



# PCI and AI

---

David Lock  
John Bycroft

# Introduction David Lock



**Spent a total of 16 Years at ACI**  
**2 tours of duty!**

**1987- 1994, 2000 - 2009**

- **BASE24 Non-stop**
- **Card Management**
- **Back-office strategy**
- **PRM**
- **Smart Card Products**

**S1 – creator of Postillion**  
**4 years**

**Consultancy**  
**PCI implementation / upgrades**

# Global success in payments and data security



15 of the 25 largest banks in the world



3 of the 15 largest retailers in the world



The 3 largest credit card processors in the world

fiserv. VISA BARCLAYS bankart

★macy's DISCOVER Shell FIS

mastercard Paymark DB BT TD

Bank of America

globalpayments USbank.

AT&T AMERICAN FAMILY INSURANCE JPMorganChase

ING

CVS caremark

ออลไทย SECURITY MERCURY Mercedes-Benz

ACI Worldwide® Real-Time Payments comforte





# comforte Data Security Platform helps ...

**Simplify and  
Strengthen Your  
Data Security**



**Enable  
Secure Usage  
of Data**



**Achieve  
Compliance &  
Reduce Risk**



# Benefits for security teams



**Simplify data security**  
and make it more  
efficient



**Enable business**  
to use data in a secure  
and compliant fashion



**Improve agility**  
to easily adapt to new  
regulations



**Reduce risk**  
by making your data  
useless for threat actors



**Control access**  
to sensitive data on  
granular basis



**Consolidate tools**  
and reduce cost by  
protecting the data itself

# Typical use cases

## Data Analytics



## Cloud Migration



## Payments



# Tokenization replaces sensitive values



Business Applications



First/Last: **Alan Turing**  
Tax ID num: **101-66-7459**  
Credit Card: **4321 1234 4568 9012**



Downstream DBs,  
Files, Apps



First/last: **Alan Efplqy**  
Tax ID num: **FD4-J2-96BG**  
Credit Card: **4321 1299 9999 9012**

**comforte**  
**Protection**  
**Engine**



Structured and semi-structured elements containing values such as names, DoB, account numbers, SSNs, etc.



# Your Data Deserves Best-in-Class Tokenization



Stateless / Vault-less tokenization



Validated by independent cryptologists



Linearly scalable for extreme performance



Collision-free



Patented technology based on unbalanced Feistel networks



Supports various element formats to be tokenized (PII, PHI,...)





**ACI Worldwide**

# Partnership Driver: PCI DSS v4.0 Compliance



## v4.0

### Why v4.0?

- Align security practices with evolving threats
- Security as a continuous process
- Increase flexibility for payment industry organizations to meet regulatory requirements amidst different methods
- Optimize validation methods and reporting options

Major new requirement concerning protecting data at rest:

- Disk Level Encryption is **not sufficient anymore**
- If Card Data must be stored, it must now be encrypted at **file level on disk, or field-level in a database.**

# Why comforte for ACI RPS and BASE24?

## Official Partnership and Integration

- comforte SecurDPS is ACI's preferred, tested solution for protecting data at rest for their on-premises products

## Proven Expertise and ACI Customer Successes

- comforte has a track record in providing data security solutions in the payments industry.
- Extensive knowledge of ACI's organization & products.

## HPE NonStop Support

- comforte has a proven track record of installations and customer successes on HPE NonStop, including many examples where our solutions protect ACI BASE24 on HPE NonStop already.

# Successful implementations for BASE24 customers

CASE STUDY

## MAJOR INDIAN BANK IMPLEMENTS DATA CENTRIC SECURITY AND MEETS PCI DSS COMPLIANCE

One of the largest banks in India that serves over hundreds of millions of customers across thousands of locations has adopted data-centric security. The company operates extensively with three-personal account numbers—as well as other types of personal data for their financial operations and organizational objectives. Much of this information is deemed sensitive according to PCI DSS and requires adequate data protection without proper security. This major financial services company was at risk of non-compliance which could have resulted in numerous financial and legal consequences.

### CHALLENGES

With more than 200 million customers, the financial services company continually strives to best serve its clients and customer base. However, it faces a challenge of understanding trends, patterns, and insights of its diverse clientele. To ensure this challenge, analysis of client data is imperative to gaining insights for strategic business decision-making. The bank faced a problem, however, in that much of the data used for analysis—names, customer names, bank channels—were deemed sensitive under PCI DSS (Payment Card Industry Data Security Standards) which is enforced by the Reserve Bank of India.

The financial services company operates across various data environments which falls under PCI scope (BASE24) provided by ACI Worldwide. It is a popular payment card which the bank uses for all its Online Transaction Processing. In addition, the company also uses Golden Gate, a data replication solution created by Oracle, for their production environment. For these applications, the Reserve Bank of India mandates that transaction log files, POS transaction log files, host interface log files, customer authorization files, host interface data and Forward File, and ATM log files comply with PCI DSS. The key issue, however, was the company's use of filing systems that contained primary account numbers, credit card numbers, and other financial information with specific bank identification details that posed challenges to meeting regulatory compliance standards.

"Working with comforte and implementation of their data security solution greatly enhanced our organization. With their transaction we were able to improve our security posture and concurrently solve challenges for PCI compliance. Going forward, our organization has the right protection technology in place to most effectively manage sensitive information and boost our security initiatives." — Chief Manager, Major Indian Public Sector Bank.

### BUSINESS OBJECTIVES

- ▶ Achieve PCI compliance
- ▶ Protect confidential data
- ▶ Enhance security initiatives

### SECURE YOUR GROWTH WITH COMFORTE

With more than 20 years of experience in data protection on truly mission-critical systems, comforte is the perfect partner for organizations who want to protect their most valuable asset: data. Comforte's Data Protection Suite, SecurGPS, has been built from the ground up to best address data security in a world that is driven by digital business innovations, empowered customers, and continuous technology disruptions. We are here to help secure your growth by providing expertise, an innovative technology suite, and local support. To learn more, get in touch with a comforte representative today by visiting [sales@comforte.com](mailto:sales@comforte.com).

CASE STUDY

## LEADING OPERATOR OF MEXICAN HYPERMARKETS ACHIEVES PCI-DSS COMPLIANCE

Comercial City Fresco is a Mexican holding company of hypermarkets headquartered in Mexico City. It operates the hypermarkets La Comer, City Market, Fresco, and Surimex in Mexico, and other areas mostly in the Central and Baja regions of the country.

Comercial City Fresco processes up to 30 m POS card transactions every year on ACI's BASE24 Classic system. Comercial City Fresco's ability to provide reliable, secure and cost-effective transaction processing services to its hypermarkets is a critical success factor.

### CHALLENGES

Since City Fresco's central ACI BASE24 authorization system must be up and running 24/7 to process the POS transactions from its hypermarkets such as La Comer, Fresco, and Surimex, the key challenge was to implement a data protection solution that avoids changes to the existing applications while offering a robust security layer to protect the data at rest in City Fresco's enterprise systems.

The main driver for City Fresco to implement a reliable data protection solution was to achieve compliance with PCI-DSS regulations, which requires that confidential data (PAN) must be rendered unavailable whenever it is stored. The solution needed to work with ACI BASE24 as well as handling servers and had to be implemented in less than 6 months to meet a PCI-DSS audit deadline.

Non-compliance would result in regulatory fines from acquiring banks and an increase in interchange fees, not to mention the reputational damage to the brand in case of a data breach.

### REQUIREMENTS

Given the complex POS network configuration and the high level of service that customers expect, City Fresco set very high standards for the solution protecting the cardholder data that they manage:

- ▶ The solution needs to run on ACI's hardware systems and ACI BASE24 environments.
- ▶ Instant, adaptive to replace parts of the PANs with tokens that are of no use to hackers.
- ▶ A token-vault conceptual control that obviates the relationship between tokens and PANs.
- ▶ Easy implementation, avoiding changes to existing applications, which was a crucial characteristic to select the solution.
- ▶ Effective authentication of users to prevent fraudulent use of unprotected data by fraudsters and third parties.

### QUICK FACTS

- ▶ Surimex Hypermarkets, La Comer, City Market, Fresco, and Surimex in Mexico.
- ▶ POS network across processing up to 30 m transactions per year using ACI BASE24.
- ▶ Now compliant with PCI-DSS requirements.
- ▶ Highly flexible and reliable solution implemented quickly and easily.

### SECURE YOUR GROWTH WITH COMFORTE

With more than 20 years of experience in data protection on truly mission-critical systems, comforte is the perfect partner for organizations who want to protect their most valuable asset: data. Comforte's Data Protection Suite, SecurGPS, has been built from the ground up to best address data security in a world that is driven by digital business innovations, empowered customers, and continuous technology disruptions. We are here to help secure your growth by providing expertise, an innovative technology suite, and local support. To learn more, get in touch with a comforte representative today by visiting [www.comforte.com/contact/](mailto:sales@comforte.com).

CASE STUDY

## PCI AND GDPR DATA PROTECTION REQUIREMENTS MET WITH ZERO DOWNTIME ON PAYMENTS PROCESSING NETWORK

Bankart is a card payments processing center headquartered in Slovakia that serves 20 banks and other institutions across six countries and in four different currencies. Bankart's mission is to provide reliable, secure and cost-effective transaction processing services involving various bank payment instruments to its customers.

With its Central Authorization System (CAS), Bankart processes over 30 million ATM, PIN, internet, and mobile transactions every month on ACI's BASE24 Classic. Bankart also receives and manages CHN and POS networks for most of their banks. In addition to payments processing and network management services, the CAS also includes card validation, PIN verification and, in case a bank is experiencing technical issues and is unable to process an authorization, Bankart will conduct off-line authorizations for them.

### CHALLENGE: PCI AND GDPR COMPLIANT DATA PROTECTION

Since Bankart's Central Authorization System must be up and running 24/7, it is hosted on highly available HNF hardware servers in a dual site configuration working in a disaster mode. Some of the data is being replicated to back office systems running on Windows servers. Both authorization servers are connected to the POS network, ATM network, and with interfaces for online transactions, all of which are routed to the bank's Bankart servers, other processing centers, and interchange. To manage all of this, various databases, files, and logs with card holder data have to be maintained.

### SECURE YOUR GROWTH WITH COMFORTE

With more than 20 years of experience in data protection on truly mission-critical systems, comforte is the perfect partner for organizations who want to protect their most valuable asset: data. Comforte's Data Protection Suite, SecurGPS, has been built from the ground up to best address data security in a world that is driven by digital business innovations, empowered customers, and continuous technology disruptions. We are here to help secure your growth by providing expertise, an innovative technology suite, and local support. To learn more, get in touch with a comforte representative today by visiting [www.comforte.com/contact/](mailto:sales@comforte.com).



