

Credit Card Transactions Fraud

By Ronald Goh

Tableau Dashboard

Digital wallet infographics

What can you buy with digital wallets?

Credit card fraud, a silent yet formidable adversary, represents **illicit activities where unauthorized transactions jeopardize financial stability and consumer trust**. This dataset, spanning January 2019 to December 2020, serves as a window into the world of this ever-present threat.

The potential impact of credit card fraud is profound, ranging from **financial losses for individuals and businesses** to erosion of trust in payment systems. Yet, it is precisely through data analysis that we uncover insights to combat this threat. By scrutinizing this dataset, we can identify patterns, detect anomalies, and develop strategies to mitigate the risk.

In this presentation, we explore the landscape of credit card fraud, assess its impact, and illuminate how data analysis equips us with the means to defend against it.

Accounts for

74% of all credit card transaction fraud occurred in the US

Predicted to reach

\$28.6 billion in 2023

20% increase from 2022

By the end of year

Estimated to reach \$38.8 billion worldwide in 2023

Dataset

Dataset Size

- Contains 1,048,575 rows

Dataset Details

Contains records dating from 1st Jan 2019 - 31st Dec 2020

Includes information such as:

- Name
- Transaction Date
- Amount
- State

Dataset Preprocessing

- Altered names to enhance readability
- Adjusted columns to their appropriate data types

