Automated Bank Complaints Monitoring

sinoF5 Unstructured data

Data Description

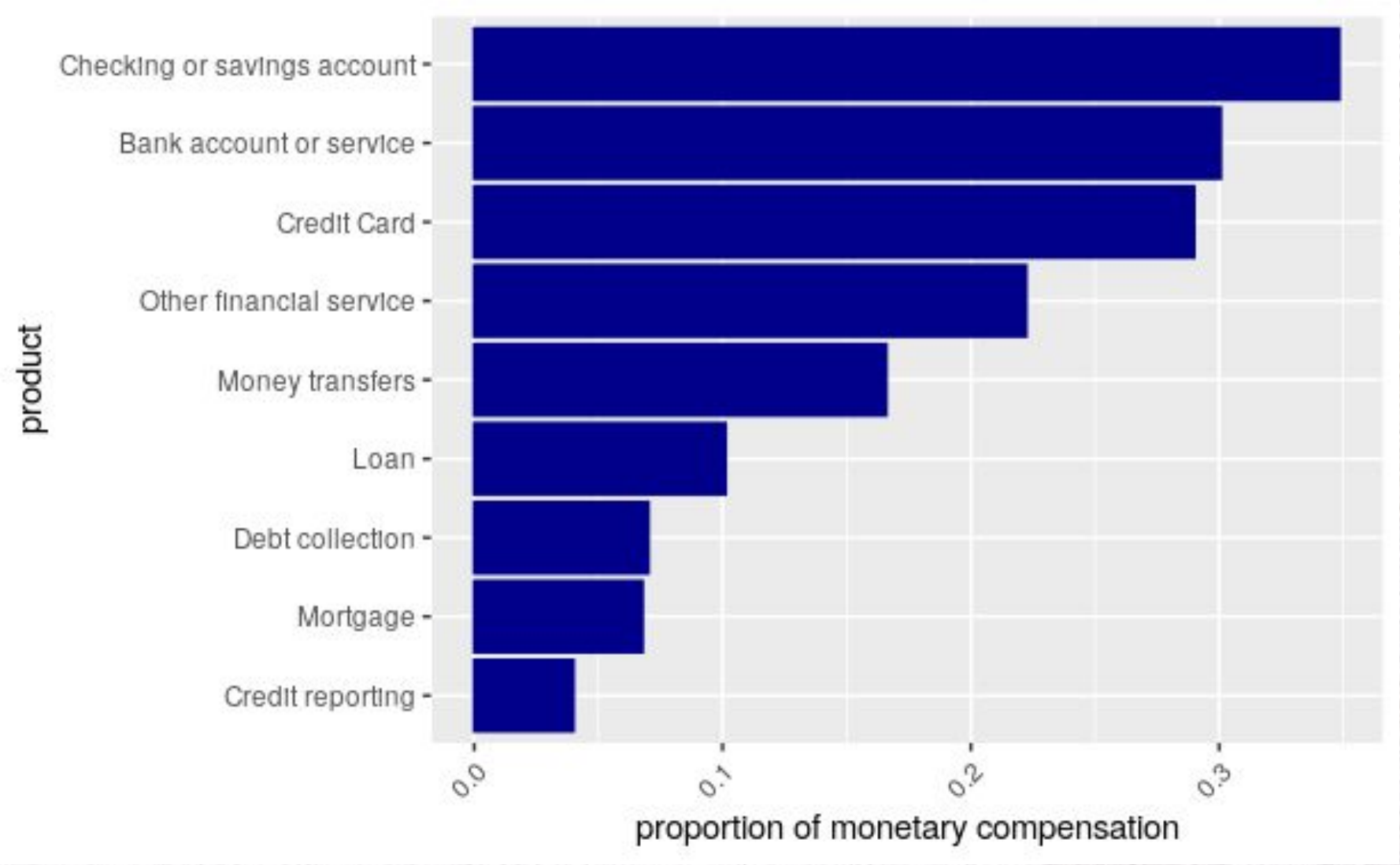|	
Total Data	22984
Monetary Compensated Entries	5027 (20%)
Non-Monetary Compensated Entries	17957 (80%)