CASE STUDY

## MAJOR OIL COMPANY CHOOSES TOKENIZATION TO ACHIEVE PCI COMPLIANCE

This oil company is one of the largest in the world and ranks among the top 10 companies in the Fortune Global 500 in the United States. They run a vast POS network on mission-critical systems that includes nearly 10,000 gas stations. At peak levels, the system processes 100 transactions per second. They also run a customer rewards program that requires the scanning and authorization of customer cards. The rewards program keeps track of every time a customer uses one of their gas stations, which over time has generated a large volume of data.

### CHALLENGES

PCI compliance without compensating controls. The main goal was to tokenize cardholder data throughout the payments network in accordance with PCI requirements. Up until this point, the company had been relying on compensating controls, which were becoming costly and impractical. PCI Requirement 3.4 stipulates that payment account numbers (PANs) must be rendered unreadable anywhere they are stored and, according to Requirement 3.1, cardholder data must also be protected when transmitted. This means the data has to be protected while in motion and at rest.

Maintain service levels on high volume network. An additional challenge was that the system had to stay online throughout implementation and without impacting service levels. At peak service levels, the system handles up to 100 transactions per second and up to 100 million USD in a single day in an average month. The system manages approximately a billion dollars' worth of transactions. Any interruption of service would be extremely costly.

### SECURE YOUR GROWTH WITH COMFORTE

With more than 20 years of experience providing security on truly mission-critical systems, comforte AG is the perfect partner for organizations who want to protect their most valuable asset: data. Comforte's Data Protection Suite, SecurGPS, has been built from the ground up to best address data security in a world that is driven by digital business innovations, empowered customers, and continuous technology disruptions. We are here to help secure your growth by providing expertise, an innovative technology suite, and local support. To learn more, get in touch with a comforte representative today by visiting [www.comforte.com/contact/](mailto:sales@comforte.com).

[Download](#)

[Download](#)

[Download](#)

[Download](#)



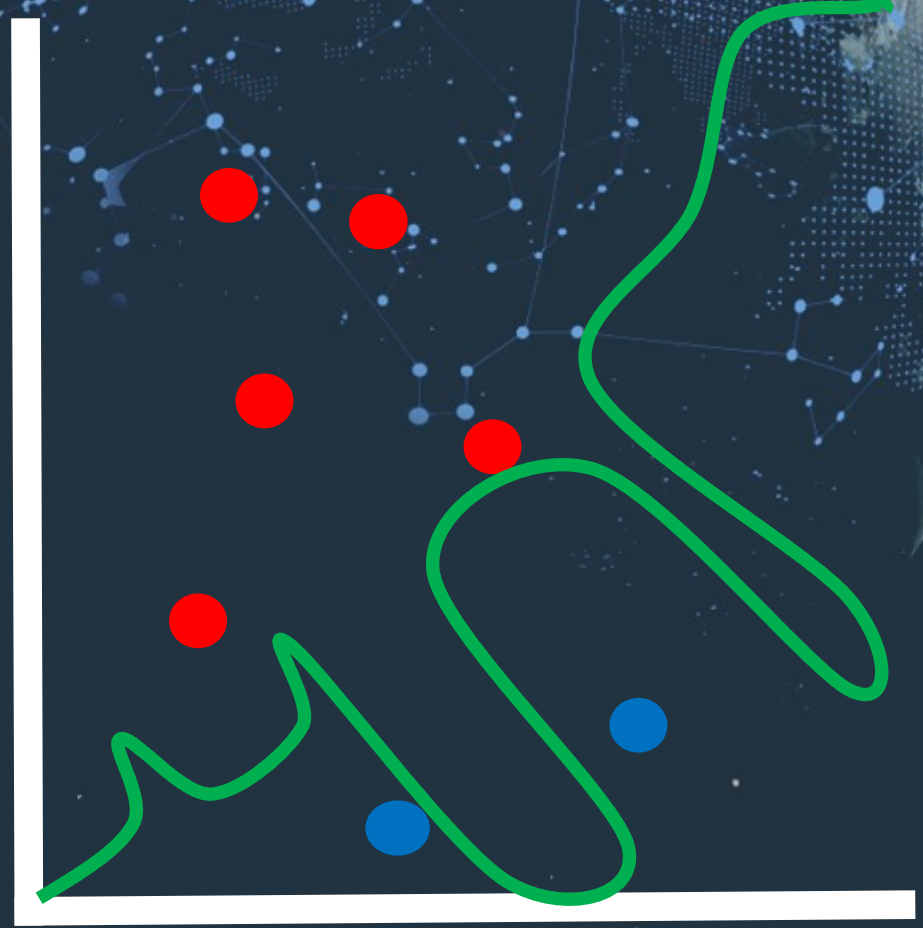
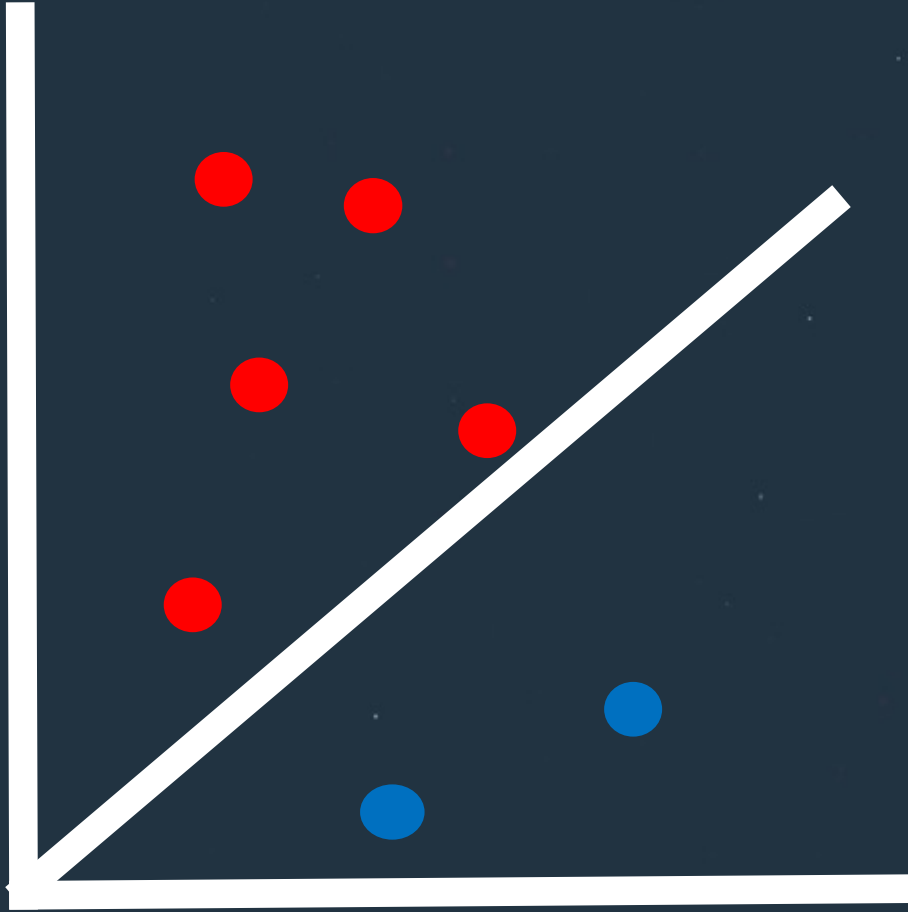
# A demonstration of Machine Learning and Tokenisation

