

HOW SECURE ARE OUR FAVORITE MOBILE PAYMENT APPLICATIONS ?

--- Analysis and comparison of the most popular mobile
payment apps in China and the US



By Haomin Feng
COMP 116 Computer System Security Final Project

RISE OF MOBILE PAYMENT APPS

- Rise in ownership and usage of mobile devices has led us to a new era of convenient services such as **mobile payment**
- Provide users with a **fast** and **convenient** payment option
- A continuously growing trend of using mobile payment
- No more cash or credit cards
- No need to bring your wallet



MOST POPULAR MOBILE PAYMENT APPS AMONG YOUNG POPULATION IN CHINA AND THE US



WeChat Pay

VS

venmo



VENMO IN THE US

- Founded in 2009 By Andrew Kortina and Iqram Magdon-Ismail
- Owned by PayPal, one of the the leading mobile payment platforms accepted by North American retailers.
- Provides easy money transfers between individuals
- Allows users to share and like payments and purchases through a social feed
- New form of social networking
- Popular among young people
- 10 million unique monthly users and handled \$ 17.6 billion in 2016



WECHAT PAY IN CHINA

- In China, cash is already pretty much dead as the country lives the future with mobile payment
- A digital wallet service which supports payments between users and vendors since August 2013
- A product launched by Tencent
- Support numerous payment methods: Quick Pay, QR Code Payments, In-App Web-Based Payments, and Native In-App Payments
- A total transaction volume of \$ 3 trillion in 2016
- 600 million active users



WHY DO WE CARE?

So widely by so many users
Such large transaction volumes

What if anything bad happen? How much damage
will it cause? How much will we lost?

Possible security Issues
privacy violation
banking account security



VENMO SECURITY ANALYSIS

- **Security claims and flaws**

How Venmo protects your financial information

Venmo uses data encryption to protect you and guard against unauthorized transactions and access to your personal or financial information. If you suspect that there has been unauthorized activity on your account, please contact us immediately at

support@venmo.com we're here to help.

- **How do Venmo guard the unauthorized behaviors specifically?**
- **Contact through email?**

If one really has an urgent security issue, email does not seem like a fast and efficient way of communication.



VENMO SECURITY ANALYSIS

- Security claims and flaws?

Account protection

If you've lost your phone or suspect that it is being used in an unauthorized way, you can prevent it from accessing your Venmo account by visiting the "Passwords & Authorizations" section of your [account settings online](#). Once access is revoked from a device, you'll be logged out of any active Venmo sessions you have on it.

- Can Venmo revoke an already occurred unauthorized transaction?
- What if it's the username and password that are stolen? Can Venmo freeze the account?



VENMO SECURITY ANALYSIS

- Major Security Vulnerabilities

No PIN by default

Session remains open unless user manually logs out

--- If close the app and then re-open again, no login password required

!!! Anyone who has access to your phone can open your Venmo and make any transactions without being asked to verify the identity !!!



VENMO SECURITY ANALYSIS

- Major Security Vulnerabilities

Venmo does not require email verification if one wishes to change an old email address to a new one

Venmo also does not verify the validity of an email address

CASE SENARIO:

If a bad person who has your lost phone does not want you to know what transactions he has made, he could change your old email address into a new one, and you would only receive one email notification about the change. With the changed email address, the bad person can also possibly change your old password, taking full control of your Venmo account.

AT&T 7:54 PM 42%

Cancel Edit Profile Save

First Name Venmo

Last Name Demonstratkn

Username helloming

Email Email

You can be paid using your username, email, or phone number.

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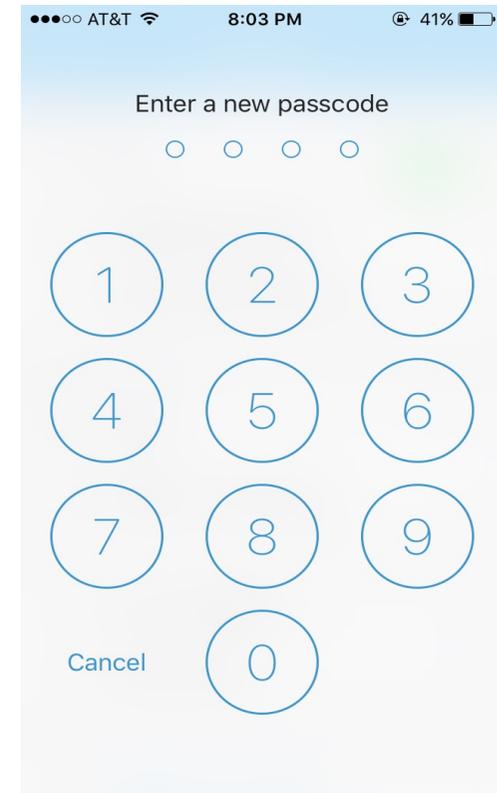
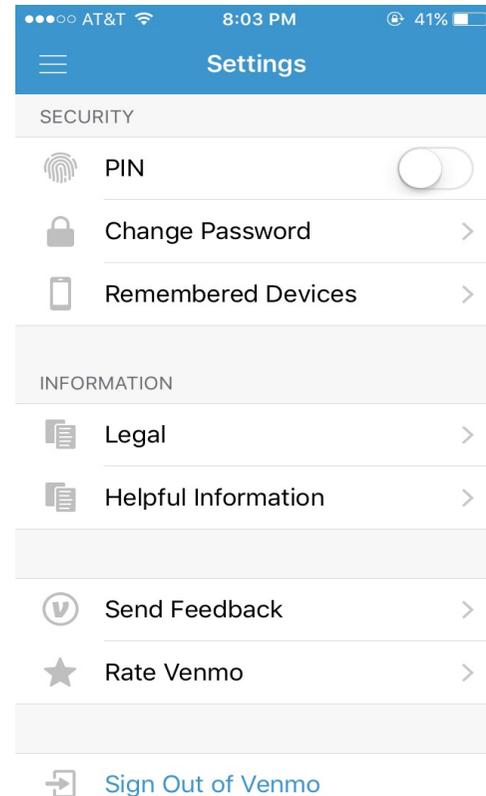