What are the products receiving most monetary compensation?
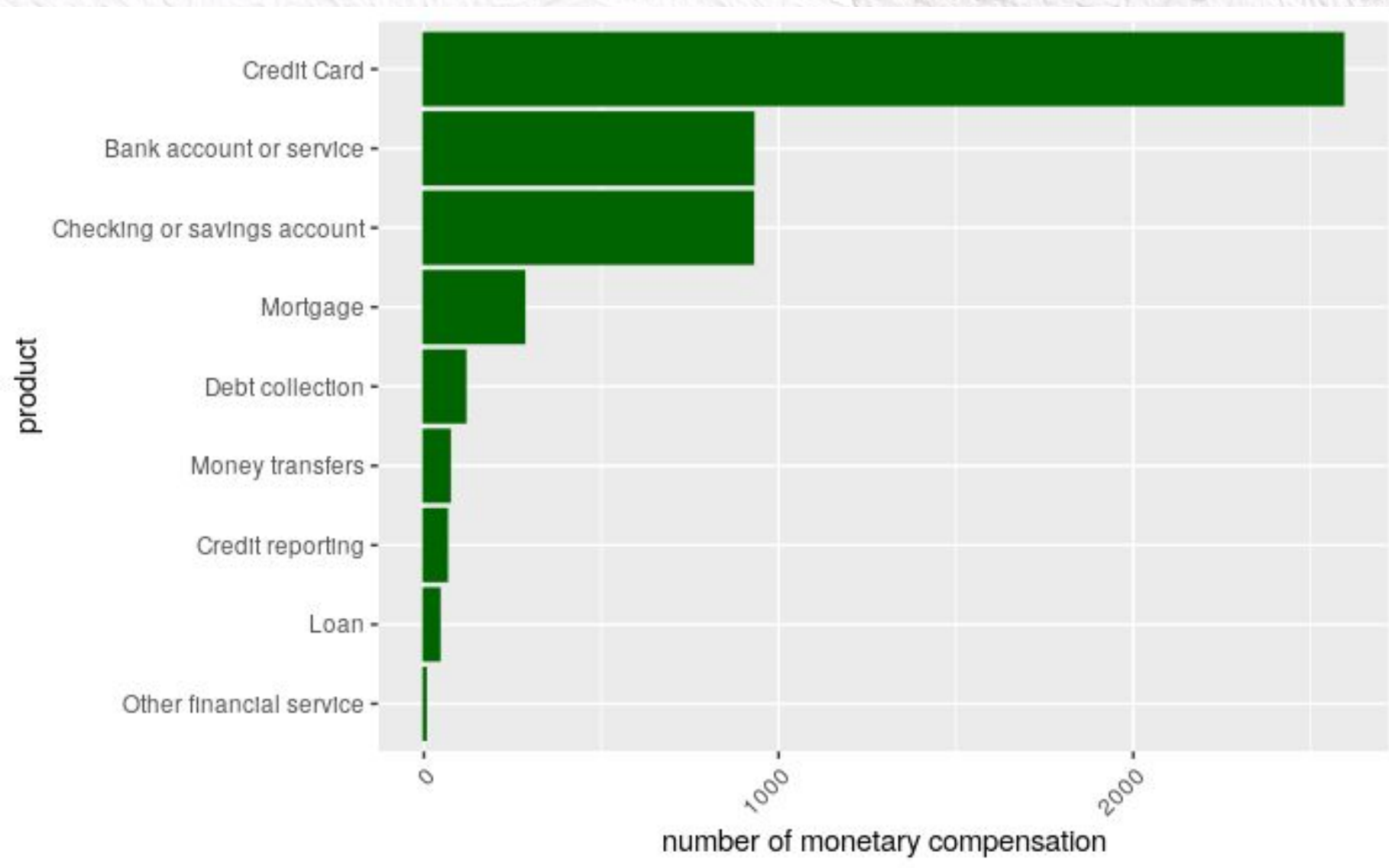
Most complaints that we give monetary compensation are about

credit card

What are the products that have the highest monetary compensation?

checking and bank account

credit card

What are the outstanding problems within the complaints that receive monetary compensation?

