

# Fintech and Credit Scoring for the Millennial Generation

by Agarwal, Alok, Ghosh, and Gupta

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# Summary of the Paper

Data: mobile-only Fintech lending platform (CASHe)

CASH<sup>e</sup>

## HOW CASHe WORKS

Through a simple, seamless & swift process, you can get started with CASHe.

Visit [Google Play Store](#) and [Apple App Store](#) to download the app now!



### DOWNLOAD APP

Download CASHe app from Google Play Store and Apple App Store



### REGISTER

Register through your Facebook / Google+ / LinkedIn accounts



### SHARE DOCUMENTS

Fill the application form and upload 4 basic documents from your smartphone



### ENTER AMOUNT

Decide on quantum of the loan based on your approved eligibility



### GET CASHe

Receive cash in your account in a matter of minutes



### REPAY

Repay your loan on due date via bank transfer / cheque deposit and raise your Social Loan Quotient

Main Idea: **Individuals' digital mobile footprint** can provide valuable information on the **individuals' creditworthiness**.

# Summary of the Paper: Data

Data: mobile-only Fintech lending platform (CASHe)

1. Full sample from the Indian firm for the period of 2016-2018
2. Loan amounts from \$142 - \$2846
3. Loan duration from 15 days to 180 days
4. 180,000 active customers with 75% repeat users
5. Documents: identification, address doc, bank statement, salary slip
6. Contains data such as
  - Loan amount, Loan purpose, Interest rate
  - Age, Salary, CIBIL (subsample), Education, Job designation
  - Preferred social media platform (Facebook, LinkedIn, Google)
  - Number of SMS, Apps, Contacts, Call logs
  - Operating software (IOS, Android)
  - Type of installed apps (Dating, Finance, Social, Travel, Mobile loan)

Main purpose of the firm: provide short-term credit to young salaried professionals by using digital footprints

## Summary of the Paper: Findings

Digital mobile footprint has explanatory power on approval and default.

Variable	Approval	Default	Type
Credit score	+	-	Traditional
Salary	+	-	Traditional
Education	+	-	Traditional
Number of Contact	+	-	Usage
Number of Apps	+	-	Usage
Number of Calllog	-	-	Usage
Number of SMS		+	Usage
IOS	-	-	Operating System
Finance	-	-	Installed Application
Mobile Loan	+	-	Installed Application
Facebook	+	+	Login Method
Linkedin	+		Login Method

## Summary of the Paper: Findings

The combination of digital mobile footprint similar Area Under the Curve (AUC) to credit score

- Credit score only: 58.26%
- Credit score and traditional controls (age, education, salary): 76.06%
- Digital mobile footprint only: 55.73%
- Digital mobile footprint and traditional controls: 76.34%
- Digital mobile footprint, Credit score and traditional controls: 76.74%

Implication: Indian data shows lower AUC using credit score compared to other papers using developed market data → digital mobile footprint may have larger potential impact in developing market (weak information environments).

# Comment #1: Approval and Default

As long as the loan is not predatory, lenders would *optimize approval screening process to minimize defaults given interest rate.*

- Interest rate is only a function of length of borrowing period.

What are your Rate of Interest on the loans I take?

We charge you 1.75% flat interest for a 15-day loan. If you are unable to repay within the 15-day period, we will automatically extend your loan to another 15 days with additional interest rate of 4%. If you are unable to repay within the 15-day extended period, we will automatically extend your loan to another 7 days with additional interest rate of 2.5%. If you exceed the 7-day extended period, we will charge you 3% late paying fee for every week thereafter.

For a 30-day loan, we charge you 3.25% flat interest. A 7-day interest-free grace period will be offered for repayment of your dues at the end of every paying month. However, any subsequent delays would incur a 3% flat interest fee (including the 7-day grace period) on subsequent weeks thereafter

For the 90-day loan, we charge you a flat 2.75% interest / per month. A 7-day interest-free grace period will be offered for repayment of your dues at the end of every paying month. However, any subsequent delays would incur a 3% flat interest fee (including the 7-day grace period) on subsequent weeks thereafter

For the 180-day loan, we charge you a flat 2.50% interest / per month. A 7-day interest- free grace period will be offered for repayment of your dues at the end of every paying month.

- Given interest rate, the firm screens applications to minimize defaults. That is, default is conditional on approval.

## Comment #1: Approval and Default

If there exist a monotonic relationship between a “variable” and default,

- Approval process may drop application with low “variable” ( if negative relationship, i.e. credit score).
- Conditional on approval, the loan is originated and will default with probability decreasing with the “variable”.
- i.e. Application with higher credit score will be more likely to be approved and less likely to default.
- This is what we see in the traditional variables.

Variable	Approval	Default	Type
Credit score	+	-	Traditional
Salary	+	-	Traditional
Education	+	-	Traditional

# Comment #1: Approval and Default

How about digital mobile footprints?

