

# NullPointer ChequeIn

[www.chequein.nullpointer.in](http://www.chequein.nullpointer.in)

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# Introduction

- NullPointer is a data analytics company based in New Delhi, India. We develop artificial intelligence solutions deployable across sectors including fintech, social networks, insurance and telecom
- Our solutions combine the latest developments in the field of AI and novel mathematical approaches making them efficient and less data intensive

# The Team



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# Promise

- Over the past few years, AI has started making inroads into the financial sector from lending to trading
- According to CB Insights, fintech firms closed funding 496 deals worth \$8 billion in 2016, a [record high](#)
- In the space of image recognition also, there is a lot of scope in India as at present cheque processing and identity verification are manual processes
- According to [IDC](#), visual data discovery will grow 250% times faster than other market tools and investing in them will be requirement for all enterprises by 2018

## Cheque processing now

- At present, cheque processing in India happens through the [cheque truncation system](#) (CTS), which is a predominantly manual process
- CTS was introduced in 2008 and is yet to spread across all branches in the country
- In this system, an electronic image of the cheque is transmitted along with information like MICR band, date of presentation, drawee bank, etc
- Though faster than speed clearing, the data processing part is still a manual process and is thus time and resource consuming

## Costs of manual cheque processing

Channel	Average Cost Per Transaction
Branch	\$4.25
Call Center	\$1.30
ATM	\$1.25
Online Banking	\$0.19
Mobile	\$0.10

- Smartphone use in India is expected to touch 300 million users by end-2017
- Migrating to image-based technology can thus help banks reduce costs significantly

Source: <https://www.fiserv.com/resources/Mobile-Image-Capture-White-Paper-August-2015.pdf>