Subsidiary Companies' problems (Topic Model)

Complaints Topic	Problematic bank
Credit Card Late Fee	Capital One
Debit Card & Fraud	American Express
Deposit Service Fee & Promotion	CITI
Overdraft Fee	Wells Fargo
Social Security & Credit Deposit	American Express
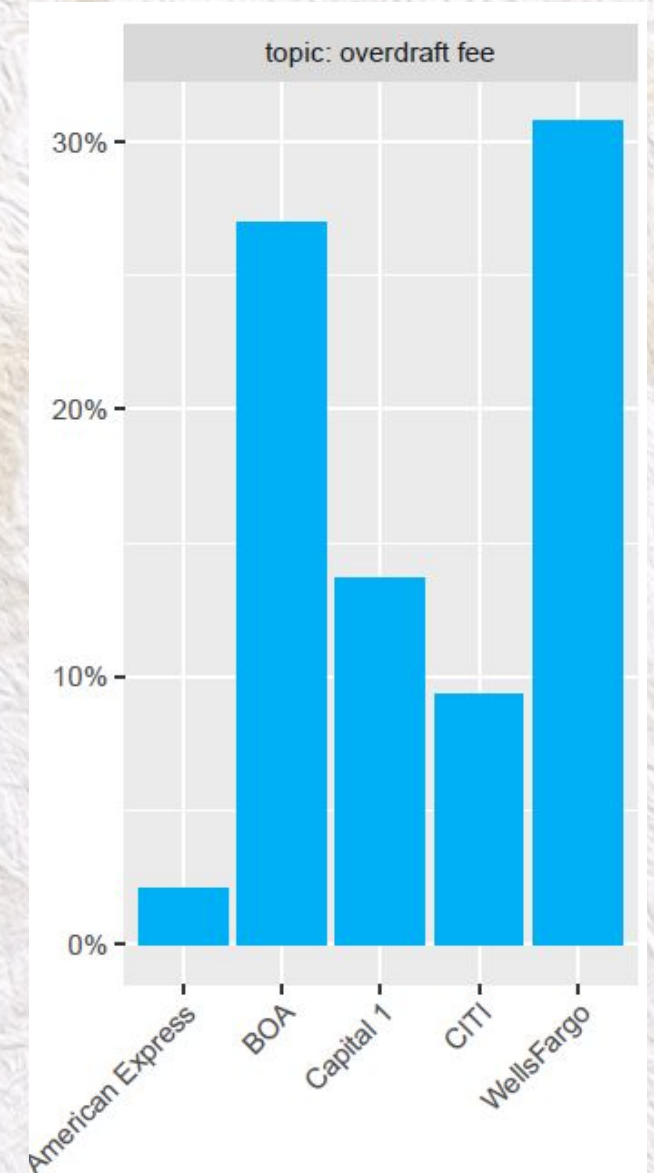
Project Goal

Help find the complaints that would need **monetary compensation**.
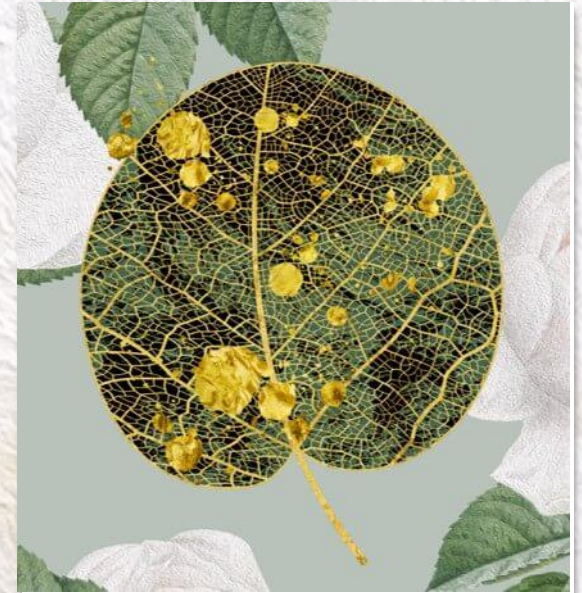
Meeting:
Discuss Approach

One Week Later

Deep Learning Model with One-hot Encoding

Deep Learning Model with Additional Features

Deep Learning Model with Embeddings

APPROACH

- Unbalanced data (80:20)