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
1	id	trans_date	cc_num	merchant	category	amount	first	last	gender	street	city	state	zip	lat	long	city_pop	job	dob	trans_num	unix_time_merch	lat_merch	lon_merch	fraud	
2	0	1/2/2019	2703188189052090	Rippin, Kub and Mann	misc_net	4.97	Jennifer	Banks	F	561 Perry	Moravian	NC	28854	36.0788	-81.1781	3495	Psycholog	9/3/1988	0b2422ab0c	1.13E+09	36.01129	-82.0483	0	
3	1	1/2/2019	630402337322	Heller, Gutmann and Zieme	grocery_pos	107.23	Stephanie	Gill	F	43039 Rile	Orient	WA	99160	48.8878	-118.211	149	Special ed	21/6/1978	17f95298	1.13E+09	49.15905	-118.186	0	
4	2	1/2/2019	38859492057601	Unit-Buildings	entertainment	220.13	Edward	Sanchez	M	594 White	Males	CO	ID	83252	42.1808	-112.282	4354	Nature co	19/1/1982	41a2a270f	1.13E+09	43.1007	-112.154	0
5	3	1/2/2019	3534930764340240	Kutch, Hemmiston and Farrell	gas_transport	45	Jeremy	White	M	9443 Cynth	Boulder	MT	59632	46.2306	-112.114	1939	Patent att	12/1/1967	6b848c16f	1.13E+09	47.03433	-112.561	0	
6	4	1/2/2019	375534208063984	Keeling-Crist	misc_pos	41.96	Tyler	Garcia	M	408 Bradle	Doe Hill	VA	24431	38.4207	-79.4629	99	Dance mo	28/3/1986	a4167549c	1.13E+09	38.675	-78.6325	0	
7	5	1/2/2019	4767265370804500	Stroman, Hudson and Erdman	gas_transport	94.63	Jennifer	Conner	F	4855 Saint	Dublin	PA	18917	40.375	-75.2645	2158	Transport	19/6/1961	189a841ac	1.13E+09	40.65388	-76.1527	0	
8	6	1/2/2019	30774693858478	Rowe-Vandervort	grocery_net	44.54	Kelley	Richards	F	889 Sarah	Holcomb	KS	67551	37.9931	-100.589	2051	Arborcult	16/6/1993	83ec040c	1.13E+09	37.16271	-100.153	0	
9	7	1/2/2019	6011360759745860	Corwin-Collins	gas_transport	71.65	Steven	Williams	M	231 Flores	Edinburg	VA	22824	38.8432	-78.6003	6018	Designer,	21/8/1947	6d294ed0	1.13E+09	38.54809	-78.5403	0	
10	8	1/2/2019	492270831011200	Herzog Ltd	misc_pos	4.27	Heather	Chase	F	6888 Hick	Manor	PA	15665	40.3359	-79.6607	1472	Public aff	7/3/1941	fc28024ce	1.13E+09	40.35181	-79.5581	0	
11	9	1/2/2019	272830304661670	Schoen, Kuphal and Nitzsche	grocery_pos	198.39	Melissa	Aguliar	F	21236 Tay	Clarkvill	TN	37940	35.522	-87.249	215785	Pathologi	28/3/1978	3095044e4	1.13E+09	37.1792	-87.4854	0	
12	10	1/2/2019	4642894980163	Rutherford-Mertz	grocery_pos	24.74	Eddie	Mendez	M	1831 Faith	Clarinda	IA	51632	40.7493	-95.038	7297	IT trainer	13/7/1990	871c55abf	1.13E+09	40.27589	-96.0115	0	
13	11	1/2/2019	3773234009613447	Kerluke-Abshire	shopping_net	7.77	Theresa	Blackwell	F	43576 Kris	Shenando	WV	25442	39.3716	-77.8229	1925	Systems d	14/2/1966	3c47786c	1.13E+09	40.10387	-78.6245	0	
14	12	1/2/2019	18004264691150	Lockman Ltd	grocery_pos	71.22	Charles	Robles	M	3337 Usa	(Saint Pete	FL	33710	27.7898	-82.7243	341043	Engineer,	28/2/1989	c169a760f	1.13E+09	27.63059	-82.3089	0	
15	13	1/2/2019	355987416065240	Klein Inc	misc_pos	96.29	Jack	Hill	M	5916 Susan	Grenada	CA	96038	41.6123	-122.526	389	Systems s	21/12/1945	41361667f	1.13E+09	41.65752	-122.23	0	
16	14	1/2/2019	351486593084960	Beier-Hyatt	shopping_pos	7.77	Christoph	Castaneda	M	1692 Cohe	Hight Rolfs	NM	88325	32.9396	-105.819	899	Naval arch	30/8/1967	8a6239af5	1.13E+09	32.86326	-106.52	0	
17	15	1/2/2019	601199906025820	Schmidt and Sons	shopping_net	3.26	Ronald	Carson	M	870 Rochoa	Harrington	NJ	7640	40.9918	-73.98	4664	Radiograp	30/6/1965	baae0099	1.13E+09	41.83117	-74.3336	0	
18	16	1/2/2019	6011860218257910	Leback and Sons	misc_net	127	Lisa	Mendez	F	44259 Bell	LaHoma	OK	73754	36.185	-96.0727	1078	Program	6/7/1952	991d0401	1.13E+09	36.18409	-99.0485	0	