---

David Lock



# Just drawing a line through data

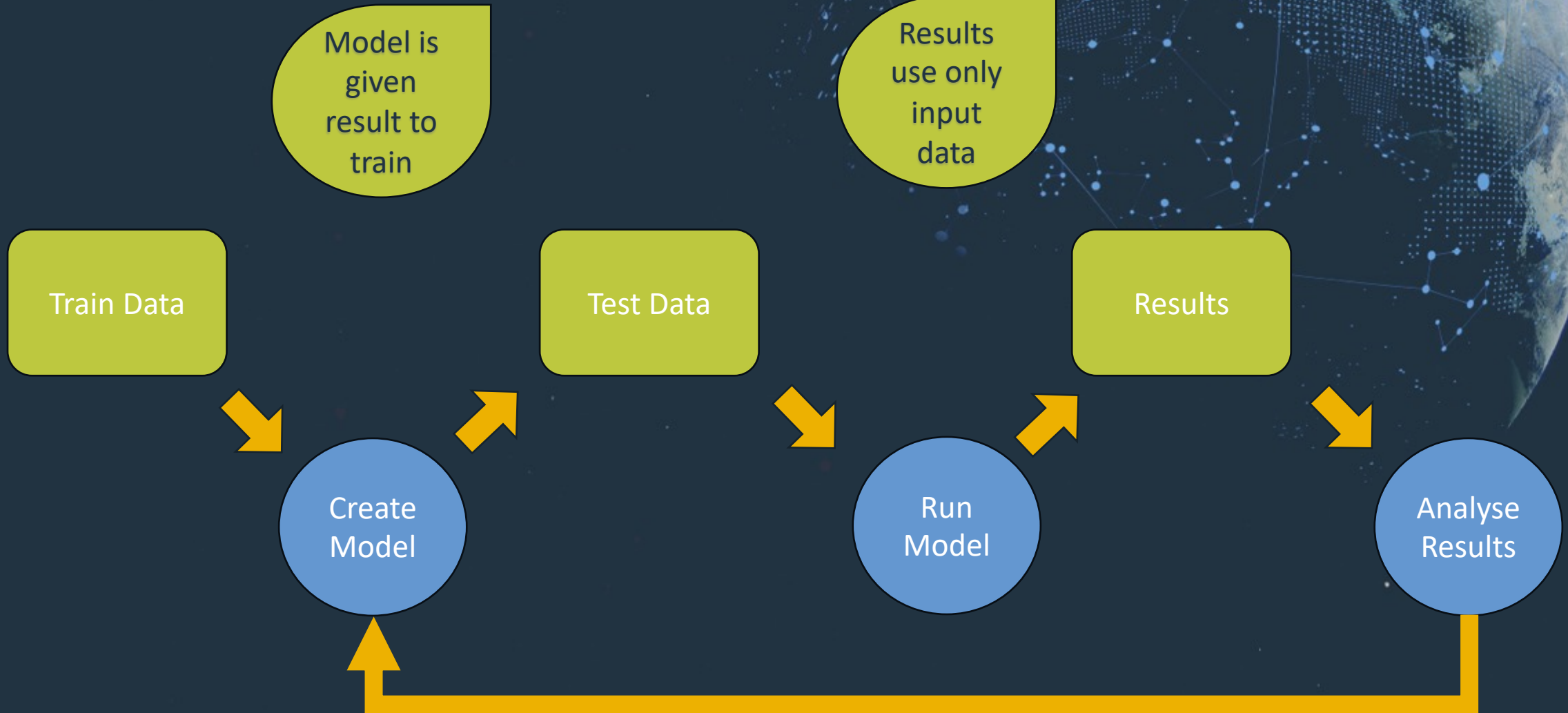


Just drawing a line through data

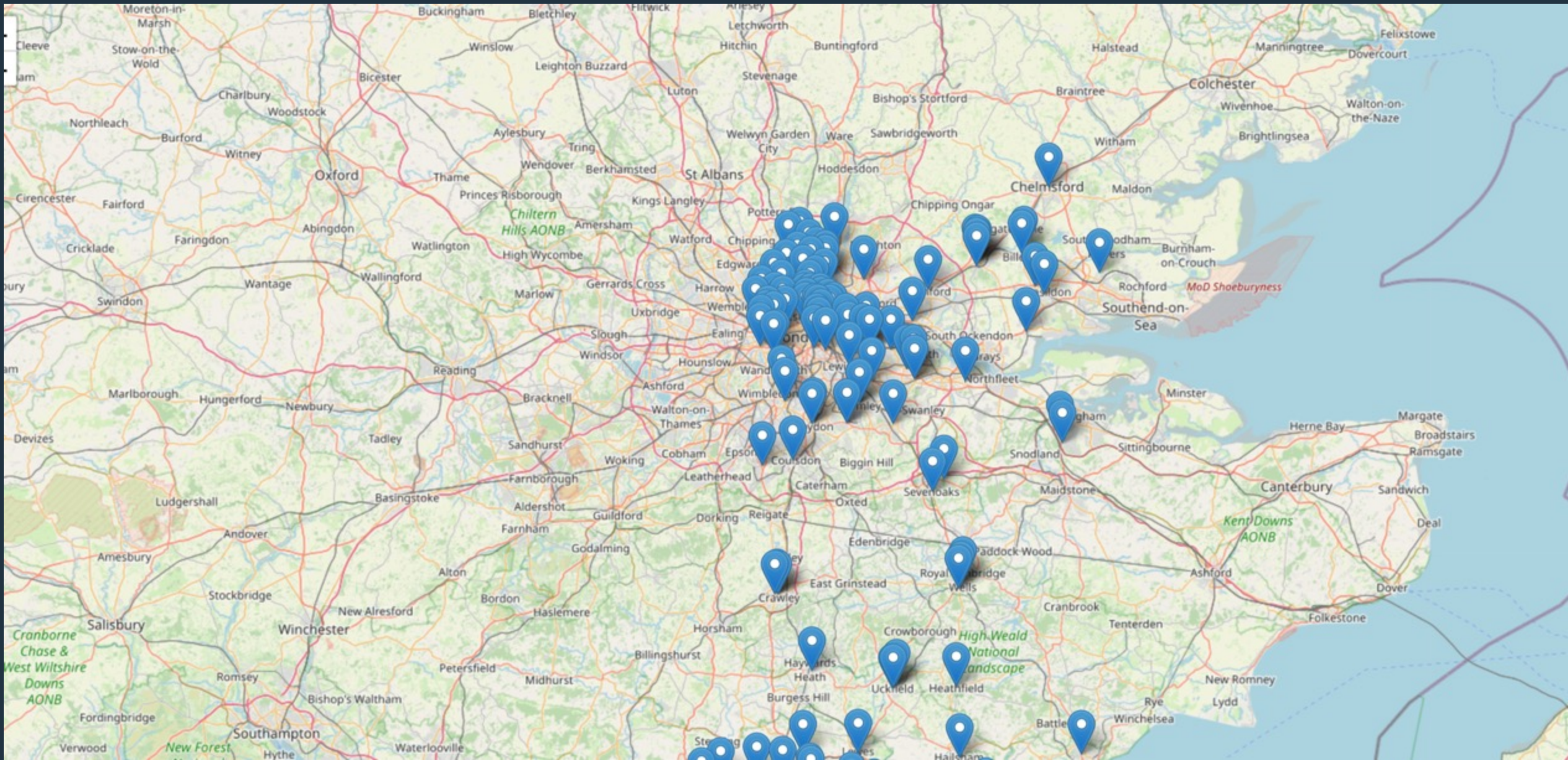




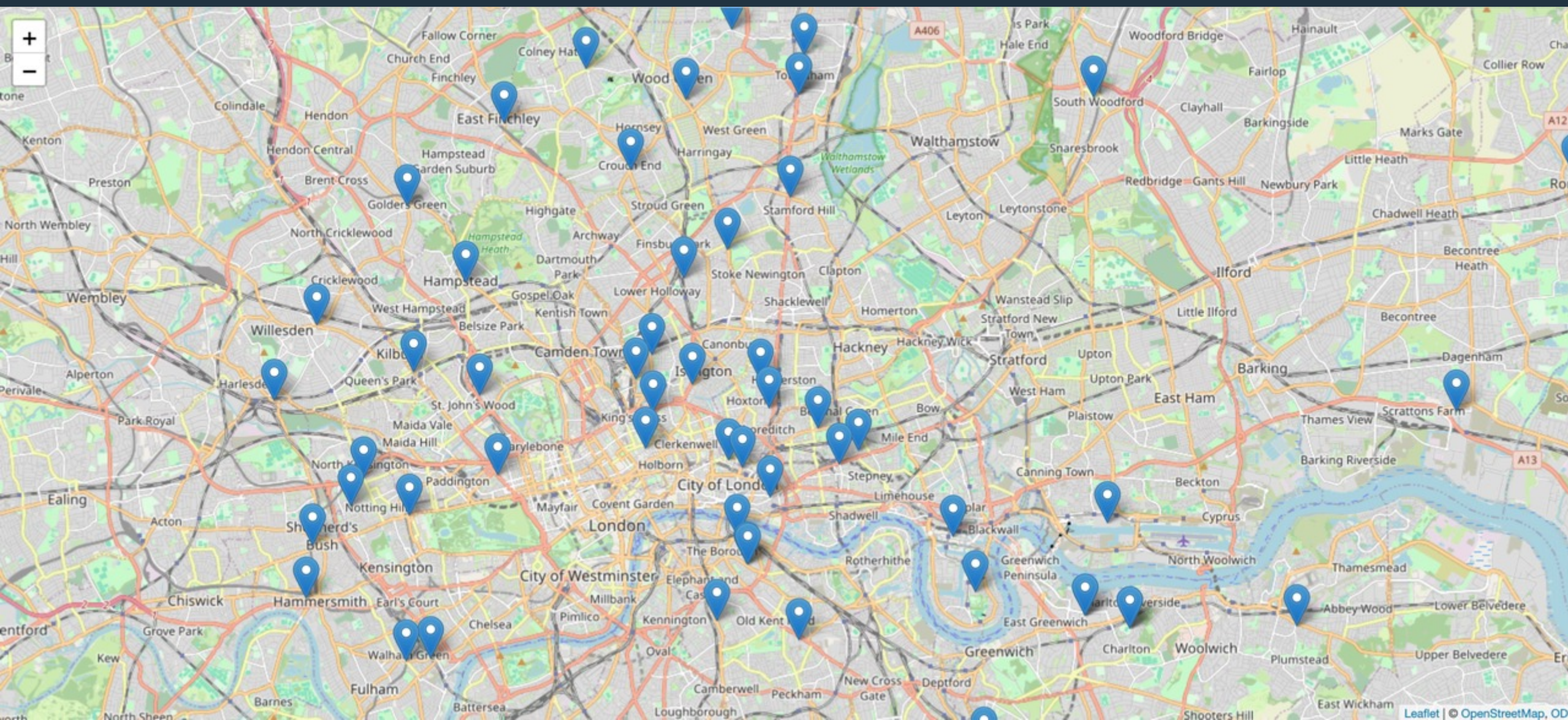
# Overview of Flow





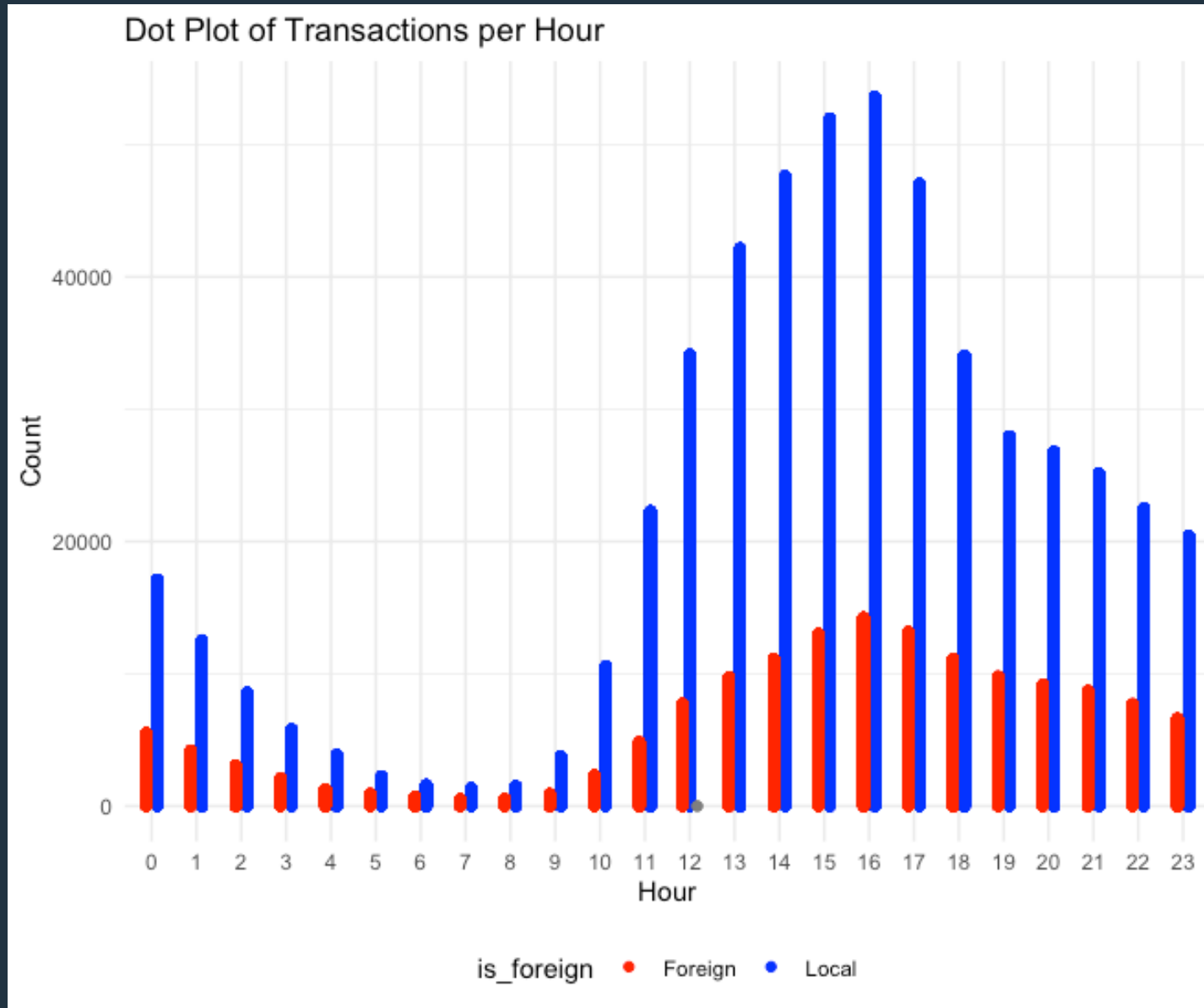




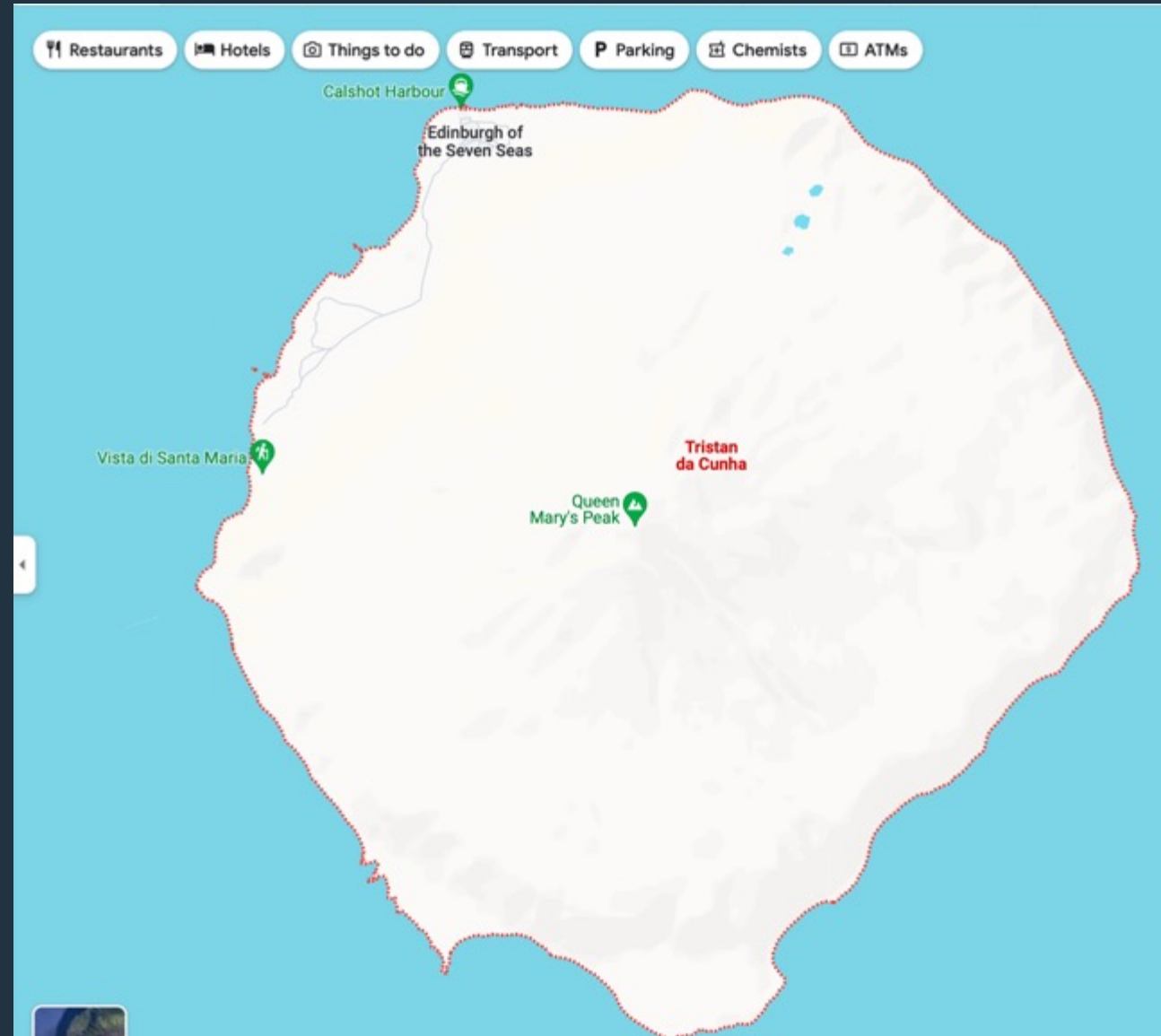




