

Smartphone pre-staging at drive-up ATMs

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SUMMARY

Formative user tests are presented investigating use of QR code and NFC to enable a user to use a smartphone with self-service devices from their vehicle.

KEYWORDS

Mobile, NFC, QR code, drive-up, ATM

Content

This paper builds on previous work (Jokisuu *et al.*, 2018) that described how contactless cards and near-field communication (NFC)-equipped devices could be used at an automated-teller machine (ATM); enabling somebody to pre-stage a transaction by starting on a mobile, and then completing the transaction on an ATM. However, unlike the previous work that focused on ATMs that are used by walking up to them, we now present formative user studies investigating methods that enable the user to pre-stage and then complete at a drive-up ATM. These drive-up ATMs are common in Canada, USA and in the Middle East, with the user remaining in their vehicle while using the ATM; and can drive unusual postures as users stretch, twist and lean out of their vehicle in a manner that would be unusual in other situations. This is due to the constraints imposed by the vehicle such as the window dimensions, roofline, and seat pan height.

User test: NFC at drive-up with non-functional foam core models

This used a non-functional foam core model (of an ATM) and a simulated mobile app (for the pre-staging) and was part of a larger evaluation into multiple drive-up concepts. There were 40 participants (27 males, 13 females, all NCR staff); and a representative spread of vehicle types and sizes (from sports car to large pickup truck). Feedback was gathered with 7-point Likert items and comparative questions. Participants were given a short briefing to explain the scenario, then used the mobile app prototype to pre-stage a cash withdrawal, then tapped on the foam core model to complete the transaction (simulating an NFC 'tap'). The notes were then presented at the model (by the evaluator lifting a handle), the user took the notes, and then checked the app which showed a receipt of the transaction (Figure 1 to Figure 3).



Figure 1: Pre-stage with app



Figure 2: Tap on ATM



Figure 3: Take cash

Both the use of a smartphone to tap on NFC and the mobile pre-staging experience were very well received. When rating the overall ease of use (1=extremely difficult, 7=extremely easy), the mean

rating was 6.48. Opinions were mixed about holding a phone out of the vehicle, with most having no concerns but others were worried (24 had no concerns, 5 were unsure, 10 were very worried). Most participants said that they were likely to use a service like this at drive-up (29/40) with 20 saying that it was extremely likely. Most participants however were not willing to go out of their way to use this service at their own bank (28 no, 6 maybe, 5 yes). However, some participants would not be happy to use their phone for banking/at ATMs anyway but mostly due to security concerns, not because of the experience itself.

User test: QR-code and NFC at drive-up with functional mock-ups

The user test took place in the UK with UK vehicles; the ATM layout was thus a mirror image of a US layout (with the NFC token being placed forwards of the screen to force the same reach forward as would be seen in the US). 15 participants (9 male, 6 female, all NCR staff) used their own vehicles (most in compact/midsize cars); but all used the same smartphone. The test used a real drive-up ATM fascia, mounted on a test rig at the correct height and angle, which was moved between the 2 parking distances. A repeated-measures design was used. Participants were asked to scan 2 sizes of QR code (quick-response code; a 2-dimensional matrix barcode) at 2 distances (840 and 550mm between fascia and car window seal). When parked far away, they were asked to scan without zooming or leaning first, then with pinch zoom, then with leaning out of the vehicle for both sizes of QR code. The test rig was then moved to the closer position, and they were asked to scan the QR codes, and then tap NFC. Feedback was gathered with 7-point Likert item, task completion for each scan and comparative questions.

All participants (15) preferred QR code over NFC for this drive-up layout. This preference was supported by the ratings for ease of use – NFC scored worse than any of the QR codes. All participants preferred the larger QR code over using a smaller one that needed pinch zoom or leaning for this drive-up layout. This preference was again supported by ratings for ease of use – large QR code rated higher than any of the other conditions at both read distances.



Figure 4: Scan far QR-code



Figure 5: Scan QR-code



Figure 6: NFC tap

Conclusions

NFC can work at drive-up, but only if the layout can be optimised to ensure the target is within easy reach of all users in all vehicle heights. If this is not feasible, QR-codes offer a convenient alternative, particularly when the user is located at a distance from the ATM. More broadly, QR-codes may be of benefit in contexts where the user is unable to get close to the target.

References

Jokisuu, E., Forrest, E., McKendry, M., Munro, M., Day, P. (2018). Introducing contactless technology into the financial self-service environment. In: Contemporary Ergonomics & Human Factors 2018 19-26