19	17	1/2/2019	3560423134670460	Mayeret Corp	shopping_pos	341.67	Nathan	Thomas	M	4923 Cany	Carlisle	IN	47838	38.9763	-87.8667	4081	Energy en	15/2/1918	112c520ac	1.13E+09	38.67449	-88.1008	0	
20	18	1/2/2019	2348245054386320	Konopelski, Schneider and Har	food_dining	63.07	Justin	Gay	M	268 Haynes	Harbors	PA	16421	42.1767	-79.9416	2518	Event org	2/2/1946	8500f1645	1.13E+09	41.43027	-79.4926	0	
21	19	1/2/2019	495682899000110000	Schultz, Simonis and Little	grocery_pos	44.71	Kenneth	Robinson	M	269 Sanch	Elizabeth	NJ	7208	40.6747	-74.2239	124967	Operation	21/12/1980	09a7f9c0	1.13E+09	40.07959	-74.8481	0	
22	20	1/2/2019	446077711515625000	Bauch-Royner	grocery_pos	57.34	Gregory	Graham	M	4005 Dana	Methuen	MA	1844	42.728	-71.181	47249	Market re	22/12/1980	199a1be	1.13E+09	42.26076	-71.2179	0	
23	21	1/2/2019	2505336922781610	Harris Inc	gas_transport	50.79	Jeffrey	Rice	M	21447 Pov	Moulton	IA	52572	40.6866	-92.683	1132	Probation	14/2/1961	b9a46150a	1.13E+09	40.18993	-91.9551	0	
24	22	1/2/2019	180048185017127	Kling-Grant	grocery_net	46.28	Mary	Wall	F	2481 Mills	Plainfield	NJ	7060	40.632	-74.4215	71485	Leisure ce	19/7/1974	19e23dca1	1.13E+09	40.02189	-74.2282	0	
25	23	1/2/2019	630441765090	Pasocha-Bauch	shopping_pos	9.55	Susan	Washington	F	729 Erin	M May	TX	76857	31.5571	-96.9656	1791	Corporate	26/7/1965	cb46da5e6	1.13E+09	31.62635	-96.6102	0	
26	24	1/2/2019	4432780798379100000	Leach Ltd	shopping_pos	22.85	Natalie	Walters	M	7983 Nava	Waukeesh	WI	53186	42.9951	-88.2336	95015	Therapist	2/12/1946	63432bfac	1.13E+09	43.17004	-89.0551	0	
27	25	1/2/2019	34346401384032	Kunze-Sanford	misc_net	2.55	Jodi	Foster	F	551 Zachael	Bayle	NC	27807	35.8072	-78.0892	6629	Call center	13/8/1962	abe0676c1	1.13E+09	36.74987	-78.8779	0	
28	26	1/2/2019	374939071163758	Deckow-O'Connor	grocery_pos	60.49	Daniel	Escobar	M	61390 Hay	Romulus	MI	48174	42.2201	-83.3583	33151	Call center	5/1/1971	cf8361618	1.13E+09	42.36043	-83.5223	0	
29	27	1/2/2019	43342305470840480	Bruen-Vrost	misc_pos	6.85	Scott	Martin	M	7483 Nava	Freedom	WY	83120	43.0172	-111.629	471	Education	2/8/1967	532a43d39	1.13E+09	43.75374	-111.485	0	
30	28	1/2/2019	422599011648120000	Kunze Inc	grocery_pos	90.22	Brian	Simpson	M	2711 Dura	Honokaa	HI	96727	20.0827	-155.448	4878	Physician	3/12/1966	8382a8e1a	1.13E+09	19.56001	-156.046	0	
31	29	1/2/2019	426059598824230	Nitzsche, Kessler and Wolff	shopping_pos	4.02	Aaron	Rogers	M	969 Huert	Valentine	NE	68201	40.862	-100.622	4005	Network s	15/3/1945	2049f931f	1.13E+09	42.47559	-101.266	0	
32	30	1/2/2019	1800940889585	Kihn, Abernathy and Douglas	shopping_net	3.66	Tammie	Harper	F	57887 Gut	Westfir	OR	97492	43.7575	-122.481	597	Forensic s	19/5/1961	870c5020e	1.13E+09	44.27819	-121.815	0	
33	31	1/2/2019	459573540737320000	Heller, Gutmann and Zieme	misc_pos	9.78	Myers	F	357897 Taper	Tipstonville	TX	38079	36.3846	-96.4649	5377	Geochem	30/12/1964	058105e	1.13E+09	36.24621	-99.813	0		
34	32	1/2/2019	63041273309	Torphy-Goyette	shopping_pos	66.21	Heather	Stanton	F	445 Jerry	I Republic	MI	40879	46.368	-87.9938	1038	Armed fol	22/4/1964	20f9a4639	1.13E+09	46.41204	-88.5167	0	
35	33	1/2/2019	271220972653180	Ballistrer-Nader	misc_pos	25.58	Jenna	Brooks	F	50872 Eate	Baton Ro	LA	70088	30.4066	-91.1448	378909	Designer,	22/2/1977	1554da2ad	1.13E+09	29.73743	-90.8532	0	
36	34	1/2/2019	374125201044085	Bahringer, Schoen and Corken	shopping_pos	9.03	Christoph	Gilbert	M	20957 Ree	Washington	DC	20012	38.7957	-77.0282	601723	Optician,	19/7/1970	c73371151	1.13E+09	38.8809	-76.4411	0	

