Assignment P4
CS6750 Human Computer Interaction

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1 QUESTION#1

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

1.1 Identifying Situation

Reach out to a professor to ask for explanation of a grade in OMSCS, a remote Online Graduate program where all interactions are via internet and asynchronous.

1.2 Describing Selection Rules

Rules are contingent with the following 3 critical requisites. This will then enumerate methods that will have different frequencies & modalities of responses.

SR1) The Professor's advocated medium of contact they are likely to be most responsive in. **SR2**) The User's preference in terms of formality and elaboration. **SR3**) The User's preference in terms of urgency of the need for a more real-time 2-way communication.

1.3 Outlining Methods

- *Ed - Students can post questions that are private and are readable only by the staff (Professor or TA's).* $\boxed{SR1}$
- *Email – Students could email the professor directly for explanation of grade.* $\boxed{SR2}$
- *Microsoft Teams – With Office 365 integrated with GT accounts, students could reach out to professors directly via Microsoft Teams chat.* $\boxed{SR3}$

1.4 Operators & Time Estimates

1.4.1 ED – *Corresponds to Selection Method SR1*

- "New Thread" button – (3 sec)

- “Private – Visible to you & Staff only” click option – (3 sec)
- Appropriate button in Category (Assignments/Exam etc.) – (5 sec)
- Appropriate button in Subcategory (P1/M1 or Exam 1/2) - (5 sec)
- “Title” field typing for question title – (30 sec)
- “Writing Space” field typing for question elaboration and context – (5 mins)
- “Post” button – (3 sec)

1.4.2 Email - *Corresponds to Selection Method SR2*

- “New Email” button – (3 sec)
- “TO” field typing; enter professor’s email – (30 sec)
- “CC” field typing (if needed) – (30 sec)
- “Subject” field typing for appropriate subject – (1 min)
- “Writing Space” field typing for question elaboration and context – (5 mins)
- “Send” button – (3 sec)

1.4.3 Microsoft Teams - *Corresponds to Selection Method SR3*

- “Chat” side ribbon option – (3 sec)
- “Search” field typing; enter professor’s email or name – (30 sec)
- “Writing Space” field typing for question elaboration and context – (5 mins)
- “Send” icon button – (3 sec)

1.5 Ultimate Goal

The goal here is to get a response from the professor (or the TA or whoever graded the deliverable) with appropriate reasoning for the grade received for a deliverable (assignment or exam).

2 QUESTION#2

The intent here is to create a Hierarchical Task Analysis to *Submit this Assignment to Canvas & Receive Grade and Feedback.* This is contingent with the assumption that *this assignment P4 is complete and saved in local drive as a PDF file.*

1 *Open Canvas*

    2 *Log in to Canvas with URL*

        3 *Click GT Account input field*
        3 *Type in GT Username*

3 *Click Password input field*
3 *Type in GT Password*
3 *Click Login*
3 *Click "Send me a Duo Push" for Duo Authentication*
3 *Approve push login through registered Mobile Phone*
4 *Unlock Phone*
4 *Open Duo mobile app*
4 *Confirm login*

1 *Navigate to CS6750-HCI in Canvas*

2 *Click "Courses" sidebar option in Canvas*
2 *Select "CS6750-HCI"*

1 *Submit Assignment*

2 *Navigate to Assignments*
2 *Select Assignment P4*
3 *Click Start Assignment*
3 *Click File Upload Tab*
3 *Upload File*
4 *Navigate to file location in local drive in computer*
4 *Select file*
4 *Click Open*
3 *Click Comment field*
3 *Type Comments if needed*
3 *Click "I agree to the tool's Agreement – This assignment is my own, original work"*
3 *Click Submit Assignment*

1 *Check Grade/Feedback*

2 *Navigate to Grades*
2 *Click Assigment P4*
2 *Read Grade on the top-right corner of the page*
3 *Click Show Rubric under Grade to display breakdown*
3 *Read your Grades*
3 *Click "X" to close*
2 *Read Feedback against Assignment Artifact filename displayed*

3 *Click "View Feedback"*

3 *Read the feedback*

3 *Click "X" to close*

1 *Close Canvas after task completion*

2 *Click "X" to close*

2.1 Low-Level Operators

The Hierarchical Task Analysis (HTA) employs appropriate low-level operators that constitute a particular task.

2.2 Three Levels of Hierarchy

The HTA above breaks the operators down to 4 levels of hierarchy to imply sufficient task breadth. 1-First Level, 2-Second, 3-Third and 4-Fourth.

2.3 Task Breadth

The HTA above nests tasks and subtasks accurately. The subtasks that can be abstracted have been *grayed* out accordingly to make it legible & coherent.

