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DIGITAL KYC PROOF-OF-CONCEPT WHITE-PAPER 2

1. Introduction

Finda Systems (Asia) Pte. Ltd. ("FINDA") has completed the scope of the Proof of Concept (POC) on 28 June 2018 for Part A and 26 September 2018 for Part B on Digital KYC authentication system, respectively.

Results of FINDA's Digital KYC Proof-of-Concept

2. Approach

After reviewing the results of the earlier POC (Part A), a follow-up POC was conducted by FINDA and OCBC (Part B). This POC is conducted over 6 months:

Part A of the POC was successfully completed on 28th June 2018

- Enable cash withdrawal via facial recognition on an ATM in Singapore with a PRC issued bank card

Part B of the POC was successfully completed on 26th Sept 2018

- Enable cash withdrawal via facial recognition on an ATM at a foreign location; and
- Enable cardless cash withdrawal via facial recognition at a Singapore ATM.

2. Summary of POC Results

Objectives:

- **[Concept test]** To confirm the legal relationship of “ATM card” and “card holder” and prevent unauthorised cash withdrawals.

- **[Location test]** To confirm the legal relationship of “ATM card” and “card holder” and prevent unauthorised cash withdrawals in an overseas location.

- **[Extended Use-case test]** To confirm the legal relationship of “ATM card” and “card holder” without using a physical ATM card.

FINDA’s facial recognition solution was tested based on the following test scenarios:

- Liveness Test – This includes testing against a photo and a pre-recorded video of card holder

- Accuracy Test – This includes conducting multiple tests on matching card holder to the right card, as well as card-holder to the wrong card

- Exceptional Test – This includes card holder doing funny face, card holder covering forehead and ears with a scarf, and undergoing transaction in low light conditions

Results of the POC were positive, the proposed measurement for the POC has been achieved. Please see appendix 1 for key results and appendix 2 for the detailed statistics.

3. Insights on user experience, transaction journey & feedback

a. The results were positive, and objectives were met.

b. User interface (UI) on the ATM is crucial in customer adoption. It must be intuitive and simple for customers to follow the instructions as part of the transaction flow. External factors such as lighting play an essential role in guiding customers on the transactions.

c. Processes to obtain/refresh new and existing customers' facial images will need to be established to ensure up-to-date and accurate database, or elsethe false acceptance rate will be high and thereby affecting customer experience.

d. The speed of authenticating customers' identities is critical as lagged response time will lead to dissatisfied customers.

4. Product fit - Identify scenarios of best fit and no fit

- Best fit - Facial recognition can be used as an additional authentication mode for the following types of transactions:

  (i) High-risk transactions;

  (ii) Transactions to mitigate against fraud; or

  (iii) Mode of identifying customers.

- No/Little fit - It will be challenging to implement in overseas banks' ATM to facilitate authentication of transactions due to the following reasons:

    (i) Overseas banks' need to obtain clearance from their respective central banks;

    (ii) Overseas banks need to work with correspondent banks to implement end-to-end authentication process;

    (iii) Cost of implementation will be of concern to these banks;

    (iv) Adaptation and adoption of ATMs to enable overseas ATMs to perform as specified in this test; and

    (v) Central banks to agree on an e-KYC standard that meets the minimum requirements set by this POC test.

5. Customers' Perception on Risk vs Safety

a. Customers who are new to facial biometrics may resist using this additional customer authentication method for their transactions.

b. On the other hand, customers who are more tech savvy may embrace the new technology and use it for their transactions seamlessly.

c. The speed and accuracy of the facial authentication will influence customers' perception of the authentication method.

d. Publicity campaign needs to be launched to encourage consumer acceptance of facial recognition technology.

6. Potential Extension Use cases suggested by FINDA

The Digital KYC facial recognition technology can be applied to a number of financial applications that require KYC due diligence today or may be subjected to regulatory mandates in the near future, when security and compliance requirements are being tightened up. The following is a list of applications that digital KYC can be used to address their specific requirements:

a. Overseas ATM withdrawal with AML requirement
b. Overseas credit card payment with AML requirement
c. Overseas foreign worker (OFW) remittance with AML and fraud prevention requirements.
d. Card-less ATM transaction with card skimming prevention requirement.
e. New customer acquisition through self-service or remote assisted channels.

6.1 Overseas ATM Withdrawal

As proven in the Macau KYC ATM implementation in 2017, digital KYC enhancement to Macau ATM network quickly and effectively countered money laundering through repeated illegal cash withdrawals at a ATM by certain Chinese nationals at Macau ATMs.