- Complaints: Original VS cleaned

- Top frequent words: 8,000

- Input variable: One-hot encoded

- Output variable: Probability

- Metrics: AUC

RESULT

Credit Card

- # hidden layers: 3

- # nodes: 256

- AUC on test set: **0.785**

Bank Account

- # hidden layers: 3

- # nodes: 256

- AUC on test set: **0.763**

MODEL 2:
Deep Learning Model
with One-hot Encoding
and Additional Features

APPROACH

- Based on Model 1, add another feature: length of complaints

RESULT

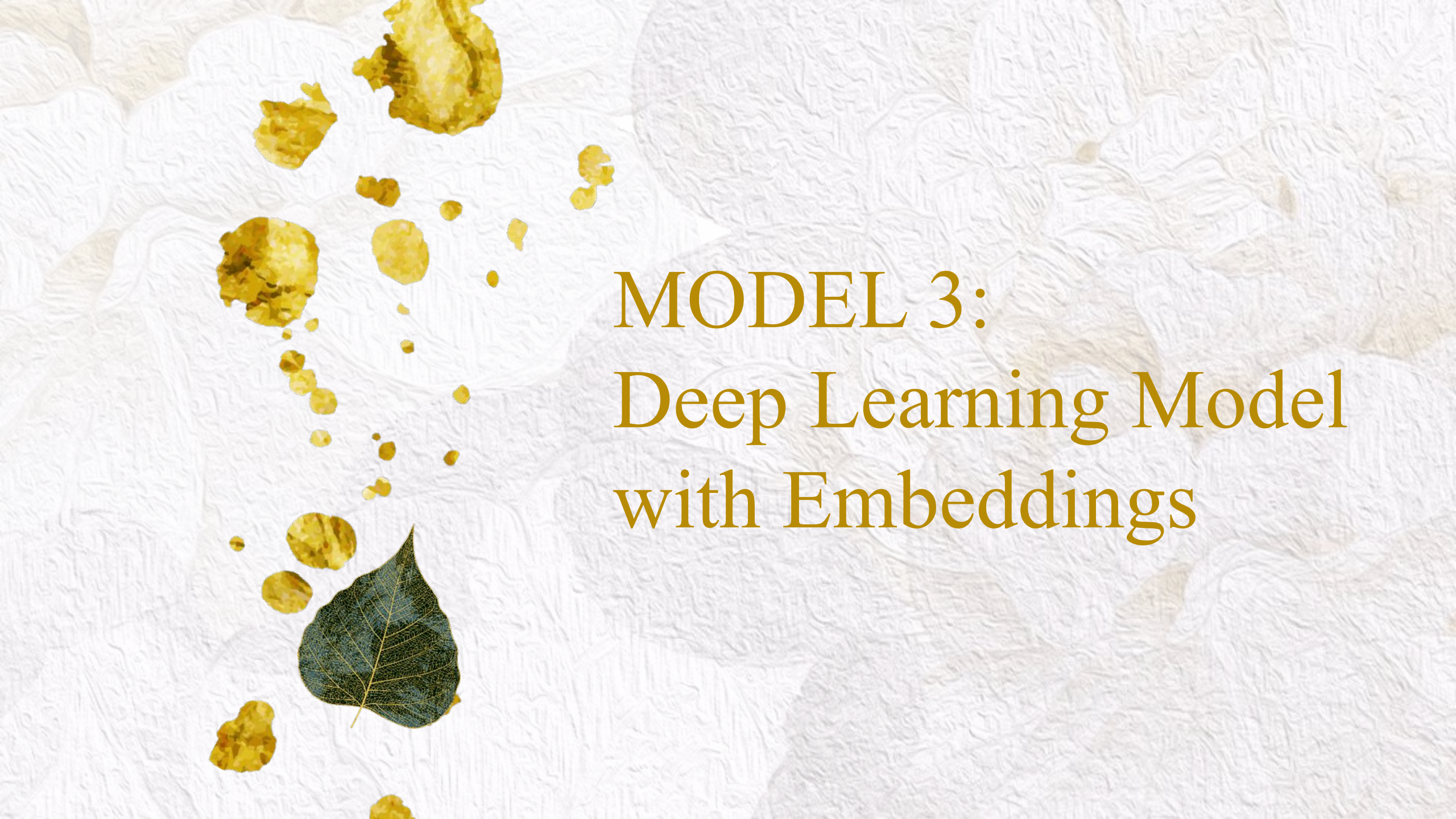## Credit Card

- # hidden layers: 3

- # nodes: 256

- AUC on test set: **0.787**

Bank Account

- # hidden layers: 3

- # nodes: 256

- AUC on test set: **0.770**

MODEL 3:
Deep Learning Model
with Embeddings

APPROACH

- Unbalanced (80:20)

