Assignment P4

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# 1 QUESTION 1: GOMS MODEL

This section will analyze a GOMS model created to contact a professor to ask for an explanation of a grade. The GOMS model emphasizes the user's as a processor when interacting with the interface, and we will discuss the ultimate goal, initial situation, selection rules, and available methods with operators.

Based on the task statement, the ultimate goal is to have a conversation with the professor about the grade. The initial situation of this task is the need to contact a professor regarding the grade.

There are multiple methods available to achieve this communication goal - posting a private thread on the Ed discussion board, having a face-to-face conversation with the professor, directly emailing the professor, or giving a phone call. Each method involves different operator sets to achieve the ultimate goal. Details are listed below with an estimated amount of time each operator takes to execute.

* *Ed discussion board:* Log in to the Ed portal (1 minute) → compile message (15 minutes) → select the assignment category (0.1 minutes) → set the thread private (0.1 minutes) → post the thread (0.1 minutes).
* *Face-to-face conversation:* take a flight to Atlanta (480 minutes), → find the professor's office (60 minutes) → brief introduction about myself (5 minutes) → discuss the reasoning behind the grade (30 minutes).
* *Email:* Log in to the Georgia Tech email (1 minute), → compile the message (15 minutes) → type in the professor's email to send (0.1 minutes) → send the email (0.1 minutes).
* *Phone Call:* Find professor's phone number (60 minutes), → open the keypad on the mobile (0.1 minutes), → dial the phone number (0.5 minutes) → brief introduction about myself (5 minutes), → discuss the reasoning behind the grade (30 minutes).

The selection rules above methods are based on how a conversation with a professor is expected to happen. Below are a few conditions to consider:

* Communicating with a professor about the grade is usually a formal conversation, so the phone call option is not considered.
* Grading-related matters are usually time-sensitive. If a regrade request needs to be submitted, the earlier the talk starts, the better. Therefore, the face-to-face communication option is ruled out by these criteria.

Concerning these selection rules, Ed discussion board and Email methods are preferred to complete this task.

# 2 QUESTION: HIERARCHICAL TASK ANALYSIS

In this section, we will be describing the task of assignment submission on Canvas and receiving the grades and feedback by applying the hierarchical task analysis.

1. Complete the assignment:
   1. Finish Ed Lessons:
      1. Log in to the Ed Lessons:
         1. Go to <https://edstem.org/us/courses/8277/lessons/>
         2. Enter the Georgia Tech email to continue;
         3. Type in the password to see the lesson list;
      2. View lectures 2.7 and 2.8:
         1. Scroll down the window to see the 2.7 and 2.8 options;
         2. Click on each section;
         3. Click through the list to finish the content;
   2. Check the assignment requirements:
      1. Go to this URL: <http://omscs6750.gatech.edu/fall-2021/assignment-p4/>
      2. Read each question carefully to understand the expectations for each question;
   3. Type the answers to each question:
      1. Copy the JDF format:
         1. Go to <https://docs.google.com/document/d/1BGv3ZSeo0dop50AEwcw_VPOAEJ2IdvkwYRv5dyubUNY/edit#>
         2. Click on “File” on the left top corner;
         3. Select the "Make a Copy" option;
         4. Select “My Drive” to save the copy;
      2. Type the responses to each question:
         1. Remove the sample text from the JDF template;
         2. Type in my answers to each section;
   4. Review and proofread;
   5. Export the file as a PDF;
2. Submit the assignment to Canvas:
   1. Log in to Canvas;
   2. Navigate to the CS6750 class page;
   3. Navigate to the assignment submission portal:
      1. Click on the “Assignment” tab;
      2. Click on “Assignment P4”;
   4. Upload the Assignment
      1. Click on the “Submit Assignment” button;
      2. Click “Choose File” on the prompt;
      3. Select the assignment from the local;
      4. Upload the assignment to Canvas;
   5. Click on the “Submit Assignment” button.
3. Receive the grade and feedback
   1. Check the Georgia tech email every day;
   2. Receive the Canvas notifications of assignment graded;
   3. Review the grade and feedback:
      1. Click the “click to view” link in the notification email;
      2. Check the grade on the right top corner;
      3. Click on the “View Feedback” to view the feedback
         1. Scroll down to see the full feedback

# 3 QUESTION: DISTRIBUTED COGNITION

## 3.1 Distributed cognition analysis for the navigation task before GPS

This section takes the system of navigation comprising a married couple, a map. And other artifacts as an example, then discuss the system from the perspective of distributed cognition. The ultimate goal of navigation is to drive to the destination. Below are the cognitive activities that are possibly happening along the way from different perspectives - the driver, the passenger, the map and the car.