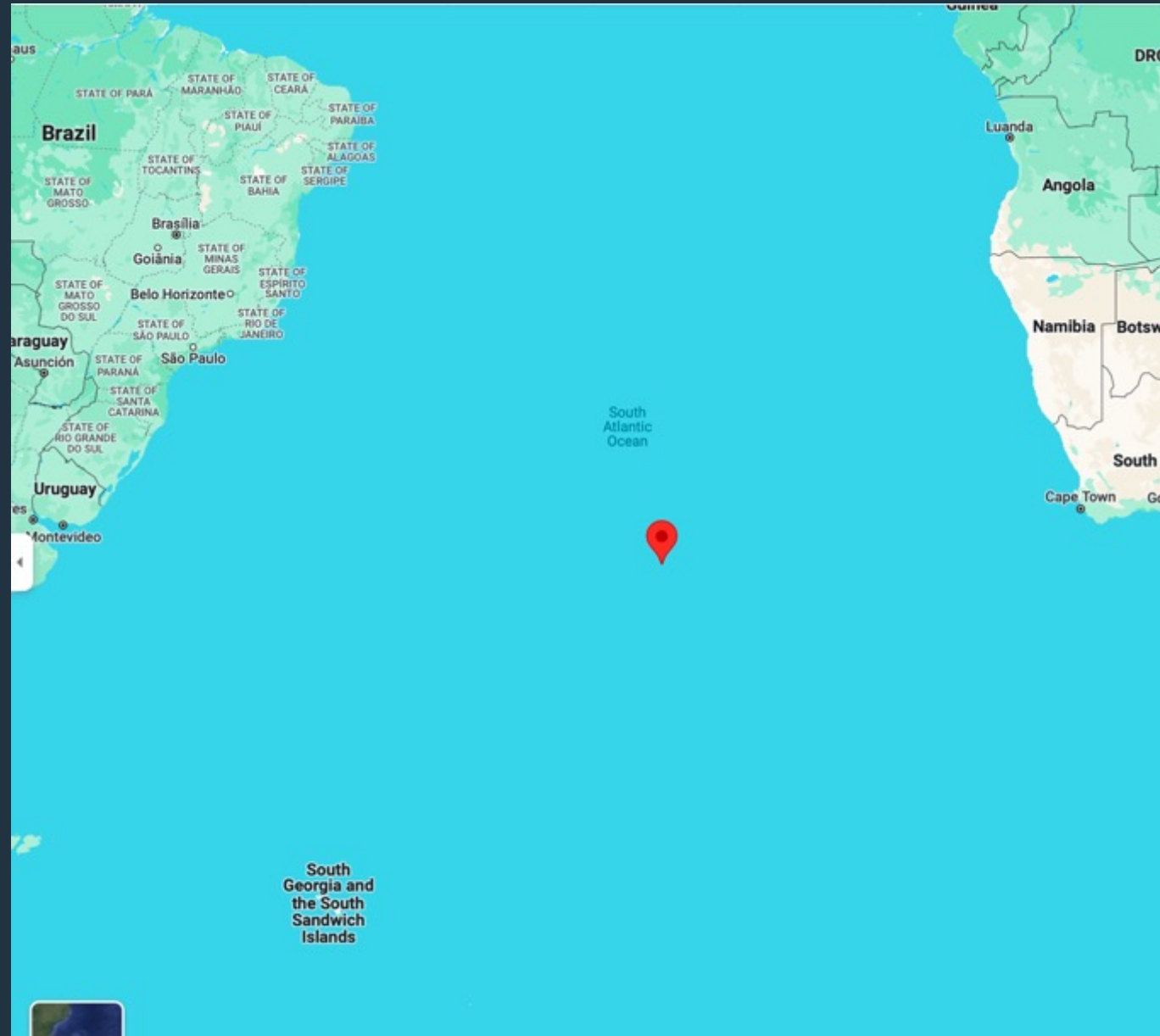
# Card use



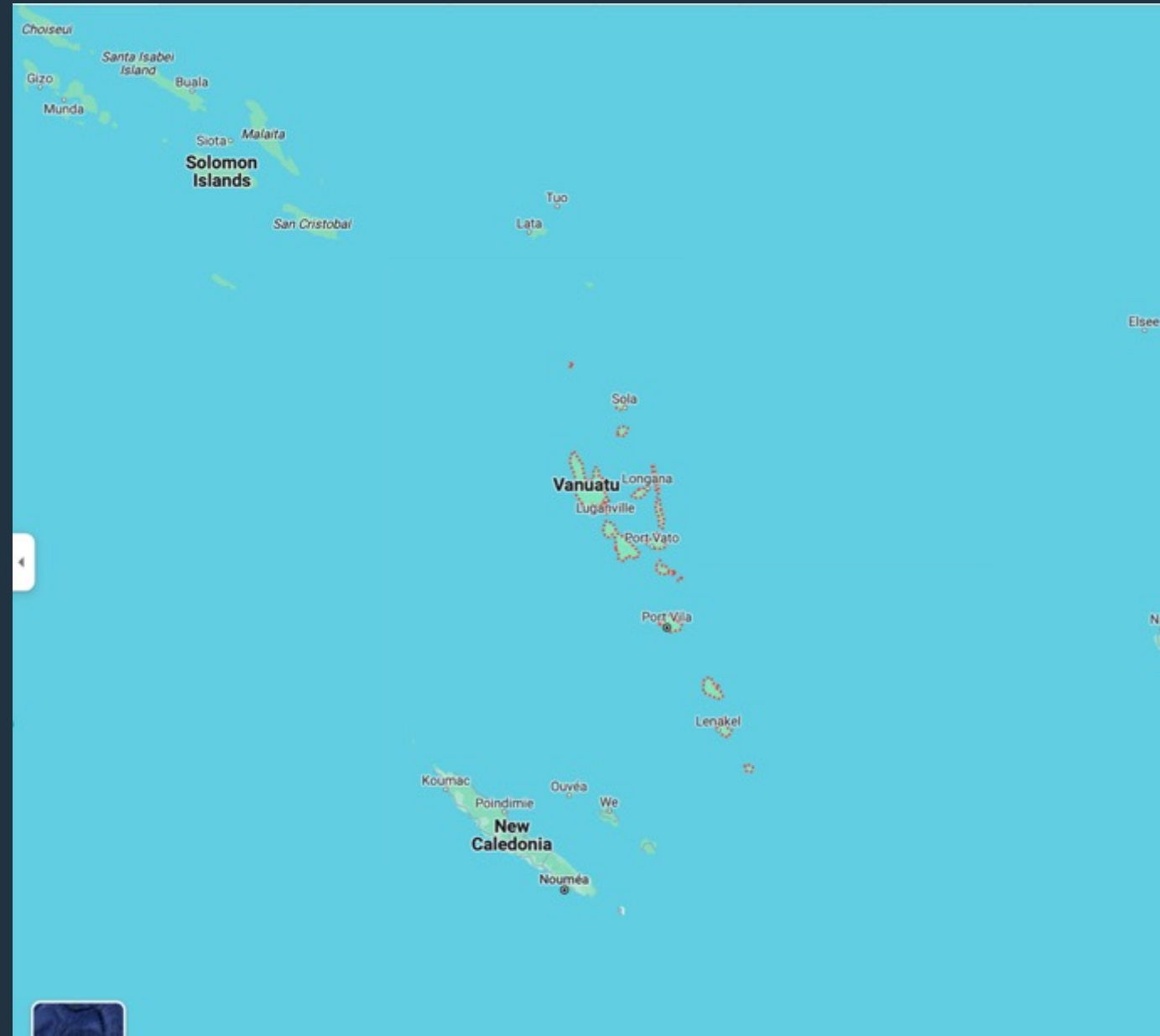
# Tristain de Cuhna



# Tristain de Cuhna

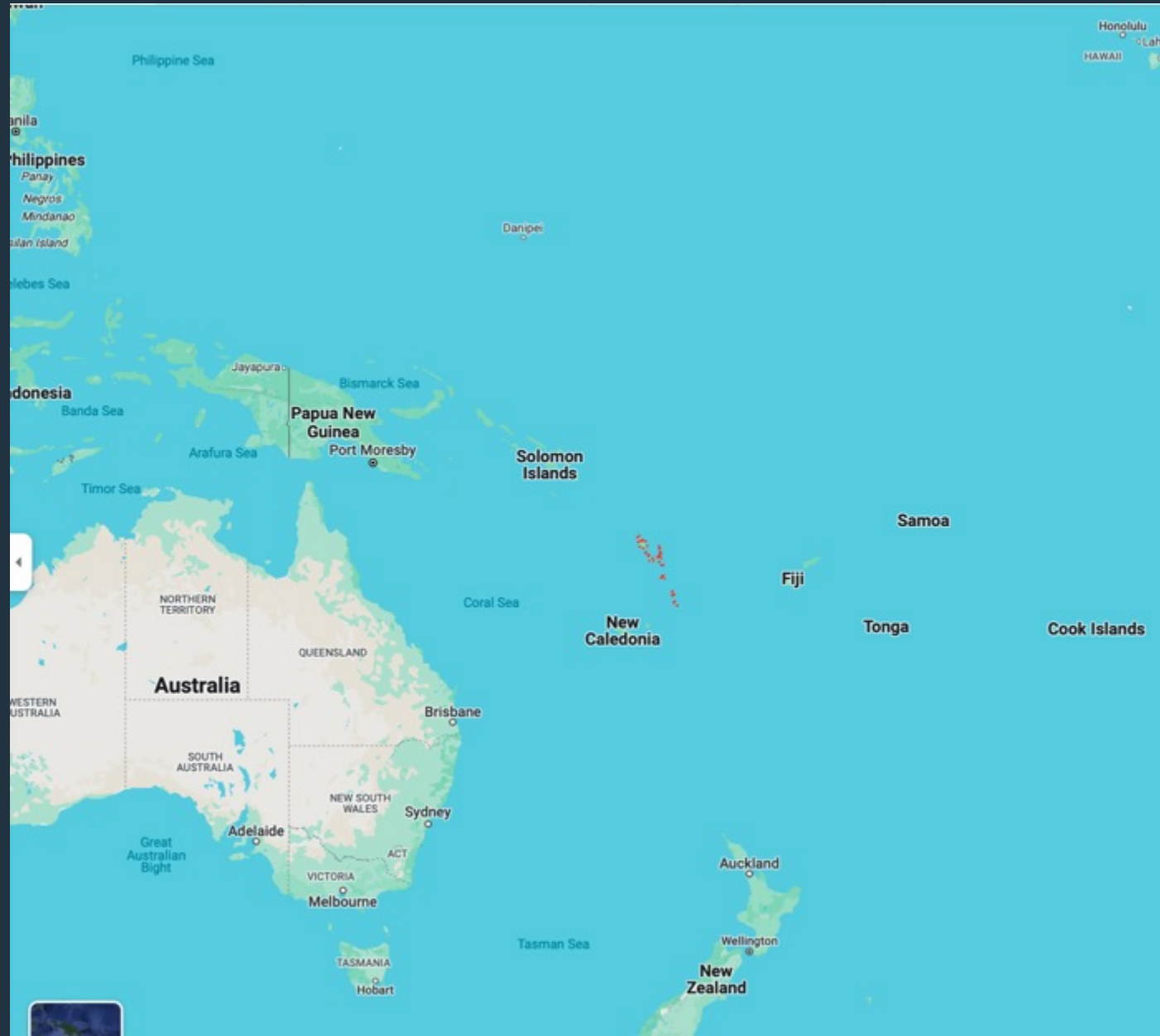


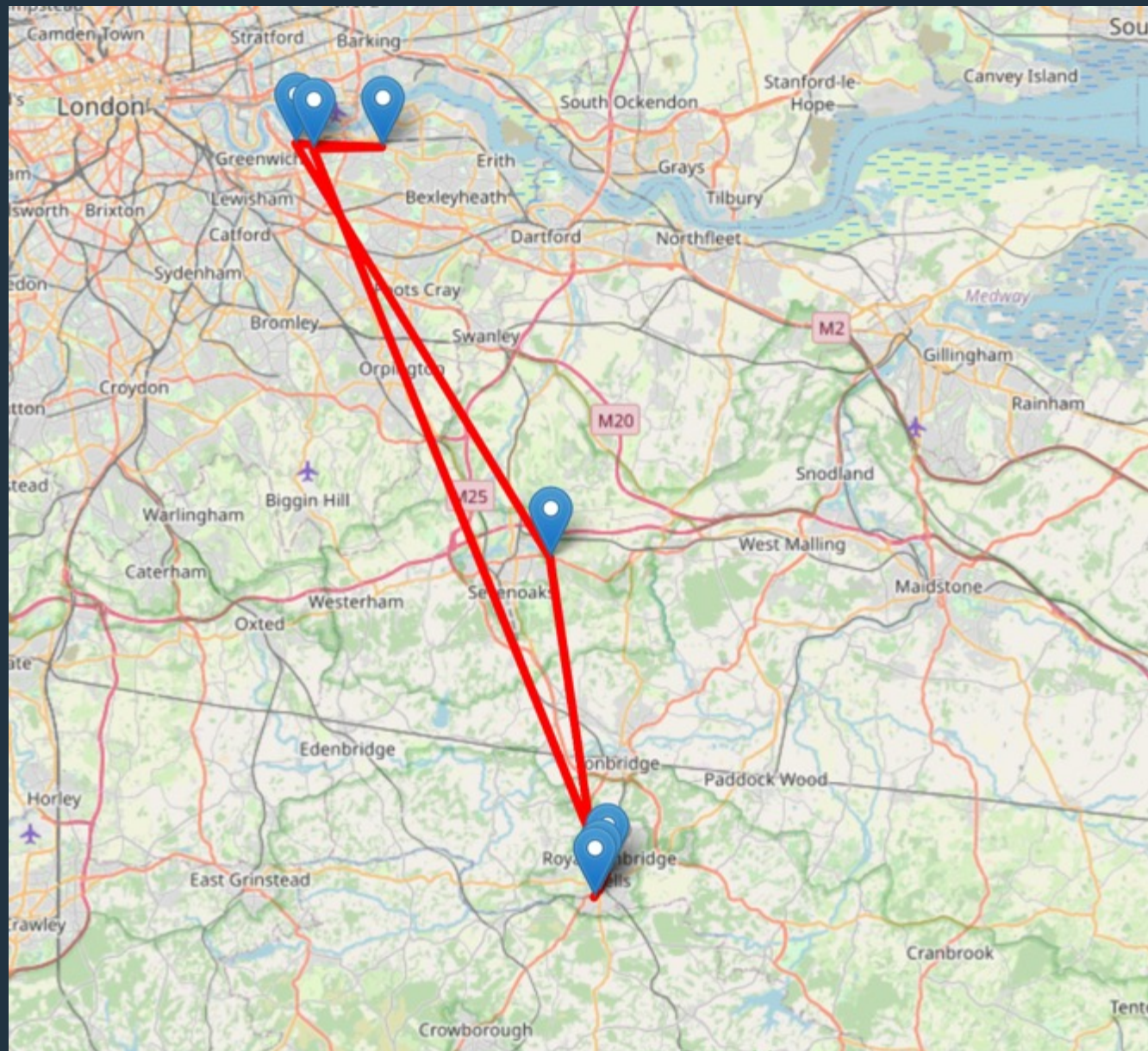
# Vanuatu





# Vanuatu





The background of the image is a dark blue space scene. On the right side, a portion of the Earth is visible, showing its blue oceans and brown landmasses. Overlaid on the entire scene is a complex network of white dots connected by thin white lines, resembling a global communication or data network. A prominent red streak, possibly representing a satellite or a data path, extends from the top left towards the center.