- # top frequent words: 8,000

- # maximum length of each complaint: 500

- Length of each vector: 150

- Training: 70%

- Test: 30%

RESULT

Credit Card

- # hidden layers: 5

- # nodes in each hidden layer: 8

- AUC on test set: **0.779**

Bank Account

- # hidden layers: 2

- # nodes in each hidden layer: 16

- AUC on test set: **0.757**

COMPARISON

Model	One-hot	Additional Features ★	Embeddings
Size	1.5 GB	1.5 GB	**46.7 MB**
Credit Card AUC	0.785	**0.787**	0.779
Bank Account AUC	0.763	**0.770**	0.757

Specific prediction

I filed a complaint charging my credit card a {$50.00} " restocking fee " for a phone that I bought and returned to the same store because it didn't work as promised. I got another bill advising me that they plan to auto bill my Barclay card for {$25.00} . I called Barclay today and disputed this new charge. The case number is XX. I have emailed disputing both the {$50.00} " restocking fee " and this new {$25.00} mystery charge. I DO NOT have a XX account, a phone, and I DID NOT authorize this mystery fee of {$25.00} or any other charges since the day I returned phone and closed my account, and ended forever my no-contract cell service with.

Credit Card: Unauthorized Charge

Predicted probability: 0.7212 -> Important complaint ✅

On XXXX/XXXX/16 my credit report showed that there were a Capital One and a bank hard inquiries. I called both banks and they both reported not to have any information on the matter. On XX reported again that Capital One had another hard inquiry for trying to open an account. I called capital one and they reported that as a matter of fact someone tried to open an account with Capital One. The representative said she closed the account that was opened on my behalf and report it as fraudulent.

Bank Account: Fraud

Predicted probability: -> Important complaint ✅ 0.6197

Business Application
(deal from the highest probability)

Credit Card

	Consumer complaint narrative	prediction
1	Citibank 's Credit Card division is charging me a late fee. I sincerely apologized fo...	0.8600351
2	I sent a money order of a {$100.00} for payment of a charged balance of {$150.0...	0.8337267
3	I used my Macy 's credit card, issued by Department Stores National Bank, in-stor...	0.8300666
4	On multiple occasions over the years, I have fully paid off a balance on my Macy '...	0.8296493
5	I have a Department Store Credit Card. The " due date " on my card is the XXXX ...	0.8286359
6	I paid my Macy 's credit card in full on XXXX XXXX, 2016. I also closed my accou...	0.8267801
7	I was double charged for {$150.00} in XXXX or XXXX XXXX on the Www.macys.c...	0.8206420
8	I opened a Macy 's star rewards credit card in the store late XXXX this year when I...	0.8096266
9	1. In XXXX of XXXX, without notice I stopped receiving online bills in which I relie...	0.8060353

Bank Account

	Consumer complaint narrative	prediction
6120	Bank of America debited from my checking account a check belonging to a different a...	0.6514542
6453	TD Bank has charged me XXXX overdraft fees on XXXX/XXXX/16 for {$35.00} each an...	0.6340179
2224	On XX/XX/2019, I submitted the following complaint : " I had enough funds to cover ...	0.6235891
4407	Citizens Bank, One Deposit Checking Account # XXXX was overdrawn {$35.00} on (XX...	0.6223115
6445	Bank of America charged placed two charges on my account for overdraft fees, {$35.0...	0.6223009
4266	Bank of America returned XXXX electronic payments I had made to pay XXXX bills, ev...	0.6196802
6084	On Friday XX/XX/XXXX I made a purchase online for XXXX and since it was at wrong l...	0.6163223
6215	Sometime in the last 2 years, Bank of America converted my checking account from X...	0.6150942
6240	When I logged into Bank of America Online Banking yesterday (XXXX XXXX 2015), M...	0.6130250
6342	On Monday XX/XX/XXXX, my account went negative by {$68.00}. That same day upon...	0.6090746
129	On XX/XX/XXXX, my account was positive {$20.00} dollars and {$20.00} in my savings....	0.6089544
6454	SunTrust is manipulating the timing of the posting of transactions to customer accoun...	0.6061599

Thank you