NCR

Solutions Architecture Usability

Usability Study of Signature Verification at Laiki Bank

A report describing my observations of the Signature Verification System at Branch 199

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Overview

During the week of August 27, 2007, I visited Branch 199 of Laiki Bank in Nicosia, Cyprus. The purpose of the visit was to learn how Laiki Bank uses our Signature Verification System (SVS), particularly Verifier and Viewer, in their day-to-day operations. Part of this learning process was getting to understand the strengths and weaknesses of the product and identifying how NCR can improve signature review in future development.

Laiki Bank has been using SVS for approximately one year to perform their centralized cheque review duties. Professional Services in Cyprus worked with Laiki Bank to tailor the solution to their specific needs and the department has been using it in their day-to-day work.

This usability study was proposed as part of a development update to the solution. The current SVS solution consists of the original Delphi application bundled as an ActiveX component which is displayed within the web browser. NCR Waterloo plans on either updating the software platform to a full thin-client solution or incorporating SVS functionality into an existing product (i.e., Archive Decisioning) so that NCR can deploy a full browser-based solution.

Since NCR Waterloo was already planning on updating the application platform, they decided to take the opportunity to improve the user experience at the same time. My task was to incorporate feedback and observations from the usability study into the design of subsequent user interface development.

Usability Study Methodology

I used the following tools and procedures for gathering information for this usability study:

- interviews – I conducted one-on-one interviews with the clearing supervisor and officers and probed for information about them, their professional background and their skill sets. In addition, I asked about the kinds of information they need to perform cheque review and what information they produce when they complete their tasks.

- observations – My primary method of information gathering was sitting with the officers while they used the application to review cheque signatures. Because I was able to observe them over a few days, I saw the kinds of exceptions they encounter while using the SVS application which might not arise during casual observation or during the controlled recorded sessions. For example, I saw first-hand how operators recover when they accidentally assign the wrong payment decision to a cheque after reviewing it.

- recorded sessions – Using my laptop, a webcam, and the Morae usability testing software, I recorded officers using SVS Verifier to review cheque signatures. This approach provided a context for understanding where users experience problems within the application.

Environment

The Laiki Clearing Officers occupy office space at Branch 199, where they share the location with other Bank departments. The Clearing Department is staffed with a supervisor and eleven clearing officers who use Signature Verification on a daily basis to perform cheque review. During my visit, several staff members were away on vacation.

The office area is set up in an open concept manner. Branch 199 officers sit at quads of cubicles facing inwards and separated by low cubicle walls. The supervisor sits at an adjacent desk within speaking distance to the rest of the staff.

The open area is conducive to communication and lets staff talk to each other as required to resolve issues, although the noise level can be distracting, particularly near the end of the work day. Lighting is a combination of natural light from large windows running along on each wall, and fluorescent lights.

Each workstation consists of a computer running Windows 2000 Professional with a Samsung SyncMaster 913N monitor (a 19-inch display running at a 1024x768 screen resolution) and a printer. Computer software is locked down, limiting staff with access to Bank-approved functions only.

Throughout the day, the staff keeps several applications running on their desktops. For example, one officer had five applications including the Bank network login application, SVS Verifier, SVS Register, Lotus Notes, and the legacy cheque-review application. The SVS user interface bears the default NCR branding.

Branch 199 Background Information

Branch 199's clearing supervisor oversees the clearing officers. He sits at his own desk, apart from the others but is well within audio and video range. He frequently interacts with them and seems to have a good rapport with the group.

The department has low turn-around—in the last two years, they have had only two new hires and no departures. New hires are typically people who transfer from other parts of the Bank.

The supervisor ensures that three to four people are trained per application so that people can cover for each other in case someone is away on vacation or sick leave. Everyone receives training on SVS Register to handle the large volume of account additions and updates. Three people in the group are considered "technical", and these people are trained for signature scanning as this task requires greater computer interaction than the other applications.

When NCR deployed the SVS solution, Professional Services provided staff with on-the-job training and sat with them as they began using the system. In addition, Professional Services developed a custom set of publications for the staff based on the NCR documentation.