**H2O.ai**

# Data

<u>sequenceNo</u>	<u>Tdatetime</u>	<u>atmid</u>	<u>Trans_type</u>	<u>Trans_PAN</u>	<u>Trans_amount</u>	<u>Response_code</u>	<u>BIN</u>	<u>Owner</u>	<u>Issuer_type</u>	<u>Scheme</u>	<u>issuer_country_code</u>
2.0233E+12	2023-12-05T00:32:31Z	BAN00001	29	4826040218544529	10000	00	482604	TCZ	Debit	MasterCard	826

<u>Foreign_Card</u>	<u>ONUS</u>	<u>latitude</u>	<u>longitude</u>	<u>formatted_address</u>	<u>Fraudflag</u>
FALSE	FALSE	51.5366119	-0.121928	134 York Wy, London N1 0AX, UK	FALSE



# No features - Untokenised

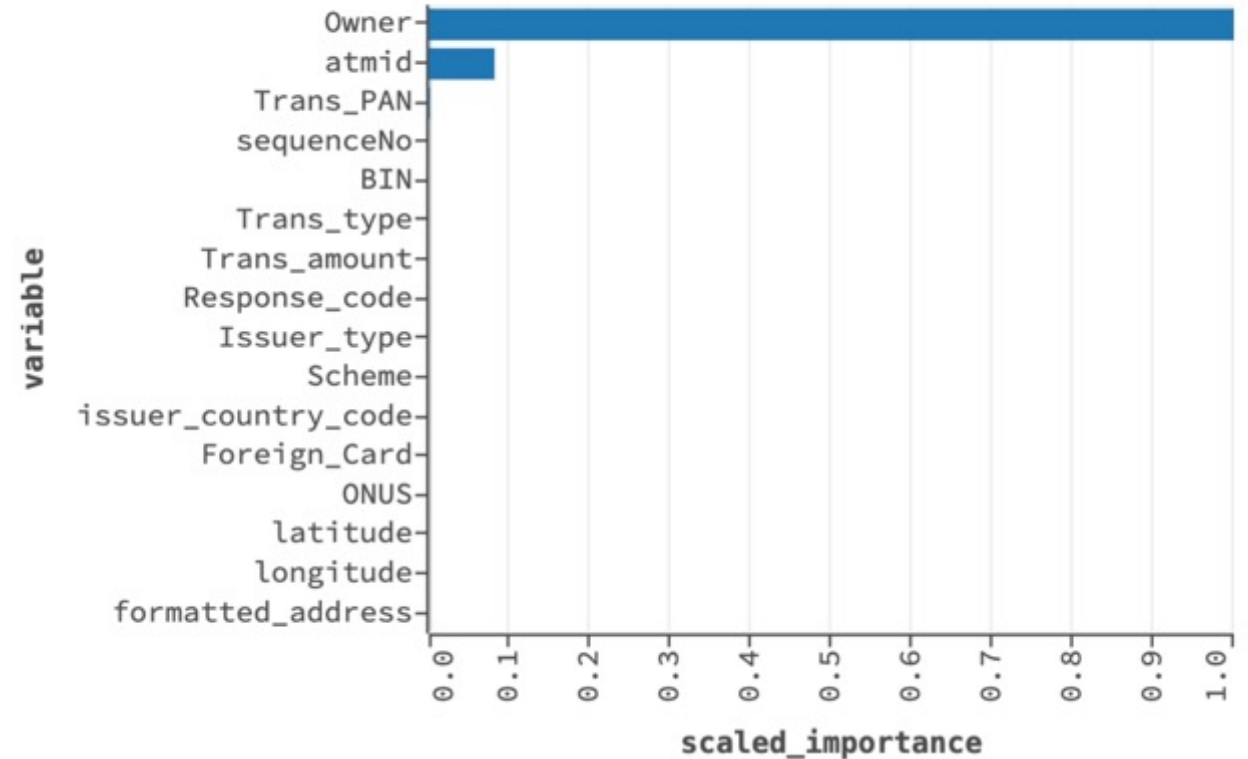
## ▼ TRAINING METRICS - CONFUSION MATRIX ROW LABELS: ACTU

	FALSE	TRUE	Error	Rate	Precision
FALSE	474362	6	0.0	6 / 474,368	1.0
TRUE	0	1155	0	0 / 1,155	0.99
Total	474362	1161	0.0	6 / 475,523	
Recall	1.0	1.0			

## ▼ VALIDATION METRICS - CONFUSION MATRIX ROW LABELS: AC

	FALSE	TRUE	Error	Rate	Precision
FALSE	190922	6	0.0	6 / 190,928	1.0
TRUE	0	360	0	0 / 360	0.98
Total	190922	366	0.0	6 / 191,288	
Recall	1.0	1.0			

## ▼ VARIABLE IMPORTANCES



# Data Tokenised

<u>sequenceNo</u>	<u>Tdatetime</u>	<u>atmid</u>	<u>Trans_type</u>	<u>Trans_PAN</u>	<u>Trans_amount</u>	<u>Response_code</u>	<u>BIN</u>	<u>Owner</u>	<u>Issuer_type</u>	<u>Scheme</u>	<u>issuer_country_code</u>
2.0233E+12	2023-12-05T00:32:31Z	BAN00001	29	4826040218544529	10000	00	482604	TCZ	Debit	MasterCard	826
2.0233E+12	2023-12-05T00:32:31Z	BAN34568	29	2241804649558024	10000	00	769925	WFC	Debit	MasterCard	949

<u>Foreign_Card</u>	<u>ONUS</u>	<u>latitude</u>	<u>longitude</u>	<u>formatted_address</u>	<u>Time_since</u>	<u>Fraudflag</u>
FALSE	FALSE	51.5366119	-0.121928	134 York Wy, London N1 0AX, UK	2579	FALSE
FALSE	FALSE	51.5366119	-0.121928	134 DTWP BD, QTSITS S1 0FC, ZP	2579	FALSE

# No features - Tokenised

## ▼ TRAINING METRICS - CONFUSION MATRIX ROW L

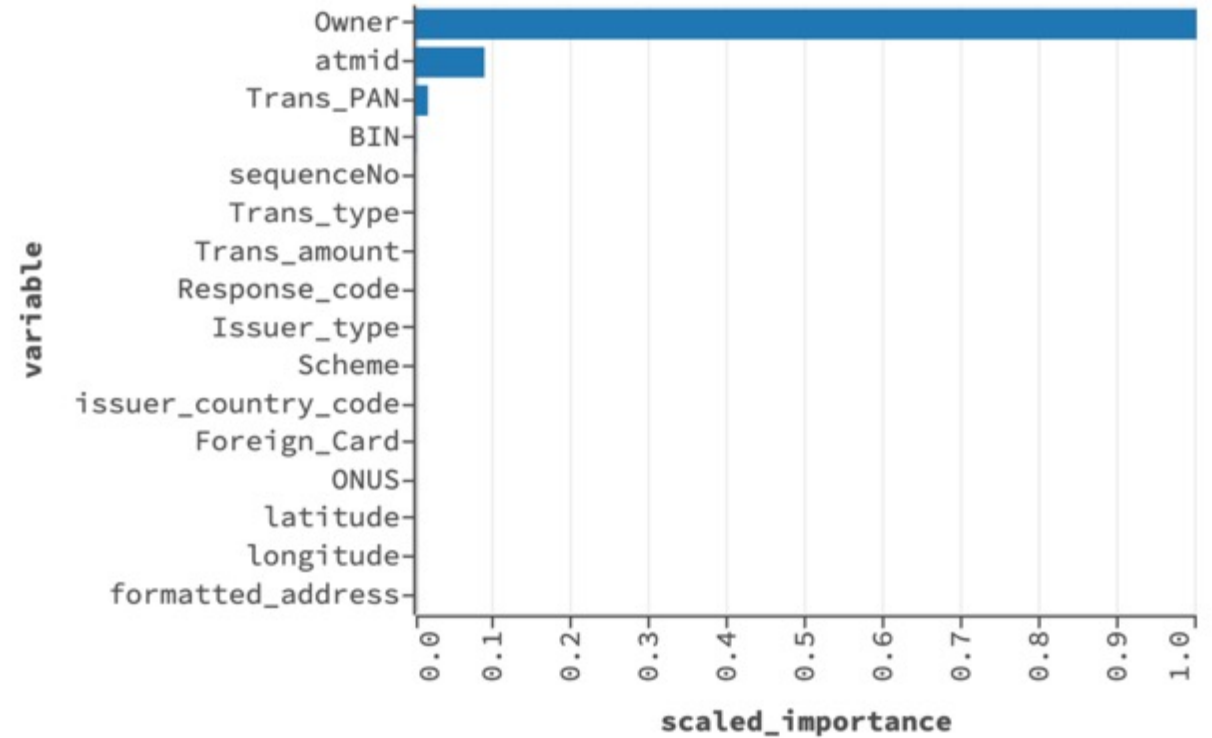
	FALSE	TRUE	Error	Rate	Precision
FALSE	474361	7	0.0	7 / 474,368	1.0
TRUE	0	1155	0	0 / 1,155	0.99
Total	474361	1162	0.0	7 / 475,523	
Recall	1.0	1.0			

## ▼ VALIDATION METRICS - CONFUSION MATRIX ROW L

	FALSE	TRUE	Error	Rate	Precision
FALSE	190920	6	0.0	6 / 190,926	1.0
TRUE	0	360	0	0 / 360	0.98
Total	190920	366	0.0	6 / 191,286	
Recall	1.0	1.0			