Fraud Amount/Count Gender and Age



The distribution of fraud victims was nearly equal between males and females, with a ratio of 50.47% to 49.53%.

The highest fraudulent transaction amounts were observed among females aged 61-70 and males aged 51-60.

As a general trend, the age group between 51 and 70 accounts for 36.34% of fraudulent transaction among all age groups.

Reasons

Technology Adaptation

While many older adults are tech-savvy, some may not be as familiar with online security measures and may fall victim to phishing or other online scams.

Lack of Experience with Online Transactions

Some older individuals may not be as experienced with online shopping and payment security, which can lead to increased vulnerability.



Preventive Action

Awareness Campaigns

Launch widespread awareness campaigns through various channels, such as social media, websites, and emails. Inform consumers about the risks, common fraud tactics, and the importance of vigilance.



Phishing Awareness

Teach consumers to recognize phishing emails and links that may lead to fraudulent websites. Encourage them to verify the authenticity of emails and links before clicking.



Secure Practices

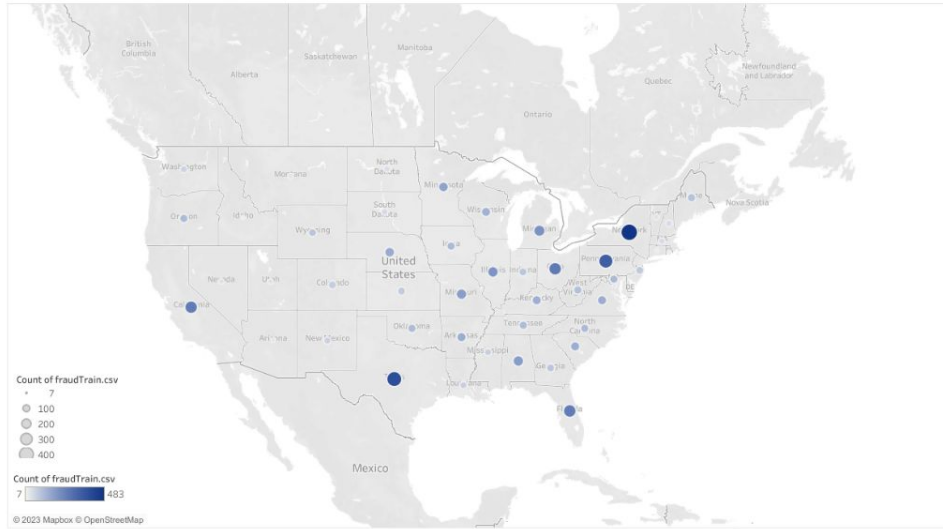
Educate consumers on secure practices like using strong, unique passwords, enabling two-factor authentication, and regularly updating software and antivirus programs.

🔒 Password ❌

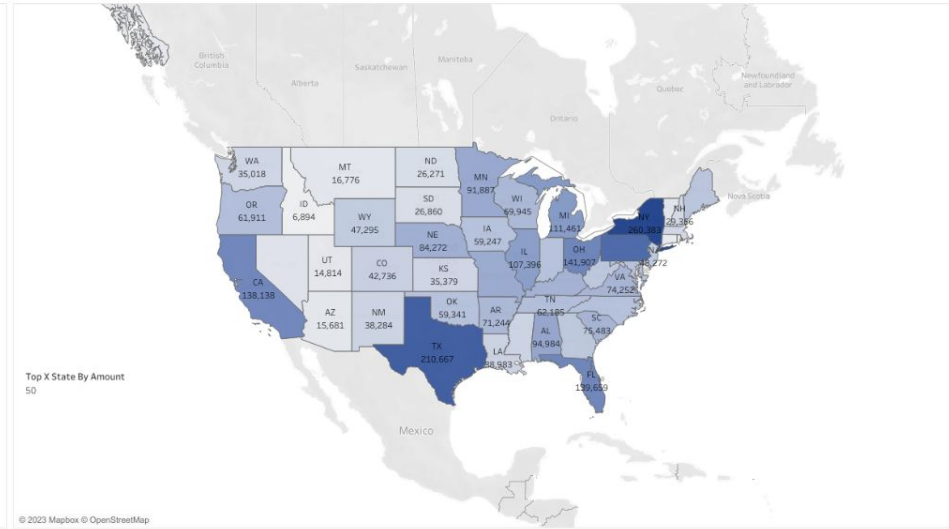
🔒 Yc4gwy8@ ✅

Fraud Amount/Count By State

Top 50 Transactions By State



Top 50 Amount By State



Top 3 states with the highest number of fraud transactions and amount are **New York, Texas and Pennsylvania**

New York has the highest fraud amount at \$260,383

The eastern side appears to exhibit higher levels of activity and a greater amount of fraudulent activity compared to the western side.

Reasons

Population

New York, Texas, and Pennsylvania are three of the most populous states in the United States. With more people, there are more opportunities to commit credit card fraud.

