**Mailroom Sorting Task Process – Multi Type**

**Materials Needed**

* Microsoft Kinect v2.0 and tripod
* Windows Laptop with Kinect Software Development Kit
* Linux Laptop with algorithm python programs installed
* Three (3) bins/boxes labeled “+”, “-”, and “φ”
* One (1) small table
* Two (2) large tables (one with with Kinova Mico robot arm attached)
* 11 (11) envelopes with math equations written on the inner flap
* One (1) holder / dish rack for envelopes
* Eight (8) post-it notes labeled “Priority’’

**Important Notes**

* Participants should be told to complete each task relatively consistently. This basis for this requirement is that this study imagines that a situation where users have been performing this task repeatedly for a long period of time, and thus have developed habits.

**Setup Instructions**

1. Room Setup
   1. Turn on all lights in the room.
   2. Ensure that the room is picked up and no unneeded items are lying about.
   3. Ensure that the two main tables are placed in the correct locations on the sides and the third smaller table is placed in front of where the participant will stand.
   4. Place the envelope holder in the predefined location on the table with the Mico robot arm.
   5. Place the three (3) test envelopes in the labeled locations of the envelop holder.
   6. Spread out all “priority” post-it notes on the smaller table.
   7. Place the bins labeled “+”, and “-” on the large table opposite the Mico robot arm.
   8. Place the bin labeled “φ” on the floor near the robot.
   9. Ensure the Kinect is placed in the correct location.
2. Laptop Setup
   1. Turn on the correct Dell Windows Laptop. Log into the computer (password is “**hcilab**”)
   2. Connect Kinect USB to Windows Laptop USB 3.0 port.
3. Kinect Program Setup
   1. Start the data recording program by double-clicking the shortcut on the desktop named “Record-Data”. Microsoft Visual Studio should open with a C# file.
   2. Test the program:
4. by pressing play in the Visual Studio toolbar. A new window should appear.
5. Stand in front of the Kinect to assure that a skeleton overlay appears.
6. Close the new window.
7. Look in filepath “Desktop/vahala/data/” to see that new files “data0.txt” exists.
   1. Search for and open the program “Screencast-o-matic” from the Windows search.
8. Attempt to record the screen and ensure that the file exists and is viewable.
9. Algorithm Program Setup
   1. From the Linux Laptop, open a terminal (Ctrl+Alt+t) and run >> python FILENAME.py
   2. A success message should appear.

**Administration Instructions**

1. Do: (Examiner) – Have the participant read and fill out the study consent form.
2. Say: (Examiner) – **“Okay, we’re all set. You can stand at the marked point on the floor.”**
3. Say:(Examiner) – **“You will be collaborating with this robot to sort mail by priority. Each envelope the robot hands you will have an equation written on the inside flap. When you get a new envelope, open the flap and solve the equation. Please take your time so you do not make a mistake! The answer will be less than zero, greater than zero, or equal to zero. Each result will require you to do something particular with the envelope. If the result is LESS THAN zero, the envelope is considered a basic piece of mail, and you should simply place it in the bin labeled ‘‘-’’. If the result is GREATER THAN zero, then the envelope is considered a priority piece of mail, and you should grab a priority post-it from the small table and place it on the envelope before placing it in the bin labeled “+”. If the result is ZERO, then the envelope is considered junk mail and you should place it in the bin labeled “φ”. I will now let you practice each of these tasks a few times. Let me know when you are ready and the robot will hand you three envelopes, each with one of the cases.”**
4. Do: (Examiner) – When the participant is ready, enter *test* into the python terminal to start the robot’s test on the three available envelopes. Replace the three test envelopes after the participant has finished and repeat this step to allow the participant to practice again. Once the user feels confident, continue with the study.
5. Say:(Examiner) – **“Now that you have practiced on each task type, we will begin the study. There is no defined order which envelope type will come next, so be ready for any of them. Let me know if you are ready to begin or would like another practice round.”**
6. Do: (Examiner) – Once the participant confirms they are ready, place the eight (8) remaining envelops in the labeled positions of the envelope holder. Start the screencast-o-matic on the windows computer. Then, on the Linux computer terminal, enter ***begin sota p#*** (where you replace # with the appropriate participant number) to start the “state of the art” version of the algorithm or ***begin novel p#*** (where you replace # with the appropriate participant number) to start the “novel” version of the algorithm. The robot will begin handing over the first envelope. After all envelopes are handed over and the participant has completed his or her final task, stop the screencast-o-matic on the Windows computer. Save the screencast-o-matic video as *“p#.mp4”.* **Should the envelop location be randomized, or should particular envelopes go in particular places? Should users be separated into two groups randomly (state of the art group vs. new algorithm group), or should users do both types in random order? How many participants should I shoot for?**
7. Say:(Examiner) – **“Now that you’ve completed all of the tasks, we’d like you to fill out this questionnaire which asks questions about how you felt working with the robot. Please be thorough with your comments and take as much time as you need.”**
8. Do: (Examiner) – Perform end of participation tasks including payment, having the participant sign the receipt of payment form, and thanking the participant for their participation.

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envelope

priority post-it

Kinect

Figure 1. General Setup