# How will image processing work

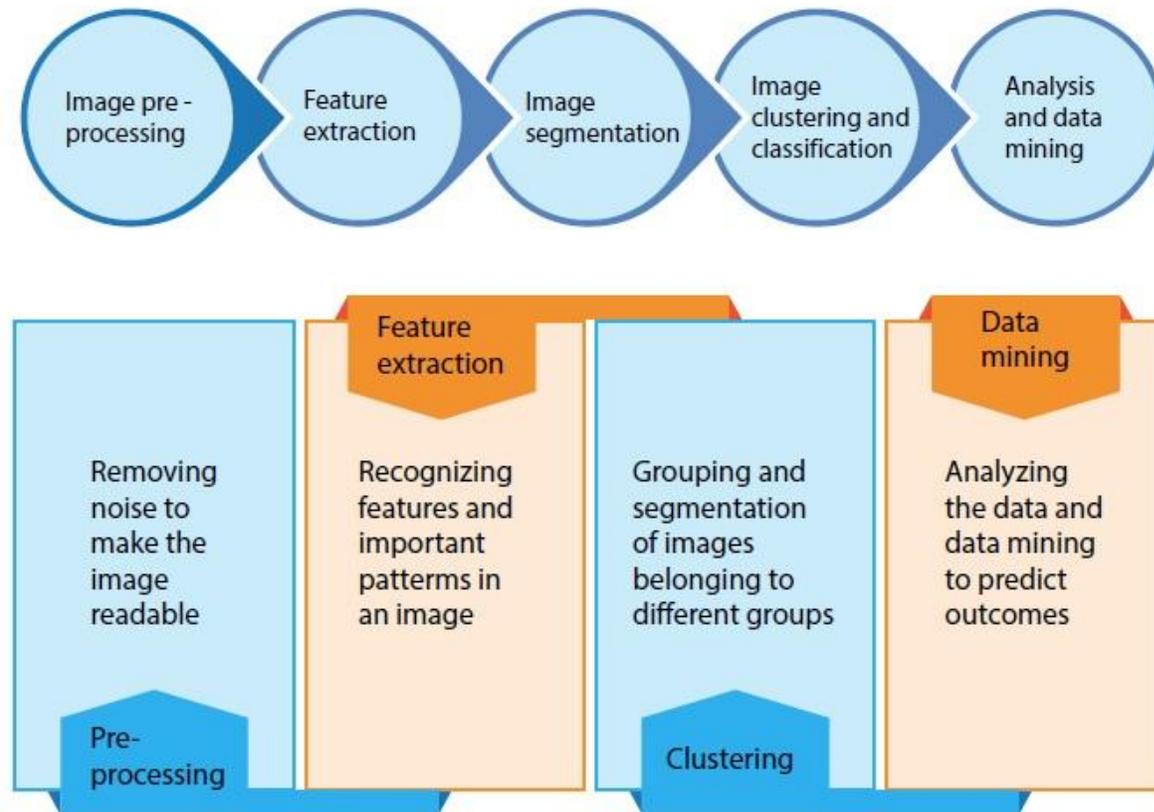
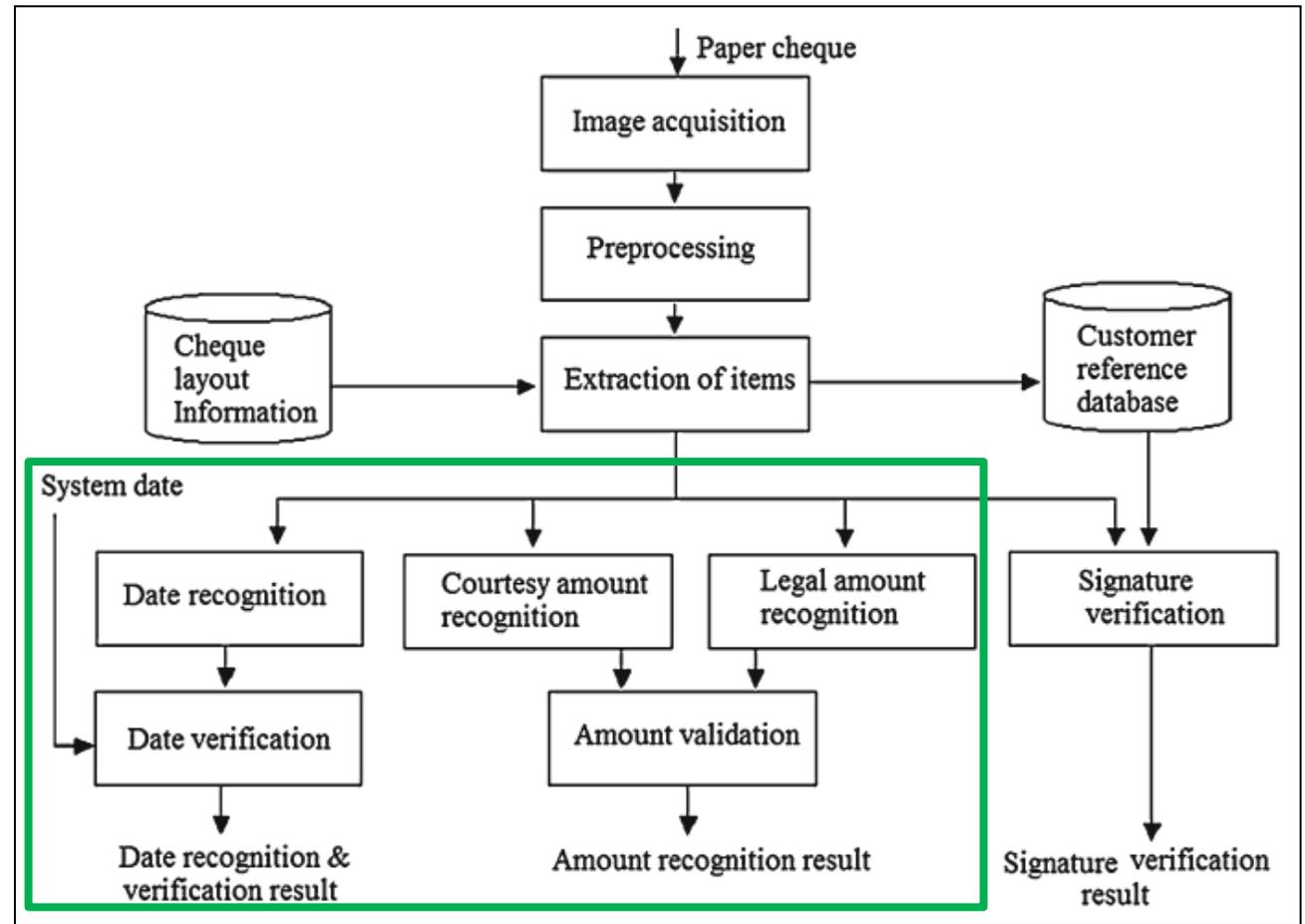