6.2 Overseas Credit Card Payment

Also proven in the Macau KYC POS implementation in 2017, digital KYC enhancement to certain luxury retailers effectively address the problem of money laundering through credit card spending at retailers.

6.3 Overseas Foreign Worker (OFW) Remittance Services

OFW remittance is gaining traction in recent years especially in Asia. Countries like Philippines, Indonesia are having huge growth in inward remittance due to the large number of their citizens working overseas. Unfortunately, this has become a notorious cross border money laundering channel and frequent fraud cases have been reported at the receiving end. It is suggested to apply digital KYC enhancement to both remitting and receiving ends to address the money laundering and fraud issues. The use case of domestic helper remittance exhibits the frequency of the domestic helper group using the remittance service frequently. It is recommended to use online authentication for this purpose. Both remitting and receiving users will go through the initial onboarding process to create for themselves a digital ID. Subsequent remittance transaction can then be performed quickly and safely under digital KYC control process without the need of carrying or scanning identification document.

6.4 Card-less ATM Transaction

Since the first modern ATM started servicing the banking customers many years ago, the industry has been using card and PIN as the two factors for authentication for ATM transactions. As a card has very limited security feature, card skimming becomes the most severe ATM fraud resulting in major financial losses to the industry and card holders. Going card-less for transacting with ATM is proposed as an innovative solution to completely eliminate the necessity of carrying physical card, thus avoiding the risk of having card data being skimmed at the ATM. Cardless ATM transaction via facial recognition will not only reduce withdrawal time at ATM, but also enhances authentication of customers', thereby mitigating against potential card skimming.

6.5 Customer Acquisition (Onboarding)

Financial institutions are watched closely as they bear the responsibility of safeguarding both the consumers' monetary and personal data. Due to the large rippling effect the financial industries have in the economic well-being of countries. They are mandated to adhere to proper and accountable KYC processes during customer acquisition. This is a

complex and lengthy process both to the banks/ institutions' staff and customers. Many financial institutions have to juggle between improving customer experience while keeping costs down. Banks/financial institutions have embarked on complicated and expensive self-service or remote assisted services implementation which do not completely address the KYC requirements. Digital KYC will be a more holistic solution that can be scaled along the way to meet changing requirements and needs. By enabling the self-service or remote assisted channel with digital KYC devices, the onboarding process can be carried out through these channels with same level of security standard as in a manned channel. Even better, customers can be served anytime anywhere. By using their digital ID, customers will gain access to additional services and products without the hassle of carrying the previously required documents.

7. Conclusion

The POC is declared successful based on the results achieved. While Digital KYC is not completely new, evolving data acquisition technologies combined with machine learning and more powerful data analytics have generated the potential to create commercial and regulatory value for the government, institutions, as well as the end-consumers. Tech firm continues to face challenges in pushing the adaption of Digital KYC solutions, but with strong support from government agencies, open dialogues with the eco-system, and industry led regional standardization, the future of digital KYC is promising and would transform the way KYC is conducted.

Submitted by:

POC applicant: Finda

Participating bank: OCBC

Appendix 1: POC Measurement and Results

	Outcomes	**Measurement**	**Target**	**Results**
1	Stability	Operating period	24*7	Pass
2	Capacity	Number of transactions/min	>80 Transaction/ min	Pass
3	Robustness	QPS (queries per second)	>200	Pass
4	Responsiveness of intervention	Speed of update	Immediate	Pass
5	Rejections of photograph (Non-live)	Percentage of positive identification	>99%	100%
6	Comparison between cardless versus physical card (for part 2 of POC)	Range of time difference	+/- 2 seconds	Pass

7	Accuracy of fraud identification	Percentage of False Acceptance Rate (FAR) * Percentage of False Rejection Rate (FRR)** *Likelihood that the system will incorrectly accept an access attempt by an unauthorized user **Likelihood that the system will incorrectly reject an access attempt by an authorized user	<0.1% <5%	0% 0%
8	Speed of Facial Recognition	Time required	<3 sec	Pass
9	ATM hardware (reader & camera) & software (agent & APIs) integration	Integration Report	Pass	Pass
10	KBM server setup to bridge KYC requests/result between ATM & KYC server	Set-up Report	Pass	Pass

Appendix 2: Detailed Report

Summary

#	Scenarios	Number of tests	Cash withdrawal approval	Pass / Fail
	Real card owner undergoing KYC facial recognition	490	100%	Pass
	False card owner undergoing KYC facial recognition	489	0%	Pass
	Total Tests	979		

(i) Cash withdrawal via facial recognition on an ATM in Singapore with a PRC issued bank card