VENMO SECURITY ANALYSIS

- Major Major Security Vulnerabilities

Problems with four-digit PIN

1. Not a default setting
2. Only remembers locally (once logged out, it is set back to no PIN by default)
3. Only 4 digits (not strong enough)
4. Better to ask for PIN before each transaction, not just upon opening the app



VENMO SECURITY ANALYSIS



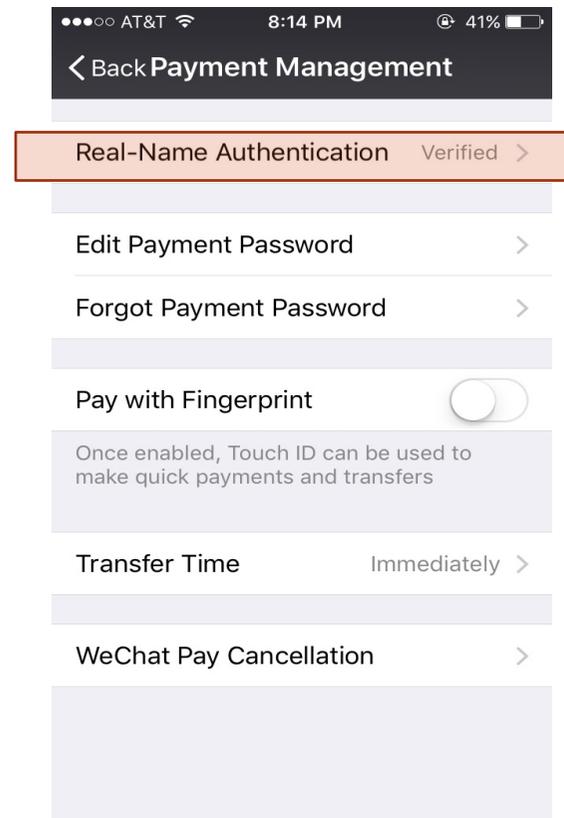
Security Level:
Low



WECHAT PAY SECURITY ANALYSIS

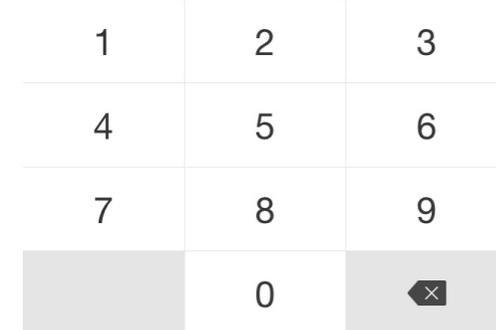
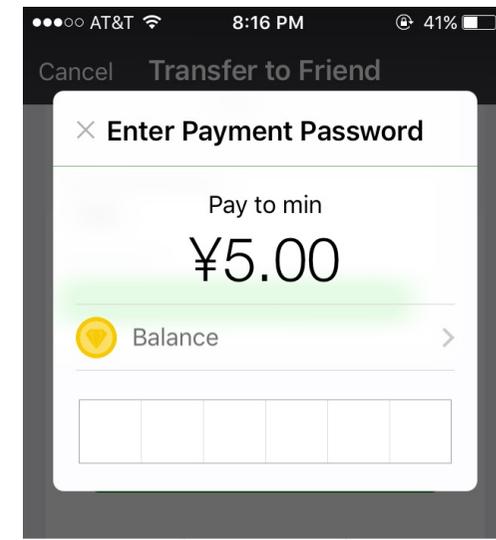
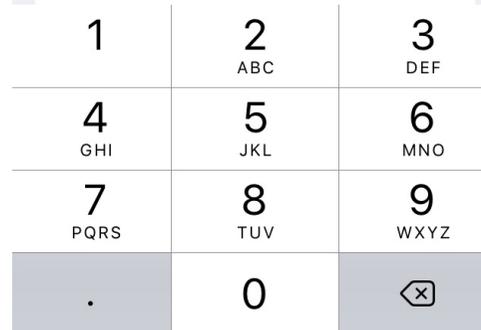
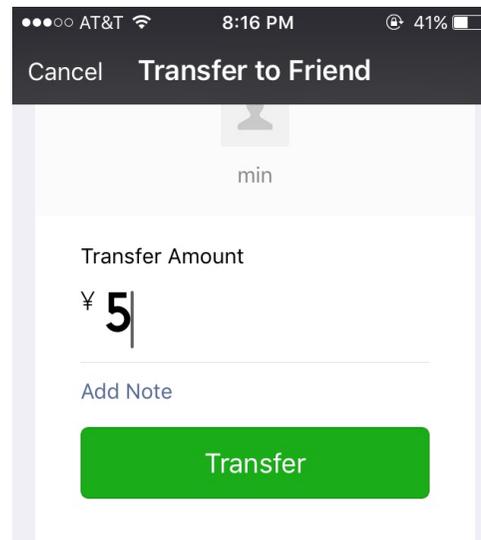
- Security Methods of WeChat Pay