3 QUESTION#3

3.1 Identifying Perception

Driver: Perceives Visual feedback such as the road itself, road conditions, weather conditions affecting visibility, traffic signs, position & direction of other vehicles on the road, vehicle status like fuel gauge. Perceives Audio feedback such as the other passenger communicating, honks from other vehicles on the road, vehicular sounds like alerts. Perceives Haptic feedback from the vehicle itself like Steering, Brake, Controls like Wiper, indicators etc., temperature of Steering wheel in certain weather conditions.

Passenger: Perceives Visual feedback in the form of information from the Map that is being used to navigate & some parameters that the driver also experiences like road and weather condition etc. Perceives similar Audio feedback as the driver but would spend more cognitive efforts in communicating with the driver. Perceives Haptic feedback such as the feel of the map itself.

Car: Perceives turning of the steering wheel by the driver to adjust wheels accordingly, wheel traction on the road. Perceives distance traveled in the journey through Odo or Trip meters. Perceives fuel capacity to indicate how much is left.

3.2 Identifying Memory

***Driver*:** Memory of initial directions' rundown given by passenger or comprehended by self before the journey began. Short term memory of what turn to take next as indicated by the passenger. Also, of identifying if they have crossed a location so that they need not drive through loops. Working memory of how much fuel is left, need to turn an indicator or Wiper or AC on or off depending on the situation. Subconscious memory of driving – gear change, braking, clutch etc.

***Passenger*:** Memory of having to communicate directions to the driver in the first place. Followed by memory of driver's execution of navigation to keep track of where they have already been to, where they must go, what turn to take by looking at the map.

Car: Memory of trip distance and all mileage covered. Memory of tire-pressure minimums, Fuel level minimums to alert driver accordingly.

***Map*:** Provides memory reference to users in reference to their current position & where they need to go.

3.3 Identifying Reasoning

***Driver*:** Reasoning in reacting to traffic signs, weather & road conditions, fuel or other vehicular alerts and in this core context, understanding & reacting to navigation instructions from the passenger, to plot the current position and identify the next change in navigating sequence. This would further involve reasoning on how to change lanes to get to the next turn.

***Passenger*:** Perhaps the most reasoning entity in this context, the passenger must reason which route to take based on time, distance, personal preferences like scenic byway or preferred pitstops. There will be continuous reasoning also in aiding driver spot blind spots or critically alerting driver of obstacles the driver may not have noticed, reacting to plot new course upon detours or road closures.

***Car*:** Car must continuously reason in the way of it presenting accurate alerts like Fuel level, tire pressure etc., constraint the user to prevent accidents.

3.4 Identifying Acting

- The Driver must act upon the navigation provided by passenger by stimulating change in direction with steering wheel turn, acceleration, gear change and braking. Driver must also interact with the passenger for feedback & questions.
- The passenger acts upon information gathered from the map to plot the course of the journey to the driver.
- The car acts in to change direction of wheels, speed upon input from driver.

3.5 Identifying Communication

In contrast to the situation using GPS, this first situation can employ effective *natural language* communication between the driver and passenger. The driver must understand what the passenger is relaying and communicate any nuances to the navigation back to the passenger. The passenger can visibly see where the driver is heading and provide feedback accordingly. GPS on the other hand may not provide a way for the driver to freely communicate to provide information. The driver may need to use allies like voice assistances. In some cases, the GPS may not immediately realize a changed path (like going under a bridge instead of over) leading to course correction slightly later whereas the passenger may notice immediately forcing course correction sooner. On the flip side, the passenger may get diverted and miss navigating completely whereas the GPS will always enforce the right course and changes in plots algorithmically.

3.6 Identifying Social Perspectives

Social Cognition exists in the first situation as the driver & passenger must work together to reach their destination. If the driver and passenger do not have a good common grasp point, it could lead them to miss critical navigation milestones. Distributed cognition takes away the risk of passenger getting diverted in the former situation. It also reduces drivers' cognition having to deal with unwanted fuzzy information from the passenger.

3.7 Identifying Relationships

The professor subtly suggests married couple as the situation to be cognizant of the interpersonal relationship that may exist. Married couple continuously adjust their roles and responsibilities in their relationship. In an effort to establish the best sense of themselves to cement their underlying relationship, communication back & forth regarding navigation may be jeopardized.

4 QUESTION#4

The task I have chosen is fueling my gasoline powered car using my credit card at a gas station. The interface is the Gas Pump.