Figure 2.0

*Image Processing Steps*

# How will image processing work in ChequeIn



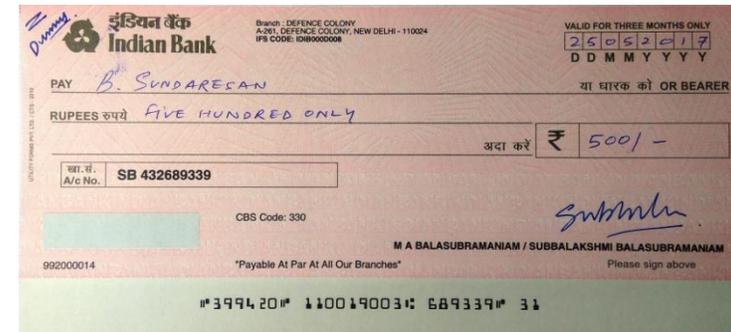
- ChequeIn will focus on date recognition and amount recognition (green box) can easily be upgraded to recognize other characteristics on the cheque

# The model I

- Our solution integrates the following two image localisation and recognition algorithms to extract cheque details
  - [YOLOv2](#) for extracting amount in words and date
  - Python's [OpenCV](#), [Tesseract](#) package to extract amount in digits using edge detection
- We use this two-algorithm strategy as YOLOv2 is known to be inefficient in recognising small objects, which in our case will be the amount in digits
- Our techstack : Web framework: Django | Programming language: Python | ML Framework: TensorFlow | Web server: nginx | OS: Linux | User experience: html

