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National Institute of Standards and Technology (NIST)
Generic Clearance for Usability Data Collections
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Information Technology Laboratory (ITL), Information Access Division (IAD), Fingerprint Directional Symbols Study Task Evaluation Questionnaire

1. Explain who will be surveyed and why the group is appropriate to survey.

Currently the Department of Homeland Security (DHS) United States Visitor Immigration Status Indicator Technology (US-VISIT) biometric systems require operators to gather user's biometrics. However, DHS would like to transition to unassisted biometric capture platforms. In order for these systems to be successful, users must be able to understand how to interact with the system and leave prints that have the appropriate quality within a reasonable amount of time. The guidance must be culturally-independent and language-independent. The NIST usability team has designed symbols to convey the directions for finger and hand placement as well as symbols to provide feedback to users. This protocol is a first step in collecting empirical data to develop a language-independent format, i.e. symbolic, for unassisted fingerprinting tasks.

As part of a usability study, we intend to recruit 120 individuals using an existing grant. All participants will perform a right slap, right thumb, left slap, or left thumb task on the fingerprint scanner as directed by the directional symbols displayed on a monitor guiding them to move their hands/fingers. Half of the subjects will only perform the task with their right hands (right slap and right thumb), and the other half will only perform the task with their left hands (left slap and left thumb). Each subject will go through 48 alternative directional symbols.

A statistical power analysis will be completed to determine the ability of the test to detect (1) Response time – the time it takes from when a directional symbol is displayed until the subject moves his/her hand. (2) Correctness – whether the subject correctly follows the directional symbol to the desired position/placement. The images of the final hand positions will be recorded. (3) Interpretation – whether the subject correctly interprets the meanings of the directional symbols.

2. Explain how the survey was developed including consultation with interested parties, pretesting, and responses to suggestions for improvement.

This usability questionnaire has been developed based on standard templates used by our usability group. Similar questions were piloted, and validated in a previous approved usability studies. We have incorporated the feedback and suggestions from the previous studies into the task evaluation questions and believe the form is highly usable in its current form.

3. Explain how the survey will be conducted, how customers will be sampled if fewer than all customers will be surveyed, expected response rate, and actions your agency plans to take to improve the response rate.

The participants will be recruited to participate in the usability study of directional symbols for fingerprint systems from an existing recruitment database of users who have previously agreed to participate in usability studies. This database contains information about participant's age, gender, ethnicity, education and occupation among other factors. Subjects selected from the database will be between 19 and 79 years old, diversely distributed across gender, ethnicity, education and occupation. Prior to participation, all participants sign a consent form that fully explains the study and the survey. Before each subject completes the task with the fingerprint device, a Demographic Questionnaire will be provided to the participant for completion. After each subject has completed the tasks with the fingerprint device, an electronic questionnaire, Fingerprint Directional Symbols Study Task Evaluation Questionnaire will be provided to the participant for completion. The questions are based on standardized methods in the usability field.

The expected response rate will be 100% since each participant will be provided the survey by the test facilitator and will complete the survey as part of the overall usability test. The estimated total time is 30 minutes for each participant to take both the Demographic Questionnaire and the Fingerprint Directional Symbol Study Task Evaluation Questionnaire.

4. Describe how the results of the survey will be analyzed and used to generalize the results to the entire customer population.

The data in the task evaluations will be subjected to statistical analysis and form a primary outcome of the experiment. We intend to perform an analysis of variance to identify the sources of variability from one or more of the factors. By varying the factors in a predetermined pattern and analyzing the output, we plan to make an accurate assessment as to the cause of the variation in the accuracy, speed, and interpretation of the differing symbols. The data collected will be used to identify directional symbols for ISO submission and standardization. The results will not be generalized based on the entire customer population.