1. Real-name authentication



WECHAT PAY SECURITY ANALYSIS

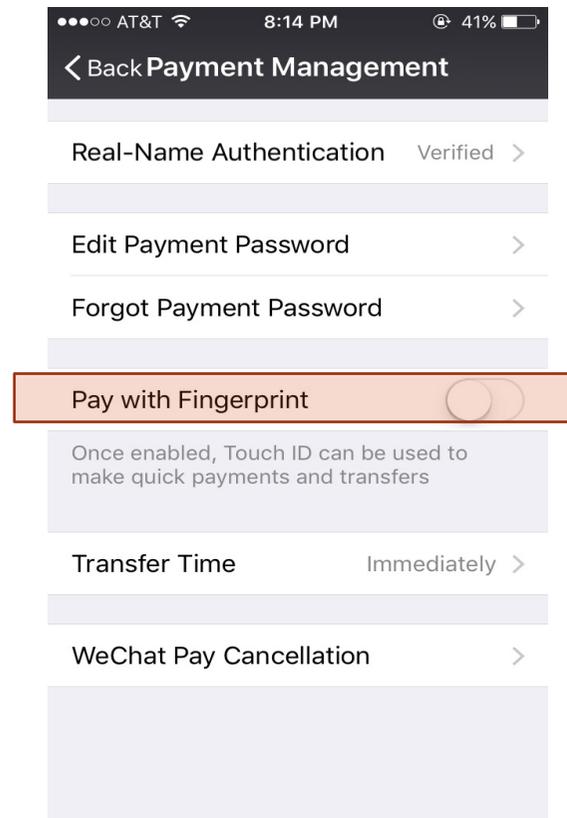
- Security Methods of WeChat Pay
2. Default 6-digit password before every transaction



WECHAT PAY SECURITY ANALYSIS

- Security Methods of WeChat Pay

3. Fingerprint password



WECHAT PAY SECURITY ANALYSIS

- Security Methods of WeChat Pay

4. Two factor authentication when logged in a different device

5. Payment insured

6. 24/7 emergency hotlines



WECHAT PAY SECURITY ANALYSIS

- Privacy Issues

Collects your personal information includes:

- Registration and Account Information
- Account Verification, Social Connect
- Purchases via WeChat, Location Data
- Log Data and your device, and Cookies
- Automatic Data Collection, and Related Technologies

Beware your information might be leaked to some third parties!!!



WECHAT PAY SECURITY ANALYSIS

- Privacy Issues

SAFETY AND SECURITY

WeChat Shares Consumer Data With Chinese Government



By PYMNTS  

Posted on September 25, 2017

WeChat accused of sharing users' personal data with Chinese authorities [Update: WhatsApp now blocked in China]

Android Authority Newsfeed   UTNIK / SEPTEMBER 26, 2017

Updated: WeChat's privacy policy update draws attention to information shared with the government

🕒 Sep 19, 2017 👤 Emma Lee

☰ WeChat, News

OVERALL COMPARISON BETWEEN VENMO AND WECHAT PAY

- In general, Venmo is a pretty unsafe mobile application when it comes to payment security. By default, it has basically zero authentication protection, and unauthorized transaction can easily occur. On the other hand, WeChat Pay does a much better job on transaction verification, and it provides multiple security measures when an emergency takes place. However, WeChat Pay users may face a higher risk of leaking personal data than those of Venmo.
- Emergency Customer Services: WeChat Pay > Venmo
- Authentication Security: WeChat Pay > Venmo
- Easy to Use: Venmo > WeChat Pay
- Daily Transfer Limit: WeChat Pay (risky) > Venmo
- Privacy: Venmo > WeChat Pay



GENERAL ADVICE

- For mobile payment apps:
 - Enhance authentication and encryption
 - Education on social Engineering
 - Rate-limiting charge confirmations

- For users:
 - How to protect yourself
 - How to manage risks



Thank You!