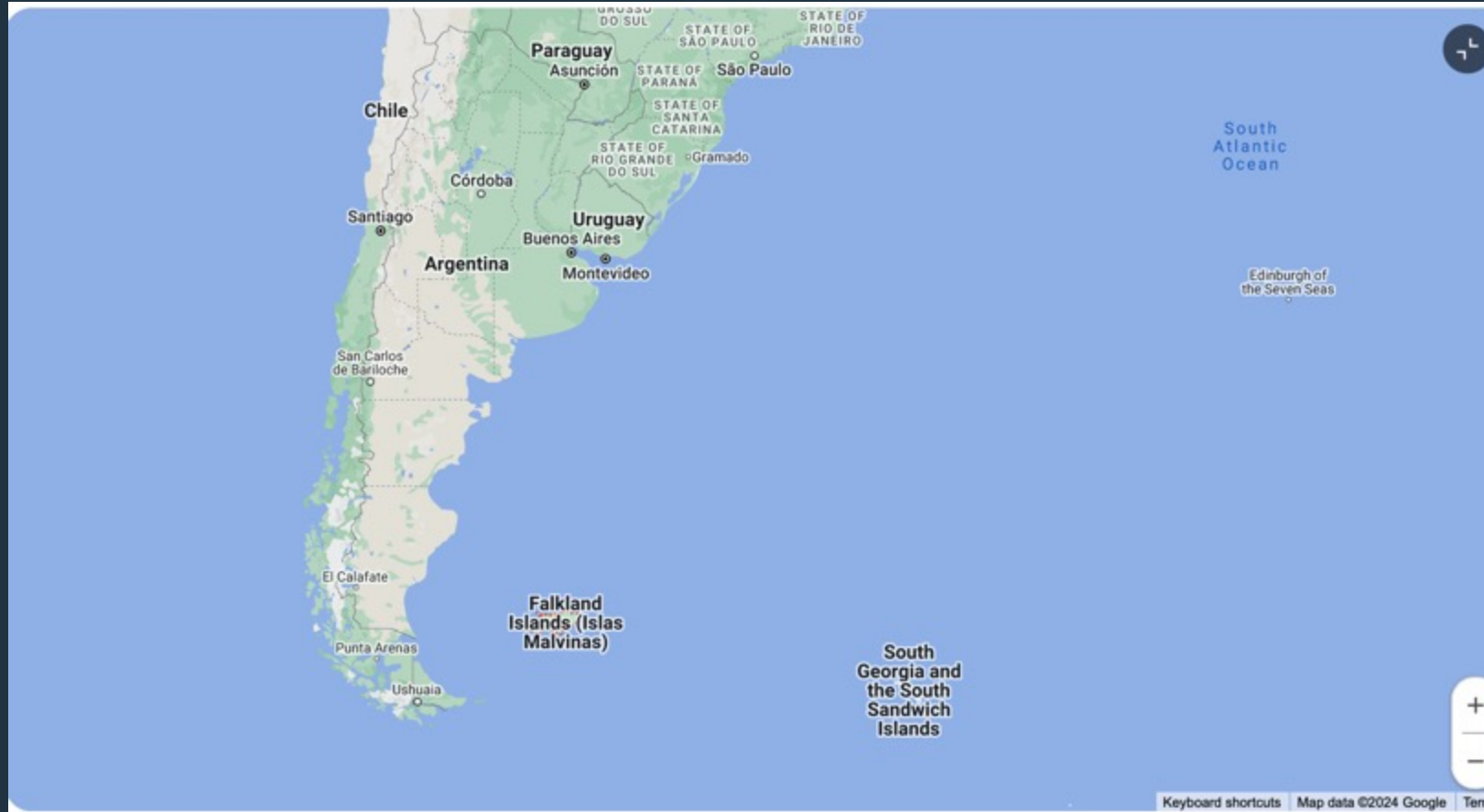
Click

## ▼ VARIABLE IMPORTANCES





# The Falkland Islands

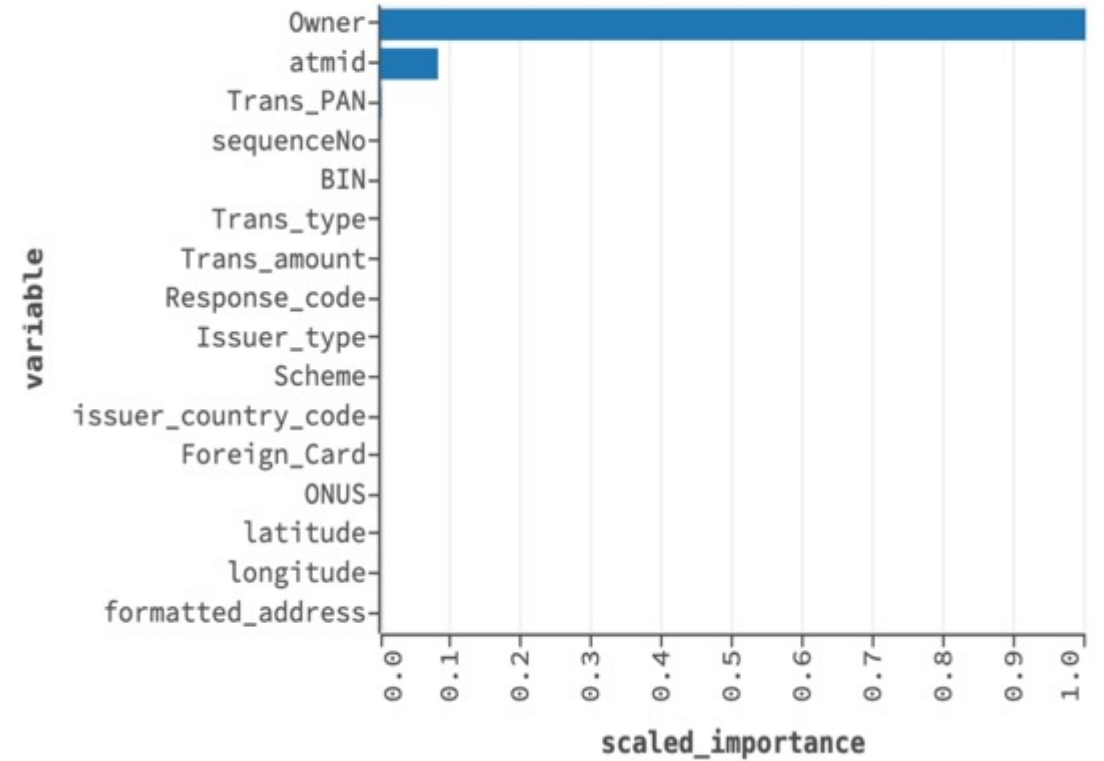


# Introduce the Falklands

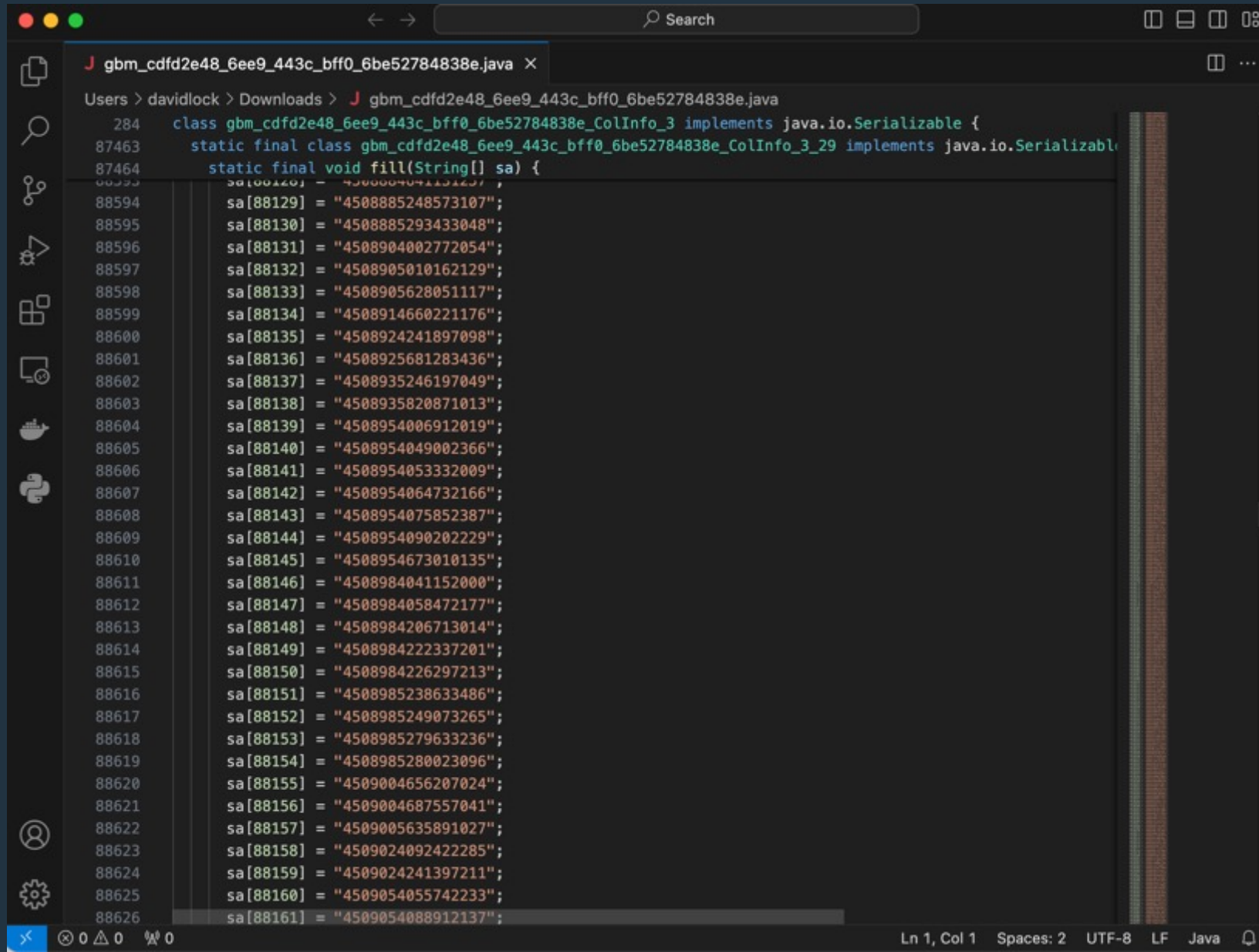
▼ PREDICTION - CONFUSION MATRIX ROW LABELS:

	FALSE	TRUE	Error	Rate	Precision
FALSE	0	7047	1.0	7,047 / 7,047	NaN
TRUE	0	180	0	0 / 180	0.02
Total	0	7227	0.9751	7,047 / 7,227	
Recall	0.0	1.0			