#	Scenarios	Number of tests	Cash withdrawal approval	Pass / Fail
	Card holder under normal lighting undergoing KYC facial recognition	80	100%	Pass
	Card holder under normal lighting with spectacles undergoing KYC facial recognition	60	100%	Pass
	Card holder under normal lighting smiling while undergoing KYC facial recognition	30	100%	Pass
	Card holder under normal lighting covering ears undergoing KYC facial recognition	40	100%	Pass
	Card holder under dimmed lighting undergoing KYC facial recognition	20	100%	Pass
	Card holder under normal lighting covering both sides of cheeks during KYC facial recognition	20	0%	Pass

	Card holder under normal lighting using a 3rd party's ID card for KYC facial recognition	88	0%	Pass
	Card holder under normal lighting using a photo for KYC facial recognition	30	0%	Pass
	Card holder under normal lighting using a video clip for KYC facial recognition	30	0%	Pass
	Card holder under normal lighting doing funny face while undergoing KYC facial recognition	6	0%	Pass
	Card holder standing away from camera during KYC facial recognition	20	0%	Pass
		424		

(ii) Cash withdrawal via facial recognition on an ATM in Malaysia

#	**Scenarios**	**Number of tests**	**Cash withdrawal approval**	**Pass / Fail**
	SG OCBC Card holder under normal lighting undergoing KYC facial recognition at Malaysia ATM	20	100%	Pass
	SG OCBC Card holder under normal lighting with spectacles undergoing KYC facial recognition at Malaysia ATM	30	100%	Pass
	SG OCBC Card holder under normal lighting with sunglasses undergoing KYC facial recognition at Malaysia ATM	20	0%	Pass
	SG OCBC Card holder under dimmed lighting under an umbrella undergoing KYC facial recognition at Malaysia ATM	10	100%	Pass

#	Scenarios	Number of tests	Cash withdrawal approval	Pass / Fail
	SG OCBC Card holder under normal lighting wearing headscarf covering ears and forehead while undergoing KYC facial recognition at Malaysia ATM	30	100%	Pass
	SG OCBC Card holder under normal lighting using headscarf to cover half of the face while undergoing KYC facial recognition at Malaysia ATM	5	0%	Pass
	SG OCBC Card holder under dimmed lighting undergoing KYC facial recognition at Malaysia ATM	30	100%	Pass
	SG OCBC Card holder under normal lighting using a 3rd party's card undergoing KYC facial recognition at Malaysia ATM	50	0%	Pass
	SG OCBC Card holder under normal lighting using a 3rd party's card and photo while undergoing KYC facial recognition at Malaysia ATM	50	0%	Pass
	SG OCBC Card holder under normal lighting using a 3rd party's card and video while undergoing KYC facial recognition at Malaysia ATM	50	0%	Pass
	SG OCBC Card holder under normal lighting standing side by side with a 3rd party while undergoing KYC facial recognition at Malaysia ATM	10	100%	Pass
	SG OCBC Card holder under normal lighting making funny face while undergoing KYC facial recognition at Malaysia ATM	5	0%	Pass
		310		

(iii) Cardless cash withdrawal via facial recognition at a Singapore ATM.

#	Scenarios	Number of tests	Cash withdrawal approval	Pass / Fail
	SG OCBC Card holder under normal lighting undergoing KYC facial recognition for cardless withdrawal	50	100%	Pass
	SG OCBC Card holder under normal lighting with spectacles undergoing KYC facial recognition for cardless withdrawal	50	100%	Pass
	SG OCBC Card holder under normal lighting with sunglasses undergoing KYC facial recognition for cardless withdrawal	10	0%	Pass
	SG OCBC Card holder under dimmed lighting undergoing KYC facial recognition for cardless withdrawal	10	100%	Pass
	SG OCBC Card holder under normal lighting wearing a headscarf covering ears and forehead while undergoing KYC facial recognition for cardless withdrawal	10	100%	Pass
	SG OCBC Card holder under normal lighting wearing a headscarf covering half the face while undergoing KYC facial recognition for cardless withdrawal	5	0%	Pass
	SG OCBC Card holder under normal lighting using a 3rd party's mobile number and photo while undergoing KYC facial recognition at Malaysia ATM	50	0%	Pass

#	Scenarios	Number of tests	Cash withdrawal approval	Pass / Fail
	SG OCBC Card holder under normal lighting using a 3rd party's mobile number and video while undergoing KYC facial recognition at Malaysia ATM	50	0%	Pass
	SG OCBC Card holder under normal lighting standing side by side with a 3rd party while undergoing KYC facial recognition at Malaysia ATM	10	100%	Pass
		245		