System Workflow

During this usability study, I noticed that Laiki Bank handles high-value cheques differently than low-value cheques. Rather than using SVS Verifier to review all the inclearing cheques, Laiki uses it only for reviewing items with amounts exceeding £1000. For cheques with amounts less than £1000, Laiki uses a legacy application from their old cheque-review solution. The following overview describes this workflow.

System Workflow
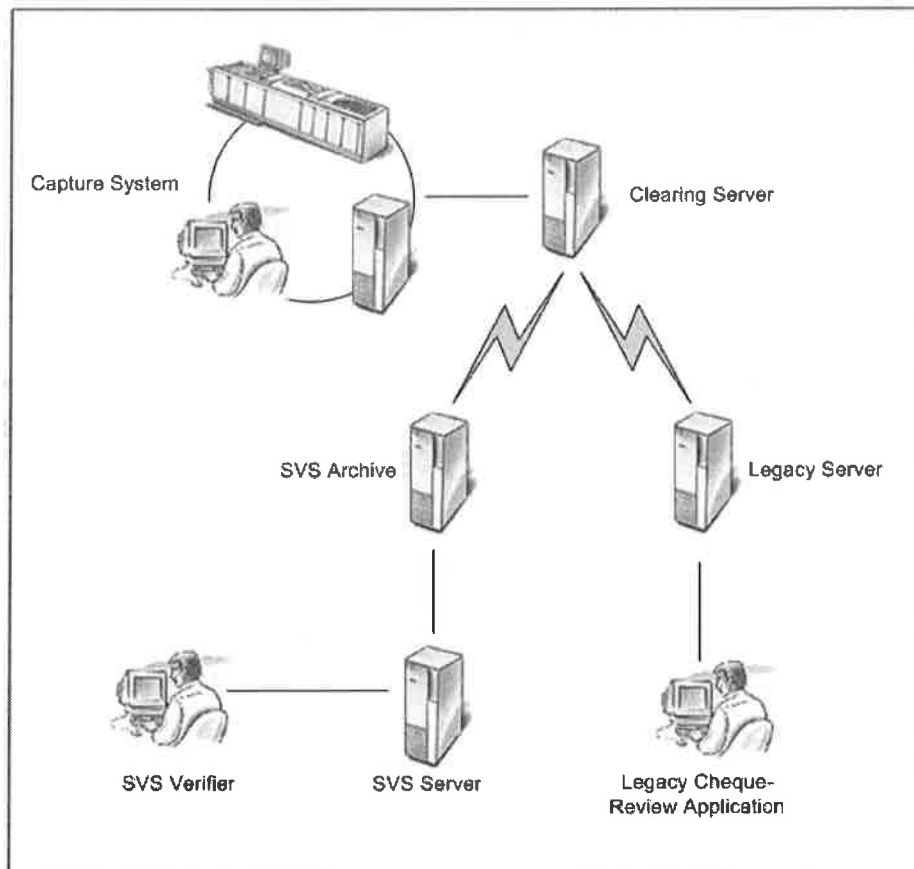
Operators capture the inclearing work at the capture site and store the data on the Bank's main clearing server. Overnight, the system transfers the cheque image files from the clearing system to the SVS Archive and to a legacy server.

The next day, the SVS administrator at Branch 199 runs the Archive Interface application to retrieve cheques with amounts exceeding £1000 from the SVS Archive.

During cheque review, clearing officers use SVS Verifier to review the high-value cheques residing on the SVS Server. As part of this task, officers conduct a technical review of the cheque image as well as a signature review for each signature on the cheque.

At the same time, other clearing officers use the Bank's legacy cheque-review application to review cheques with amounts less than £1000. This review is strictly a technical review of the cheques to ensure that each one has a date and signature.

The following table shows a sample distribution of volume and cheque amounts (all values are approximates):

Total Cheques/day	1200
Cheques with amounts over £1000	14.8%
Cheques between £100 and £1000	49.5%
Cheques below £100	35.7%
Percentage rejected cheques	3.8%

A Day in the Life

In the morning, the Branch 199 clearing supervisor arrives before the clearing officers and connects to the SVS server remotely to run the Archive Interface (an NCR SVS administration tool) and retrieve the cheques for the day. He compares the volume and value of the items reported by the Archive Interface with the report he receives from the Clearing House to ensure that they show the same amounts.