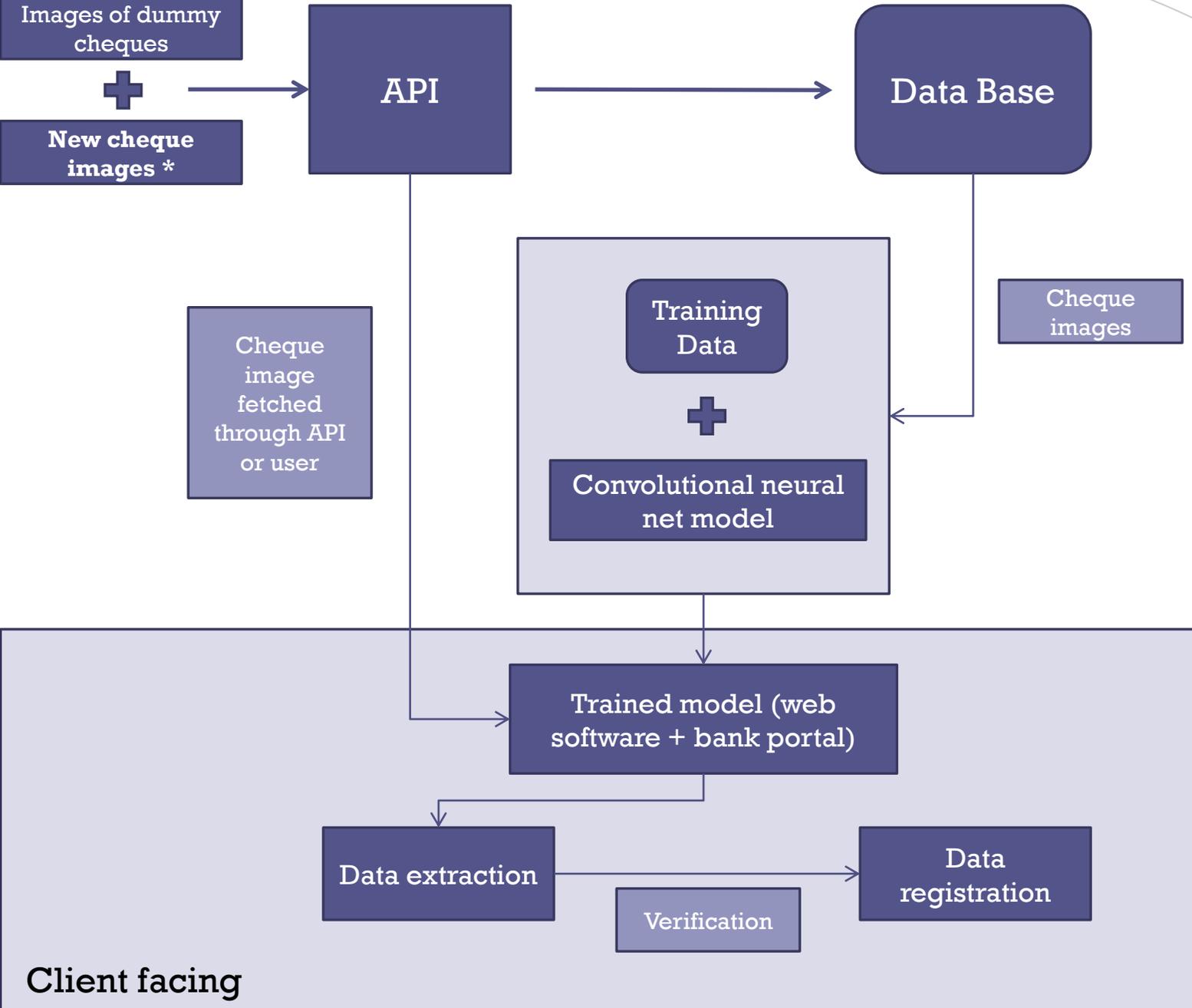
## The model II

- In both cases we take dummy cheque images such as the following as input:



- 600 such cheque images were used to train the YOLO algorithm after labeling the required characteristics
- In case of amount in digits, we have used an algorithm trained on [MNIST](#) handwritten digit database
- A bounding box for the amount in digits is then used to provide an image input to the algorithm for extraction

# High-level architecture of solution



\*Feature that allows user to upload and verify cheque will be made functional later

## Solution summary

- Users will be able to upload images of cheques in various formats
- These cheques will be automatically processed, authenticated and their data will be extracted
- The user will be shown the data extracted and asked for consent. The data will then be fed into the system.
- This step will help the solution learn from its mistakes and also help build confidence among users
- **The error of our algorithm is 11%**

# Challenges I

- The biggest challenge with cheque processing is lack of a handwritten database of Indian cheques
- We circumvented this issue by using dummy cheques made on image editing softwares but that is not ideal
- Handwritten cheque database is maintained by [CENPARMI](#) but is priced steeply and has cheques written in English and French

## Challenges II

- Since, our solution is based on ML it is hugely dependent on data, time and computational power
- [YOLOv2](#), the algorithm used in our solution, requires at least 34,200 different cheques to be trained well
- Since we were able to create only 600 dummy cheques our accuracy will improve further with more cheque data
- This will require more time and computational power but we will believe this will greatly improve our solution

## Scaling-up opportunities

### **There are the steps in which this solution can be scaled up**

- At present, our solution extracts amount in words, numbers and the date. We are in the process extracting payee name, account number and the MICR band from the cheque also
- Integrate signature and identity verification along with cheque data extraction to create a complete platform that can accomplish majority of the image recognition-based tasks in a bank branch
- Integrate cheque depositing machines into the solution to directly source the images into our solution

# Contact

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