Tourism

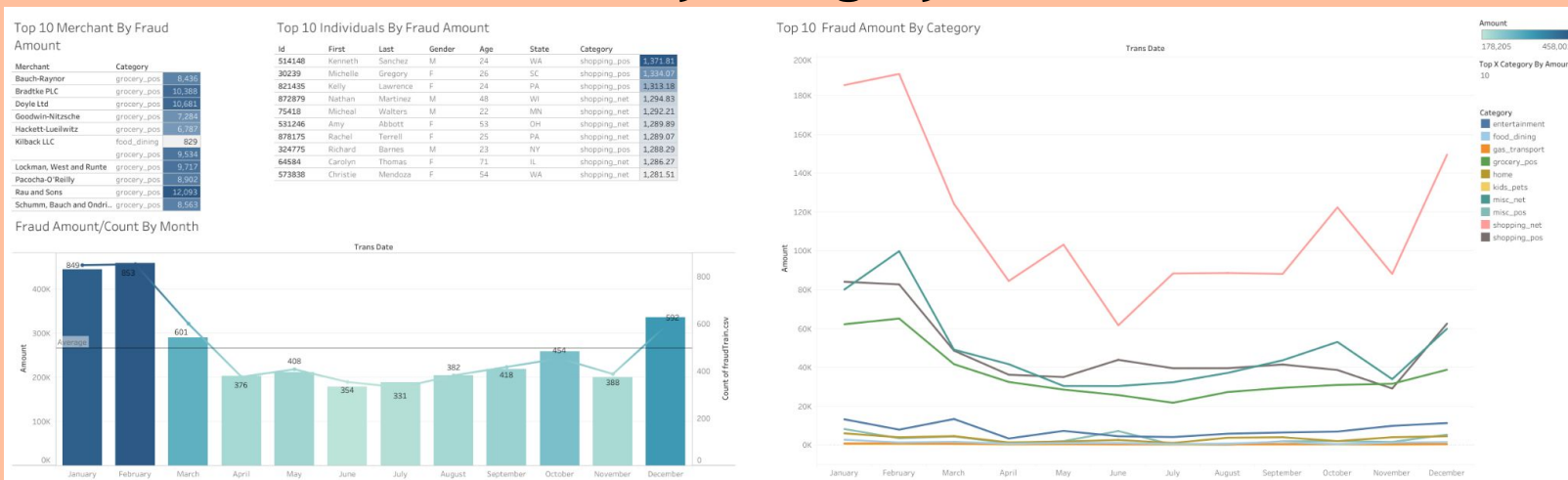
New York is a major tourist destination, attracting millions of visitors annually. Tourist areas are often hotspots for credit card fraud due to the increased number of transactions and the use of credit cards.

Financial Services

New York is a global financial center, and both New York and Texas have a significant presence of financial institutions. This concentration of financial services makes them attractive targets.



Fraud Amount By Category and Merchant



Among merchants, the leading contributor to credit card fraud is purchases related to **groceries**.

Online shopping constitutes **60% of the top 10 individuals**, and it also **ranks as the highest** category in terms of **annual spending**.

The highest amount of credit card fraud occurs within the **initial two months** accounting for **28.31%** of the year.

Reasons

High Transaction Frequency

Groceries and online shopping are everyday activities for many consumers, resulting in a high frequency of credit card transactions. This increases the likelihood of exposure to potential fraud.

Ease of Access

Online shopping platforms and grocery stores often have less stringent identity verification processes compared to some other industries. Making it an easy target for fraudsters.



Low-value transactions

Groceries and online shopping transactions are often relatively low-value. This makes them less likely to be flagged by fraud detection systems.

Preventive Action

Be careful about using self-checkout kiosks

Self-checkout kiosks can be more vulnerable to skimming devices than traditional checkout lanes. If you do use a self-checkout kiosk, be sure to inspect the card reader before using it.

Enable two-factor authentication

Two-factor authentication adds an extra layer of security to your online accounts by requiring you to enter a code from your phone in addition to your password when you log in effectively safeguarding your account against unauthorized access.

Improve fraud detection systems

Fraud detection systems with the help of AI can help to identify and flag suspicious transactions. This can help to prevent fraudsters from using stolen credit cards to make unauthorised purchases at your store.



Thank You!