Next, the supervisor runs a batch file on the SVS server that prints out a report showing the volume of cheques per value range (i.e., the AI Status Viewer ranges). He uses this information to assign each clearing officer a range of cheque items to review. For example, he might ask officer A to review cheques between £1000 and £2500, officer B to work on cheques between £2500 and £5000, and so on.

Officers who are assigned lower-value cheques (under £1000) use a legacy cheque-review application to complete their task. For these kinds of cheques, officers look at the cheque image quickly to ensure sure that each one has a date and signature.

Officers perform a full signature review for cheques with an amount over £1000 using the SVS Verifier application. The Clearing Department at Branch 199 must process these higher-value cheques by 1:30 pm in order to meet the posting deadline. Officers examine the signature(s) on each cheque carefully to ensure that they match the associated signature image(s). At the same time, officers perform a technical review of the cheque image to ensure that the information on each one is valid (i.e., a correct date, amount, payee, etc.).

Officers assign cheques that fail validation with a "Pending" or "Rejected" payment decision depending on the fail reason, and these cheques go to the supervisor for final resolution. The supervisor returns any cheques with a signature problem to the branches for handling. Then he handles the remaining cheques that failed technical review on a per cheque basis. Some of these may be returned to the presenting Bank for re-processing.

Once the officers complete the cheque review, they perform other tasks such as scanning signature forms and registering accounts with new or updated signatures.

At the end of the day, the supervisor logs into the SVS server to update the SVS Archive with the verification results. Then, he runs a batch file that creates a report with the rejected cheques' details. He sends a hard-copy of this report to the capture site where operators can stamp the cheques with the appropriate reject reason.

Applications

This section describes the applications that the Clearing Department at Branch 199 uses to perform cheque review. Although the focus of this usability study was on SVS Verifier and Viewer, I spent some time watching operators use the signature scanning and registration applications.

SVS Scanner

Laiki does not use the SVS Scanner application. Rather, they have a custom application that they developed with NCR Professional Services. Laiki uses this custom application because it makes use of their Recognition engine to automatically scan the account number from the signature form. In contrast, the SVS Scanner application requires the operator to type the account number manually for each signature form, which increases the amount of time needed to complete the task.

After the operator scans the signature form and the system performs recognition, the FormReader application presents each account number that Recognition could not read to the operator, who keys in the correct account number.

Observations

- when correcting account numbers, if the operator changes the zoomed area to a different part of the page to see the account number, the displayed window zooms back to its default location as soon as he starts to type. If he forgets the account number, he must reset the zoom so he can see the remaining digits and then resume keying.

- the scanner operator counts the paper pages manually because the application does not have a simple way of showing the number of the signature forms in each batch. The operator has to count the pages because the scanner application cannot handle more than 50-60 pages at a time.

- the scanner operator commented (several times) that he thinks this part of the process could be improved as there are several manual steps in this process.

SVS Register

Clearing officers use SVS Register to process the scanned signature form images in order to update or add new accounts into the system. The first part of the signature registration process involves clipping each signature image from the signature form and then setting up the rules for the signatures. The second part of this process is verifying that the signatures and rules are correct. According to one operator, 90% of accounts have one or two signatures with no rules or conditions while the remaining 10% have multiple signatures with rules and conditions.

Observations

- after typing the branch number, Register operators must type the full account number for each account. One operator suggested that this task could be expedited if they had some sort of auto-complete feature or could select an account number from a list instead of having to type it in every time.

- excessive time lag (up to ten seconds) for the account information to appear after the operator selects the account number from the matching accounts list.

- if the signature tab information is missing, the operator needs to refer to a mainframe application to determine the source of the problem. For example, in one case the mainframe indicated that the signature was written by a minor, so the user had to void the signature. In another case, the account number did not exist on the mainframe so the operator had to reject the form.

SVS Verifier

The Clearing Department at Branch 199 uses SVS Verifier to make payment decisions on cheques with amounts exceeding £1000. Approximately 85% of these cheques have one or two signatures with no rules. Verifier operators spend approximately five seconds reviewing these kinds of cheques. The remaining 15% have multiple signatures with one or more rules. Depending on how many signatures are on the cheque and how complex the signing rules are, officers take at least ten seconds to review each cheque, and often much longer.

