Digital Cheques

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ABSTRACT

Although the British cheque has a history dating back over three centuries, it is under continued threat of being withdrawn as a payment method in the UK. In these interactive demonstrations we present two digital cheque propositions designed in collaboration with groups of people aged eighty and over. These two proposals embody many of the qualities our participants valued in cheques, and at the same time questions some of their expectations of how cheques are used. We also demonstrate our bespoke crowd-sourcing cheque clearing platform that operates outside of the banking sectors payment infrastructure. The banks have a desire to phase out cheques but our cheques phase out the banks.

Author Keywords

Digital Payments; Cheques; Anoto; Eighty Somethings.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

According to the UK payments council cheque use has been falling since 1990 [2]. Retail banks claim that cheque clearing is an expensive process and whilst the fraudulent use of bankcards is at an all-time low, cheque fraud continues to increase [2]. These factors mean that the traditional British cheque is continually under a threat of abolishment. Despite this, there are a number of user groups who rely on cheques, such as small businesses, charities and older people [1][2]. In our previous work we have argued that for many people aged 80 or above cheques are an irreplaceable element of their financial ecology [3]. Despite the apparent ease of cheque fraud, many of this age group experience cheques as a highly secure method of payment. Cheques also engender trust (and distrust) between their users, and are a useful means of asking carers, friends and family members to make payments on another person's behalf [3].

DIGITAL CHEQUES

The design challenges here are multiple: to preserve the qualities of cheques that engender trust, to develop a personal cheque clearing system that will address some of the banks' concerns, to develop a more secure and automated clearing process, and to integrate current payment infrastructures with paper-cheques. In collaboration with groups of people aged eighty and over we have developed two design proposals and an underlying digital cheque clearing process to enable the paper cheque to make electronic payments (Figure 1). In [4] we explain parts of the participants design process informing these systems. Here we focus on demonstrating their use.

Figure 1: The two digital cheque proposals using Anoto pens (left) and a scanning/shredding depository (right).

Paying with a digital pen

Our first digital cheque prototype appropriates Anoto digital pen technology. We use a Bluetooth Anoto DP-201 which requires an almost invisible pattern to be printed on the cheque paper. In the use of the Anoto technology we wanted to make the pragmatics of writing a cheque as close to a normal cheque as possible—the only difference is an 'Authorise Transaction' "magic box" in the stub that must be ticked to confirm the payment. The "magic box" triggers the pen to send the handwritten information to a nearby computer via Bluetooth.

Paying into a digital depository

The second design explores an alternative usage scenario that preserves the traditional cheque book completely but throws into question the principles of the current clearing process. Here we appropriate and package together a business card scanner (CardScan Executive) and a paper

shredder in a design that scans the cheque, completes the payment and then immediately destroys the cheque. Once shredded the cheque drops into a bin at the bottom of the device. As per the Anoto-based design, a signal is sent to a nearby computer, which then processes the payment.

Digital cheque clearing

In order to enable the two designs to make a payment we developed a bespoke cheque clearing system enabling us to make simulated transactions without having to access secured bank servers. The system can be split in five main areas discussed below (Figure 2).
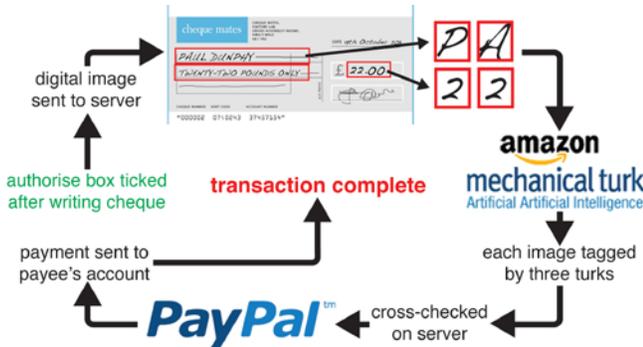

Figure 2: Digital cheque clearing cycle.

Conversion of paper-cheque to a digital copy

To convert a conventionally written cheque to a digital copy, a scanning mechanism had to be used. For the first prototype the digital pen automatically stores the handwritten information and sends it to a connected computer when the pen synchronization is triggered. For the scanner/shredder prototype a scanner has been used that scans the handwritten cheque.

Segmentation of the for identification areas

The areas that we need to identify from the digital image of the cheque are the name of the payee, the amount to be paid, the cheque-book holder's account number and sort code. Other areas could be identified like the signature for an offline signature recognition but this was not done because of the low performance of offline signature recognition algorithms.

Character segmentation

For segmenting the characters to be recognized, the images of the cheque areas are rendered to black and white. Then the characters are segmented by checking the connected black pixels in these areas.

Character recognition

A particularly challenging aspect of the development was the recognition of handwriting. Reliable optical character recognition (OCR) is still a challenge so there were limited

open algorithms. Therefore, we appropriated Amazon's Mechanical Turk platform. Mechanical Turk is a crowd sourcing marketplace which allows programmers to use human intelligence to perform tasks that computers are poor at performing. Here it is possible to have users from across the world perform basic tasks where they recognise the individual characters from the cheques for a minimum fee. The software uploads one by one the characters for recognition and waits for enough replies per character to decide if the answer is correct. After some time the software has all the details needed to initiate an online payment.

Making the payment

After receiving all the responses and successfully identified the handwritten characters, a transaction needs to be made with this information. To do that PayPal's SDK has been used. A PHP request is made to PayPal's SDK including the details of the PayPal users and the amount to be transferred between these accounts.

FUTURE WORK

The digital cheque clearing system is currently been demonstrated to the UK's banking industry, not as a solution to the issue of cheque replacement, but as a way of illustrating the needs and desires of specific user groups and that digital payments do not need to be consigned to those who use computers or smart phones. We are currently exploring opportunities to develop the demonstrated prototypes further, with the goal of deploying a number of digital chequebooks and depositories in local communities.

ACKNOWLEDGMENTS

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