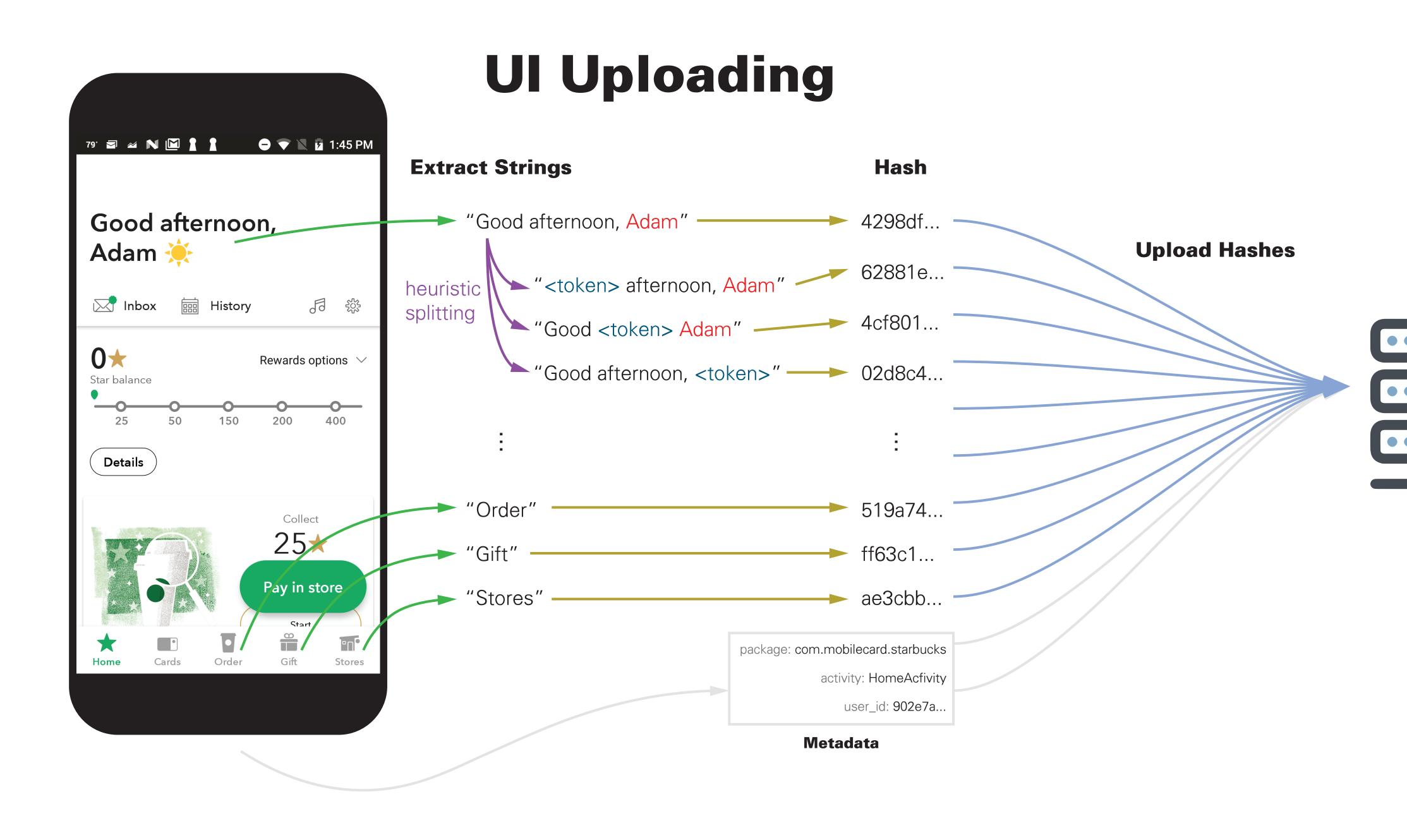
Watch What I Do... But Not Too Closely

(preserving privacy when sharing programming-by-demonstration scripts) Brandon Canfield¹, Toby Jia-Jun Li², Brad A. Myers²

¹Yale University, New Haven, CT ²Carnegie Mellon University, Pittsburgh, PA

Summary

GUI-based programming by demonstration is a powerful tool to enable end-user development. An unplanned side effect of end-user development is the desire to share scripts from one user to another. These scripts may contain private information about the creator that should not be revealed. We are working towards a system that removes this private information at share time without user intervention. This is particularly important in situations where we have large amounts of possibly private information (that is, too large for users to clean by hand) or when we want to collect scripts automatically from users (where user intervention cannot be expected). We do this by crowdsourcing hashed strings from users phones as they run potentially automatable apps in everyday use. String hashes that appear on large numbers of phones are interpreted to be hashes of non-private strings.



View Script: order an americano "Order, tab 3 of 5" "New Haven, Church Street" **Heuristic Split** "Confirm store" "Checkout \$3.14" "New Haven, Church <token>" '<token> store" 'Confirm <token>" '<token> \$3.14" "Checkout <token>" 'Checkout \$<number>" 6 Click on the FrameLayout that has the text e486ae... "Add to order" in Starbucks 113c48.. 7 Click on the RelativeLayout that has the 471f36... text "1" in Starbucks 8 Click on the RelativeLayout that has the text "View store list" in Starbucks d479d1... ea68bc.. the tex "New Haven, Church Street" 9bd662.. 10 Click on the FrameLayout that has the text "Confirm store" in Starbucks **Hash Strings Select Public String Hashes** Click on the FrameLayout that has the "Checkout \$3.14" n Starbucks **END SCRIPT** 113c48... not public public 9bd662.. not public "Starbucks" "Starbucks" "Order, tab 3 of 5" "Order, tab 3 of 5" -"New Haven, Church Street" ----- no replacement "Confirm store" ————— "Confirm store" "Checkout \$3.14" ———— "Checkout \$<number>" **Build Replacement Table** Starbucks" in Home Screen Click on the FrameLayout that has the

content "Order, tab, 3 of 5" in Starbuck

Click on the II\$If that has the conten

ne text "New Haven, Church Street" is

Upload Script

Click on the LinearLayout that has the to

Script Sharing

Extract Strings

"Starbucks"

Future Work

- Cleaning embedded information as well as script operations
- Automatically aggregating similar scripts from different users
- User study to determine if users can trust and predict behavior of downloaded scripts
- Repairing errors when shared scripts get stuck





Substitute Queries

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