Sample Verifier screen (not from Laiki)

At Laiki, SVS Verifier runs alongside a legacy signature verification system and, as such, SVS Verifier interacts with legacy software applications. For example, if a signature image was captured from the legacy system, SVS defers to a legacy signature viewer that appears in a pop-up window with the signature snippet. This pop-up shows a portion of the signature form along with a textual description of the rules (e.g., "joint account").

Operators also refer to a legacy application when handling branch cheques. For these items, Verifier operators consult their Lotus Notes web application to ensure that the signatures on the cheque adhere to the branch-specific signing rules.

Observations

While watching operators use the application, I noticed the following software errors:

- operators are not able to see the back image of cheques. Even though the image manipulation controls have a "Show Back of Image" button, it does not seem to work properly.

- opening SVS Verifier closes their Lotus Notes web application. To recover, the operator must re-open the Lotus Notes application.

- on one occasion, two operators received the same cheque (fortunately, both operators gave it the same decision!)

Beyond software errors, I noted the following application design issues:

- unable to go back to the previous cheque in case the operator makes a mistake. I saw this first-hand when an operator accidentally approved a post-dated cheque. Because the operator could not recall the cheque to correct it, she had to find a senior operator to help resolve the problem. The senior operator used the legacy cheque-review application to track down the item in a batch of 525 cheques (he was able to locate the cheque because the operator with the problem remembered its approximate value). Several officers, including the supervisor, stated that being unable to go back to the previous cheque is a major issue for them.

- unable to print a cheque image or send a cheque image to the supervisor or branch officer. If the clearing officer wants a second opinion or needs to consult with the branch officer to ask a question about a cheque, the clearing officer reverts to their legacy cheque-review application to locate and print the cheque image. The supervisor and several officers mentioned that this lack of print (or email) within SVS is major time-waster for them.

- on the SVS Verifier cheque list screen, operators need to navigate to the end of the list to see how many cheques are in the selected range. Otherwise, operators have no way of seeing how many items they need to review.

- users need to change the default cheque zoom (currently set to zoom to codeline) every time they log in. SVS Verifier does not "remember" the zoom level after the browser session is closed.

- the cheque image is left-aligned in the image window while the signature image appears on the lower right. The distance between the two images increases the operators' scanning distance and slows down how quickly operators can make a matching decision.

- the distance between the checkmark button (for accepting signatures) and the submit button increases the time taken for the operator to complete the operation.

The following observations pertain to information on the screen that is either not helpful for reviewing signatures or is simply not used by operators:

- The host status is always displayed as "1", which is not meaningful to the user

- operators do not use the remarks field to type additional information

- operators do not use the signature rules. Rather, operators simply check off signatures until they run out of signatures to compare or until the cheque is accepted.

SVS Viewer API

The Clearing Department at Branch 199 uses the Viewer API in some circumstances such as when they review cheques having an account status field set to a specific value (such as Not Approved, Not Validated, and so on). The Viewer API provides the signature images for these kinds of current cheques.

