CS6750 HCI Summer 2021:
Assignment P4

Nan Xiao
nanx@gatech.edu

1 QUESTION1 - CREATE GOMS MODEL

Objective:

> Create a thorough GOMS model for contacting a professor to ask for an explanation of a grade.

We will recap what is GOMS model from Joyner's lesson.

The GOMS Model (Joyner, 2016a)

1. G - Goals
2. O - Operators
3. M - Methods
4. S - Selection rules

Below is the GOMS model for the task.

Initial Situation - One have questions about a grade and need to contact a professor to ask for an explanation.

- Selection rules - If the question is general and contains no sensitive information, one should choose to use a public post on the Edstem forum.
  - **Methods - Edstem Public Post**
    - Operators - Enter URL of Edstem (30 secs)
    - Operators - Login with Gatech account username and password (30 secs)
    - Operators - Create new thread (3 secs)
    - Operators - Type in title (30 secs)
    - Operators - Select Category (30 secs)
    - Operators - Key in question (5 mins)
    - Operators - Leave Private unchecked (1 sec)
    - Operators - Click Post (1 sec)
- Selection rules - If the question is not a general one and contains personal information, one can choose to post privately on Edstem forum.

- **Methods - Edstem Private Post**
  - Operators - Enter URL of Edstem (30 secs)
  - Operators - Login with Gatech account username and password (30 secs)
  - Operators - Create new thread (3 secs)
  - Operators - Type in title (30 secs)
  - Operators - Select Category (30 secs)
  - Operators - Key in question (5 mins)
  - Operators - Check Private box (2 sec)
  - Operators - Click Post (1 sec)
- Selection rules - If there is someone asked related questions and get answered, you may be able to find the answer straight away. This should be used as the first method to try.
  - **Methods - Search Edstem Post**
    - Operators - Enter URL of Edstem (30 secs)
    - Operators - Login with Gatech account username and password (30 secs)
    - Operators - Click Search box (1 sec)
    - Operators - Key in the question (1 min)
    - Operators - Find answer in search results (5 mins)
- Selection rules - If there is someone posted related questions but not exactly for your case, you may ask follow-up questions in that question thread.
  - **Methods - Edstem Post follow-up question**
    - Operators - Enter URL of Edstem (30 secs)
    - Operators - Login with Gatech account username and password (30 secs)
    - Operators - Click Search box (1 sec)
    - Operators - Key in the question (1 min)
    - Operators - Find related question in search results (5 mins)
    - Operators - Click Add comment under that thread (1 sec)
    - Operators - Key in the follow-up question (5 mins)
- Selection rules - If you cannot find an answer on Edstem forum and not able to get reply using Edstem post, the last choice is to email the professor.
  - **Methods - Email the professor**
    - Operators - Google Professor's name (10 secs)
    - Operators - Find Professor's website and click through (1 min)
    - Operators - Find Professor's email address on the website (3 min)
    - Operators - Open the email app (10 secs)
    - Operators - Copy Professor's email address to "Send-to" (10 secs)

- Operators - Draft the email asking the question about the grade (5 mins)
- Operators - Send out email (3 secs)

Ultimate Goal - You question about the grade is answered and you understand the explanation.

2 QUESTION2 - CREATE HIERARCHICAL TASK ANALYSIS

Objective:

> Create a hierarchical task analysis of the task of submitting this assignment to Canvas and subsequently receiving one's grade and feedback.

While GOMS is using the processor view, Cognitive task analysis adopts the predictor view of a human's role in the system. It generally follows below common sequence: (Joyner, 2016b)

1. Collecting preliminary knowledge
2. Identify knowledge representations
3. Apply focused knowledge elicitation methods
4. Analyze and verify data acquired
5. Format results for the intended application

Below is the Cognitive task analysis for the submitting assignment and getting feedback task.

Top level task - Submitting this assignment to Canvas and subsequently receiving one's grade and feedback

- **Sub-task** - Submitting this assignment to Canvas
  - Sub-sub-task - Find Canvas assignment page
    - Operator - Entering a Canvas URL
    - Operator - Clicking Course page
    - Operator - Clicking Assignments page
    - Operator - Scrolling down to the correct assignment
    - Operator - Clicking that assignment link
  - Sub-sub-task - Upload assignment in the assignment page
    - Operator - Clicking Start Assignment button
    - Operator - Selecting a file from the file browser
    - Operator - Selecting Choose a file

    - Operator - Selecting the correct file and click Open
  - Sub-sub-task - Add more assignment files in the assignment page
    - Operator - Clicking Add another file button
    - Operator - Selecting a file from the file browser
    - Operator - Selecting Choose a file
    - Operator - Selecting the correct file and click Open
  - Sub-sub-task - Submit assignment
    - Operator - Selecting "Agree to the agreement"
    - Operator - Clicking Submit Assignment button
- **Sub-task** - Receiving one's grade and feedback
  - Sub-sub-task - Find Canvas Assignments page
    - Operator - Entering a Canvas URL
    - Operator - Clicking Course page
    - Operator - Clicking Assignments page
  - Sub-sub-task - Find grade on the Assignments page
    - Operator - Scrolling down to the correct assignment
    - Operator - Reading the score under assignment name
  - Sub-sub-task - Find the assignment sub-page that specific to the target assignment
    - Operator - Clicking the target assignment
  - Sub-sub-task - Find the feedback on the assignment sub-page
    - Operator - Reading the feedback on the right side of page
    - Operator - Scrolling down to read the full feedback

3 QUESTION3 - THE SYSTEM FOR NAVIGATION

According to Joyner (Joyner, 2016b)

> "Distributed Cognition suggests models of cognition should be extended outside the mind."