* Perception

The driver performs the cognition task of perception by checking the driving conditions - traffic signs, weather, distance between other vehicles - and controlling the steering wheel, brake and gas pedal to drive. The passenger performs perception via map interpreting and route recognition along the way. The car completes the perception task by correctly responding to the driver's control - for example, adjusting the steering wheel accordingly.

* Memory

The driver needs to rely on long-term memory to obey the traffic rules and drive along all the way. The passenger performs the cognition task of short-term memory by keeping track of their route on the map. The car "memorizes" and keeps track of the gas status and how many meters have been driven. The map performs the memory task by listing all the roads and possible routes to the destination.

* Reasoning

The driver needs to monitor the car status by constantly checking and reasoning the stats from the speedometer and tachometer. Communication between the driver and the passenger is required to reason and pick the route to their destination. The map reasons the trails, roads and highways by adding textural explanations and notations wherever necessary.

* Acting

The driver needs to act on the driving task, interacting with the driving environment and communicate with the passenger if necessary. The passenger must interpret the map, ensure they are driving along the picked route, and remind them of turning directions or traffic restrictions. According to the driver's navigation, the car must be fully functional and act by moving forward and turning in the correct direction.

## 3.2 Compare and contrast the same situation with the driver using a GPS

The cognition tasks for a lone driver with GPS can be different from the above for the same driving task.

In addition to the perception task in the previous section, the driver perceives the actions suggested by the GPS. The GPS performs the perception task by locating and tracking the car in real-time and calculating the most reasonable route to reach the destination. The memory cognition task remains the same for the driver. The GPS is expected to "memorize" all the possible ways to the destination, where the car is and direction information. The GPS recalculates the routes by reasoning with the potential accidents, traffic restriction, accidents etc. In this case, the driver will need to interact with the GPS to drive, and the GPS needs to take the driver's inputs to generate a preferred route.

Regarding the social components, driving with GPS and driving with a human navigator are different. Communication between the married couple is necessary to arrive at the destination. However, verbal communication is not required when driving with the GPS because the GPS supports visual and audio interaction with the driver. By leveraging the existing traffic knowledge, advanced algorithms, and visualization, GPS interacts with the driver more efficiently to navigate to the destination and offloads the driver's cognitive resources of multi-tasking (driving while talking).

# 4 QUESTION 4: COOKING A MEAL

We will make cooking a meal (baked salmon) from Assignment P2 as an example. In P2, we discussed how human perceptions give the user feedback and how the feedback cycle helps the person complete the cooking task. We will focus on analyzing what each member of the system performs cognitive duties.

To bake a salmon fillet, we will need first to read the recipe, then use the chef knife to trim the salmon, season the salmon with salt and pepper, and bake the fillet in the oven. Given the associated interfaces, we first describe the pieces of this system as follows:

* The person who needs to cook the salmon;
* The recept listing all the ingredients and requirements;
* Salt and pepper shakers required to season the salmon;
* A baking pan to hold the salmon fillet;
* The oven to cook the salmon;

The cognitive tasks - perception, memory, reasoning and acting - performed by each member in the system are described below.

* *The person who needs to cook the salmon* needs to cognitively **perceive** to prepare the ingredients and **act** the cooking steps as instructed on the recipe. Then, the person will need to **reason** if the salmon fillet is cooked to a desired level at the end;
* *The recipe listing all the ingredients and requirements* performs the **perception** task by mapping the textual cooking steps to the actual cooking task and must **“memorize”** all the instructions for future use. Potentially, the recipe can also provide **reasoning** for each step.
* *Salt and pepper shakers needed to season the salmon -* the seasoning shakers need to **act** on the salmon and make it more flavorful.
* *A baking pan* - the pan needs to **act** to hold the fillet when baking in the oven. Otherwise, the salmon may fall apart, and the liquor from the baked salmon would make the stove hard to clean.
* *The oven to cook the salmon* - the oven first needs to **act** the baking task by preheating itself, maintaining the desired temperature and cooling itself down after the salmon is cooked. It is required for the oven to **perceive** and **memorize** the interior temperature and baking time to bake the salmon to the desired level.