions of the driver that perhaps distributed cognition does not. It uncovers the thought process of the driver and how the human navigator could be acting as a morale support for the driver. The human navigator could be pointing out interesting facts or places on the way that GPS may not necessarily do. So, it is evident that while GPS can offload the tasks from the driver related to navigation, however a human navigator helps to establish social relationships to maneuver through difficult situations while driving.

4 QUESTION 4

I would like to consider the task of creating the list for Grocery Shopping to elaborate on distributed cognition. A grocery list is usually prepared prior to going shopping so we don't miss out on any item. In a traditional task of preparing the grocery list, the cognition load is on the user and perhaps shared with spouse or roommate to check the refrigerator for the items that need to refilled or if any are nearing expiration date. Similarly, while shopping the user had to rely on someone at home to perform checks on behalf of the user to

reconfirm any missing item from the list. Now, if we consider the Samsung Family Hub Smart Refrigerator in this context, we can evaluate how the smart fridge has offloaded the task of creating the grocery list. The smart refrigerator comes with a huge display on the door that acts as an assistant for keeping track of groceries, refills needed and also items that are nearing expiration.

In this scenario, the user goes grocery shopping however the smart refrigerator shares the load of creating the grocery list. Rather than the individual tracking the items in the fridge that need to be refilled or are expiring, the refrigerator takes the load off from the user and maintains the list. In addition, when the user is out shopping and needs to reconfirm any missed item from list, then the refrigerator has a camera built-in that helps the user to check if anything missed from the grocery list. Also, the refrigerator can send notes and reminders to the user.

The following cognitive tasks can be attributed to the smart refrigerator:

- Perception: The refrigerator gives visual and audio feedback using the display, shows the list of items that need to be refilled. It sends the reminders to the user. The refrigerator helps in organization, identification and interpretation of the information for creating the grocery list.
- Reasoning: The refrigerator reviews the expiration date of the products to evaluate if the item should be discarded. It looks at the usage of a certain item and confirms if a refill is needed. Hence, given the evaluation the refrigerator performs, we can infer that reasoning is one of the cognitive load that has been offloaded
- Actions: Sending reminders to the users, creating the grocery list, checking on behalf of the user with the help of camera if an item is missed from the list and needs to be added. In addition, it also suggests recipes based on the ingredients and products available in the kitchen
- Memory: Refrigerator keeps track of the usage and continues to build on the grocery list.

Traditionally, this grocery shopping involved a couple in a household for creating the grocery list. The smart fridge shares the load, cognitive tasks like perception, reasoning and action are offloaded. We could soon be part of an era, where smart fridge places an online order for the essentials to be refilled, the product arrives, thereby eliminating the load for the user to even go shopping.