4.1 Enumerating Pieces

1. The User & his/her attributes like mode of payment
2. The Car's gas tank
3. Gas Pump's touchscreen/keypad interface
4. Gas Pump's embedded system
5. Gas Pump's Nozzle

4.2 Human's Roles

Perception: The user must visually perceive the state of the Gas pump, follow directions on the Gas pump touchscreen interface to make payment, make selections of appropriate fuel grade, the position of the Gas nozzle in spatial relation to the Car's gas tank filler. The user must auditorily perceive any alerts from the Gas pump's interface, fueling process by the sound of fluid flow. The user must haptically perceive the touch of buttons on the Gas Pump's keypad for making payments, buttons to make fuel selection, the trigger of the Gas pump's nozzle, the vehicle's gas filler cap.

Reasoning & Acting: The user must make payment by following instructions on the Gas pump interface. In some case, the user may require a certain amount maximum or volume maximum limit to specify. The user must identify what fuel grade matches the car's requisite and make selection on the gas pump accordingly. Once done, the user must actuate the nozzle into the car's tank filler to enable fueling and press trigger to begin.

4.3 Non-Human Role 1 – Memory

The Gas pump interface must keep in memory to display the final amount and grade of fuel selected. In cases where the user specifies amount maximum the system must keep in memory the amount user enters to fill fuel for, the type of fuel it must dispense during the entire time of transaction.

4.4 Non-Human Role 2 – Perception

The Gas pump interface must perceive user's touch action to actuate required functions to its Embedded system. For example, if a user selects credit card as payment, it must actuate a payment gateway embedded within to exercise card swipe. The Gas pump nozzle mechanically perceives if the gas tank is full or perceives actuation from the embedded system to stop fueling when the desired amount or volume is reached.

4.5 Non-Human Role 3 - Reasoning

When user selects an amount maximum to stop fueling, the embedded system must match this input to match its internal calibrations to calculate & dispense equivalent volume of fuel.

The gas pump interface must process user's touch input to bring up new prompts and guide the user in their journey to successfully purchase gas.

5 APPENDICES

5.1 Reference Image 1

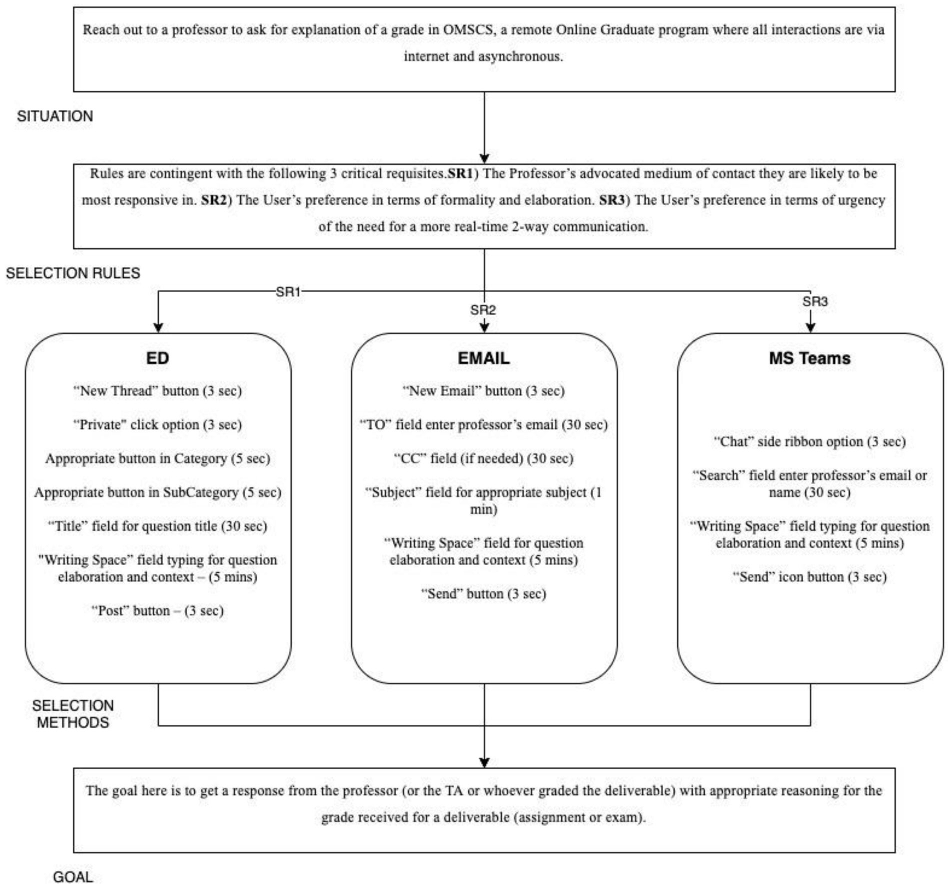

Figure 1— GOMS Model

5.2 Reference Image 2

Figure 2— Gas pump at Gas Stations in US