Sample Viewer API screen (not from Laiki)
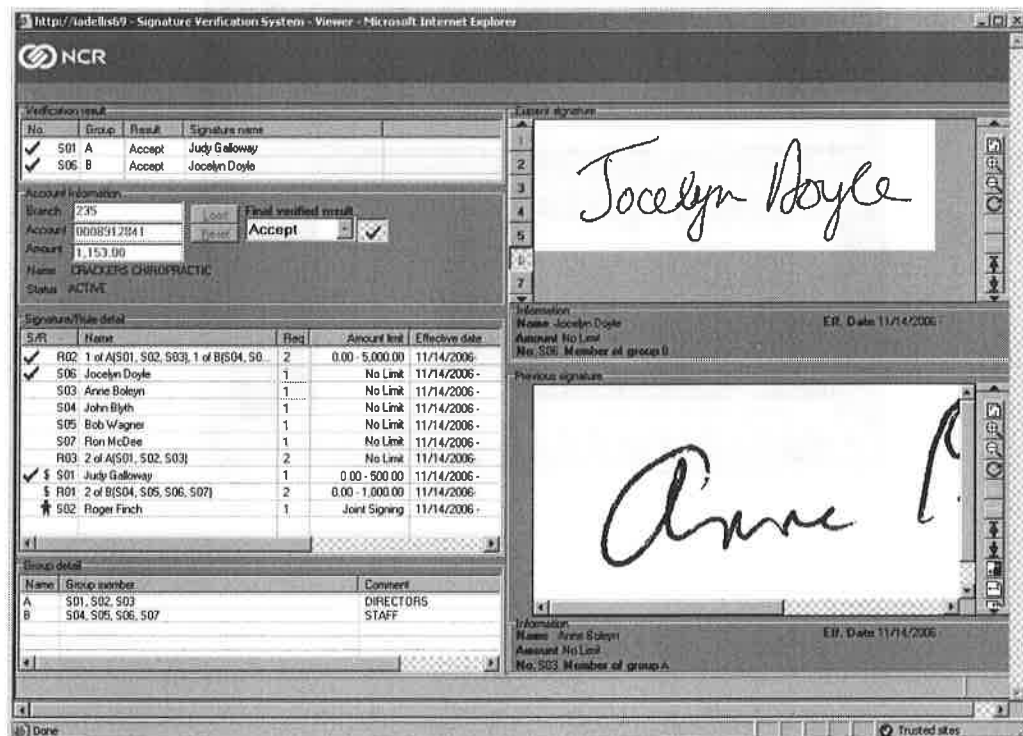
Observations

- when the Viewer API appears, the Viewer API takes over the Verifier window. To recover, operators must close and then restart the Verifier application.

- operators are limited to viewing two signatures at once, requiring multiple mouse clicks

- like with Verifier, Viewer API operators do not refer to the on-screen rules

Legacy Cheque Review Application

The Clearing Department at Branch 199 uses their legacy cheque-review application to handle cheques with amounts less than £1000 pounds. Like SVS Verifier, when run, the legacy application presents operators with a dialog prompting for the amount range to load. The operator indicates the amount as per the supervisor's assignment and queries for the matching items. Then, the operator works through the list to ensure that each cheque has a date and at

least one signature. Since this application does not provide rule-checking, it does not validate the signatures on these lower-value items.

Laiki's Legacy Cheque Review Application

Conclusions

Overall, the customer has successfully incorporated our SVS solution into their cheque-review process and they are generally satisfied with the product. However, on a few occasions, they expressed concern regarding an anticipated Q1 (2007) delivery, which they expected would address some of their issues.

As far as functionally, I would recommend that as a short-term action to improve customer goodwill, we supplement the existing solution with print/email and undo functionality or provide an efficient way of working around the issues. The customer brought up these issues repeatedly and I witnessed several occasions when the lack of these features impacted operator efficiency. In addition to these improvements, Professional Services suggested the addition of a Remarks field under the Account and/or Signatory tab of the Register Application screen so that supplementary information can be entered and displayed during viewing/verification.

In looking at a long-term solution, if NCR decides to stay with the current SVS solution, I recommend that we incorporate GUI changes based on the existing Laiki issue list and the observations from our usability study. Otherwise, if we add signature verification to Archive Decision, we need to re-factor the GUI to maintain current SVS operation efficiency as well as address the customer issue list and these usability observations.

With regards to the usability study methodology, the interviews and job shadowing techniques complemented each other well because I developed an understanding of the business processes and practices and then had the opportunity see first-hand how the software issues impact them.

The visit to Laiki Bank was our first opportunity to use the Morae usability test software at a customer site. The tools worked as expected despite some less-than-ideal circumstances—rather than testing in a closed-off office I had to record sessions in the actual workplace. Despite the occasional high-noise levels, the recording quality was satisfactory

Unfortunately, I was not able to test my laptop with an existing SVS system prior to my visit to ensure that the application worked properly. I found, too late, that Verifier was unable to display images on my laptop. I learned later that this was due to a problem with XP. Also, next time I would consider loading Morae Recorder on one of the computers at the site. I learned that the SVS operators interact with several applications while performing Signature Verification, and I was unable to have all their software on my laptop. Had I installed the Morae software and webcam on an actual workstation, I could have recorded operators using their different applications to complete their work.

Despite the technical issues, the recorded sessions provide a snapshot of how operators work with the application and the context for the issues. I have used the feedback from these recordings to present my findings to the SVS team and will continue to refer to them in our upcoming design efforts.