In this section, we will analyze the distributed cognition for navigation tasks.

3.1 The system for navigation comprised a married couple, a map, and street name sign

We can summarize how the cognitive activities are distributed in the system in Table 1 below.

Table 1—Navigation for a couple driving with a map

Cognition	Component	Cognitive Activity
Long-Term Memory	Map	Where the car has gone through so far
Long-Term Memory	Map	What is the route to the destination
Short-Term Memory	Street name sign	Where is the car currently at
Short-Term Memory	Street name sign	When to turn left/right if you want to go certain places on the map
Short-Term Memory	Passenger	Where is the car currently at on the map
Working Memory	Passenger	What to do in the next crossing
Working Memory	Driver	What is the traffic now
Deliberation	Driver	Whether to turn left, right or keep straight

3.2 Compare and contrast this same situation with a lone driver using a GPS

Without a passenger, the below tasks will be replaced with GPS as shown in table 2 below.

3.3 What does social cognition reveal about the situation that distributed cognition does not

From table 2 we can see that, GPS can do a good job if we use it to map the distributed cognition. It can give instructions to the driver when to turn and show the overall plan to the destination, just like a passenger will do. And it may do better at this because of the visual interface. But through social cognition analysis, we can see that several social components are missing by using GPS instead of having a human aside. The GPS cannot help drive to notice the traffic around, rephrase instructions if seeing driver confused, or make a suggestion to change the route or take a rest. If it is a long journey, having a conversation with the passenger will also reduce the tiredness of the driver.

3.4 How might the social relationships among the parts of the system affect the success of the system as a whole

Social relationships among the parts of the system can help to reduce the cognitive load of the individual parts, and many activities that can be distributed using social relationships cannot be replaced by artefacts yet as shown in the

Table 2—GPS vs Passenger in handling navigation cognitive tasks

Cognitive Activities	GPS	Passenger
Understand overall route planning	Show in GPS map	Read the map
Understand when to turn left or right	Use GPS with map and voice instructions	Use physical map and road signs to figure out
Understand where the car current is	Use GPS with map to show	Estimation based on map and surroundings
Notice traffic around	Missing	Through observation
Rephrase instruction if driver do not understand	Missing	Through conversation
Suggest change of route	Missing	Based on conversation to change the plan
Suggest to take a rest	Missing	Through observation that drive is tired

previous table 2. In this way, social relationships reduce cognitive effort and individuals can have more working memory to accomplish the tasks. The system as a whole has a higher chance of success.

4 QUESTION4 - TASK ANALYSIS FROM THE PERSPECTIVE OF DISTRIBUTED COGNITION

4.1 Identity and briefly describe the task you've chosen and the interface associated with it

The task chosen here is collaboratively writing documentation on Google doc. Currently, a lot of group projects or products need a team to write together on an online platform. Google doc is one of the best options. The main interface of Google Docs is like a simplified version of what we already have in Microsoft Word as shown in Figure 1. Collaborative works are shown in the interface.

4.2 Describe the pieces of the system

The interface has a big "Share" button to let you control who you want to share the document with. It has a version history of how files changed through the timeline and shows when and who changed which content. One can use the editor tools to alter the size and font of the text or change the alignment and

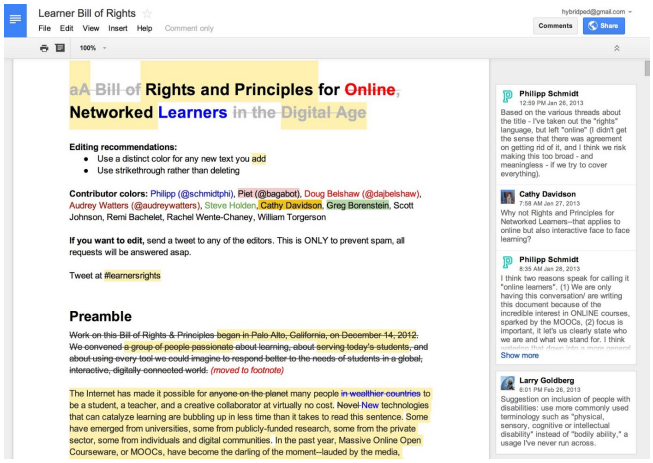

Figure 1—Main interface - Collaborating on Google Doc

indent. Also, one can highlight part of the content and add comments. On the top of the interface, there is a status indicating who is currently on this page. In the main content, there are cursors in different colours indicating who is currently writing on which part of the document.

4.3 Describe what cognitive tasks are performed by each member of the system, both human and artefact alike

Table 3—Cognitive tasks by each member of the system

Member	Task Category	Cognitive Task
Human	Reasoning and action	Writing the content
Cursor	Perception	Understand where one is writing, and where the others are writing now
History versions	Memory	Remember what is the historical versions of the content
Highlighting and comments	Memory	Save other people's feedback
Editor tools	Perception and action	Alter the content formatting, the icons reduce the cognitive effort
User status	Perception	Understand who is currently active on this document
Auto suggestion	Action	Help to avoid misspelling

Cognitive tasks performed by each member of the system are summarized in

table 3.

5 REFERENCES

[1] Joyner, David (2016b). *Cognitive Task Analysis*. URL: https://classroom.udacity.com/courses/ud400/lessons/9438503139/concepts/94303133490923. (accessed: 03.07.2021).

[2] Joyner, David (2016a). *GOMS Model*. URL: https://classroom.udacity.com/courses/ud400/lessons/9438503139/concepts/94303133420923. (accessed: 03.07.2021).