Variable	Approval	Default	Type
Number of Contact	+	-	Usage
Number of Apps	+	-	Usage
Number of Calllog	-	-	Usage
Number of SMS		+	Usage
IOS	-	-	Operating System
Finance	-	-	Installed Application
Mobile Loan	+	-	Installed Application
Facebook	+	+	Login Method
Linkedin	+		Login Method

- Number of Contact, Number of Apps, Having mobile loan app seems to have monotonic decreasing relationship with default.



# Comment #1: Approval and Default

How do we understand other variables?

1. If the firm fully optimized the approval screening process, this indicates non-monotonic relationships with default.
  - Number of Callog, IOS, Finance app
  - i.e. Once sort out some applications with finance app (such as extreme risk takers?), having finance app reduces default likelihood.
  - But this still cannot explain “Facebook login”: higher approval with higher default.
2. If the approval process is not fully optimized yet, the variables (with some explanatory power) may not be actually used in the approval screening process.
  - They should reject more applications with “Facebook login”.

## Comment #1: Approval and Default

Traditional model of loan approval is a steady state outcome from the evolution in the history of finance.

- In equilibrium, approval and default should share same economics.

Then the fundamental question is how to solve steady state outcome using new digital mobile footprint.

- Unless we find steady state model for using new digital mobile footprint, the real application of the results are limited.
- Feedback effect from users: stop login through Google.
- This logic may apply to other works on digital footprints.

# Comment #1: Approval and Default

Then how?

- Some trial and errors?
  - Typical way of improving products.
  - And the data seems to be the outcome of those trial and errors of the model selections.
  - Suggestion: Authors should include some time-fixed effects i.e. year-month since the model for the approval may differ by time.
- Or large number of simulations/experiments to find convergence.
  - If you know the model that generates outcome and the models have some variations in time-series, you may look for an optimal screening procedure using digital mobile footprints.
  - Or run some random experiments on the platform.
- Or we need some economics to explain why it works.

## Comment #2: Mechanism behind digital footprint

First look: “Number of contact” reduces default likelihood.

So, what if I default?

CASHe is an enterprise of trust. As a user of CASHe app, Lender lends you cash because it believes in your creditworthiness, and in your ability to return it. So, should you default despite the trust bestowed, the Lender will be forced to make your status as a defaulter public on the CASHe app and website, Lender's website and on your social network and take necessary steps for recovery. Lender will also inform CIBIL and other credit rating agencies.

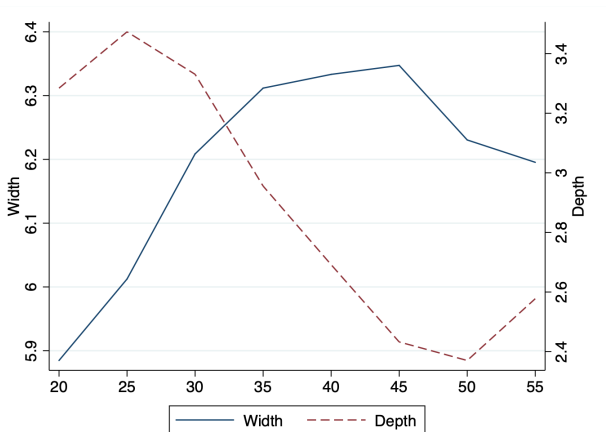
- Maybe through collateralizing human network/ reputation.

## Comment #2: Mechanism behind digital footprint

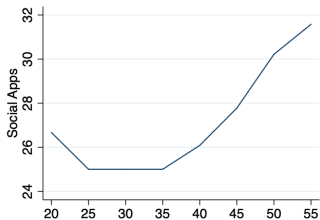
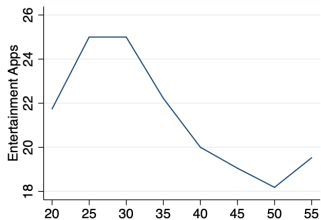
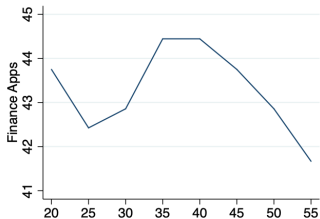
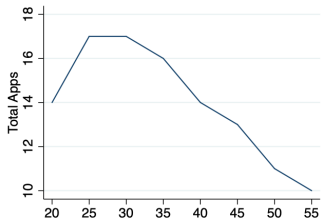
Define:

$$\text{Depth of Relationship} = \frac{\text{Number of Callog} + \text{Number of SMS}}{\text{Number of Contact}}$$

Width of Relationship = Number of Contact



# Comment #2: Mechanism behind digital footprint



## Comment #3: Potential expansion of idea

Push the idea further.

You may identify the social network using the callog data.

- Not only the number but intensity of callog may matter (depth).
- Or may study some network effects on borrowing decision. (i.e. Bailey, Cao, Kuchler, Stroebel (2018) using Facebook data on real estate decisions)

# Conclusion

- Important question and great findings.
- Additional thoughts on optimal application screening model with economics will bring the paper to the another level.