▼ VARIABLE IMPORTANCES



# Code



The screenshot shows an IDE window with a file named `gbm_cdfd2e48_6ee9_443c_bff0_6be52784838e.java`. The code defines a class `gbm_cdfd2e48_6ee9_443c_bff0_6be52784838e_ColInfo_3` that implements `java.io.Serializable`. It contains a static final class `gbm_cdfd2e48_6ee9_443c_bff0_6be52784838e_ColInfo_3_29` that implements `java.io.Serializable`. The main method `fill(String[] sa)` populates the array `sa` with 48 strings, each representing a hexadecimal value. The strings are assigned to indices from `sa[88129]` to `sa[88161]`.

```
284 class gbm_cdfd2e48_6ee9_443c_bff0_6be52784838e_ColInfo_3 implements java.io.Serializable {
87463     static final class gbm_cdfd2e48_6ee9_443c_bff0_6be52784838e_ColInfo_3_29 implements java.io.Serializable {
87464         static final void fill(String[] sa) {
88594             sa[88129] = "4508885248573107";
88595             sa[88130] = "4508885293433048";
88596             sa[88131] = "4508904002772054";
88597             sa[88132] = "4508905010162129";
88598             sa[88133] = "4508905628051117";
88599             sa[88134] = "4508914660221176";
88600             sa[88135] = "4508924241897098";
88601             sa[88136] = "4508925681283436";
88602             sa[88137] = "4508935246197049";
88603             sa[88138] = "4508935820871013";
88604             sa[88139] = "4508954006912019";
88605             sa[88140] = "4508954049002366";
88606             sa[88141] = "4508954053332009";
88607             sa[88142] = "4508954064732166";
88608             sa[88143] = "4508954075852387";
88609             sa[88144] = "4508954090202229";
88610             sa[88145] = "4508954673010135";
88611             sa[88146] = "4508984041152000";
88612             sa[88147] = "4508984058472177";
88613             sa[88148] = "4508984206713014";
88614             sa[88149] = "4508984222337201";
88615             sa[88150] = "4508984226297213";
88616             sa[88151] = "4508985238633486";
88617             sa[88152] = "4508985249073265";
88618             sa[88153] = "4508985279633236";
88619             sa[88154] = "4508985280023096";
88620             sa[88155] = "4509004656207024";
88621             sa[88156] = "4509004687557041";
88622             sa[88157] = "4509005635891027";
88623             sa[88158] = "4509024092422285";
88624             sa[88159] = "4509024241397211";
88625             sa[88160] = "4509054055742233";
88626             sa[88161] = "4509054088912137";
```

# Feature Engineering

22/04/1972



=



# Feature Engineering

**10/04/2024 12:17**

- Second quarter
- Spring
- April
- Second week of month
- Wednesday
- 12<sup>th</sup> Hour
- Second quarter hour
- Afternoon

# Binning

5  
10  
25  
5  
20  
10  
10  
15

Small

100  
120  
80  
50  
75  
90  
130  
110  
90  
90

Medium

250  
220  
200  
200  
250  
250  
210

Large

# Vectored Features

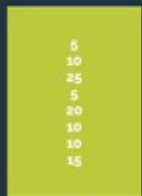
22/04/1972



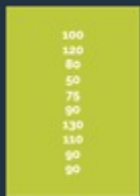
=



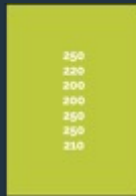
- Second quarter
- Spring
- April
- Second week of month
- Wednesday
- 12<sup>th</sup> Hour
- Second quarter hour
- Afternoon



Small



Medium



Large



# Adding Features

Distance

TimeDiff

Speed

StartWindow

PAN\_60\_Minute\_Count

atmid\_60\_Minute\_Count

atmid\_BIN\_60\_Minute\_Count

atmid\_Foreign\_60\_Minute\_Count

# Untokenised Features

123456 121126 129856 122356 111156 126546 123456 185461 123456 126543 111222



# Tokenised features

777777 112244 888888 122356 154321 165432 777777 937377 777777 984322 965123



# Adding Features

Distance

TimeDiff

Speed

StartWindow

PAN\_60\_Minute\_Count

atmid\_60\_Minute\_Count

atmid\_BIN\_60\_Minute\_Count

atmid\_Foreign\_60\_Minute\_Count



# With features - Tristan

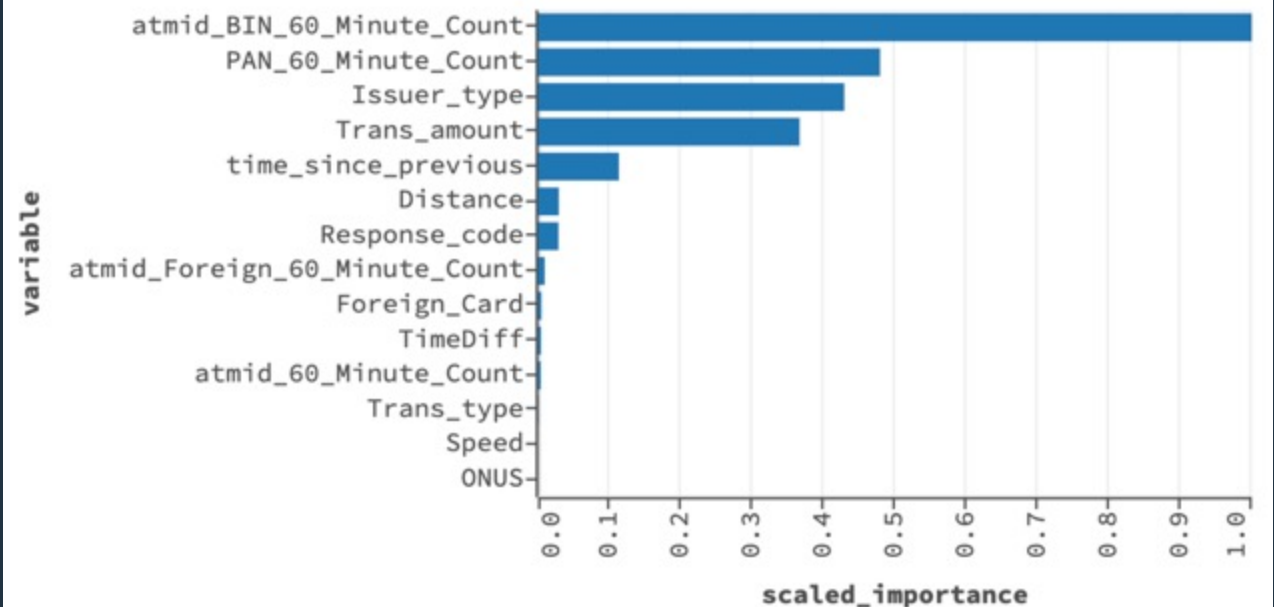
## ▼ TRAINING METRICS - CONFUSION MATRIX ROW L

	FALSE	TRUE	Error	Rate	Precision
FALSE	474368	0	0	0 / 474,368	1.0
TRUE	0	1155	0	0 / 1,155	1.0
Total	474368	1155	0	0 / 475,523	
Recall	1.0	1.0			

## ▼ VALIDATION METRICS - CONFUSION MATRIX ROW L

	FALSE	TRUE	Error	Rate	Precision
FALSE	190924	2	0.0	2 / 190,926	1.0
TRUE	0	360	0	0 / 360	0.99
Total	190924	362	0.0	2 / 191,286	
Recall	1.0	1.0			

## ▼ VARIABLE IMPORTANCES

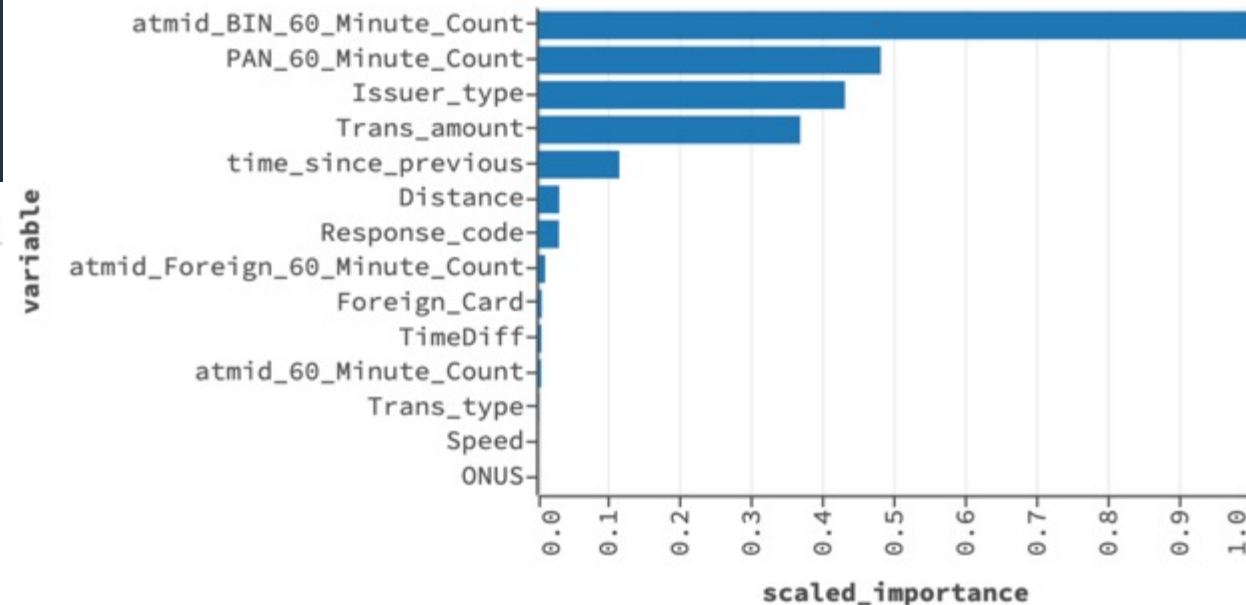


# With features Falklands

▼ PREDICTION - CONFUSION MATRIX ROW LABELS:

	FALSE	TRUE	Error	Rate	Precision
FALSE	7045	0	0	0 / 7,045	1.0
TRUE	0	180	0	0 / 180	1.0
Total	7045	180	0	0 / 7,225	
Recall	1.0	1.0			

▼ VARIABLE IMPORTANCES



# Conclusion

- Not all people from Tristan / Vanuatu / Falklands are bad
- Risk is high of insecure data being used in Machine Learning
- Tokenising data does not impact results
- Using Features on tokenised data provides secure ways of providing models that are not overfitted
- SecurDPS should be part of any AI pipeline

# Old stuff!!!







# I asked Gemma this:

give me directions like an old drunk pirate from  
amsterdam to berlin

# The response I got was:

"Avast, me heartie, and listen close to the rumblin' directions of this old drunk pirate named Barry from Amsterdam to the wicked city of Berlin.

First, you gotta sail down the North Sea, me hearty, and head north-east like a drunkard's dream. Once you reach the coast of Denmark, you're gonna want to hop ashore in

Copenhagen. It's a fine city, with plenty of ale and beautiful broads. But you ain't got time to mess around, so get your boots on and prepare to journey onward.

From Copenhagen, you're gonna wanna head south-east, me lad, following the old river Rhine. It'll lead you through Germany and past some mighty fine castles. You'll also encounter a bunch of grumpy Germans, but don't let their sour faces fool you. They're actually quite friendly, once you get to know them.

# It goes on.....

Once you reach the city of Berlin, you'll be in the heart of the world. It's a wicked place, full of art, history, and plenty of trouble. But hey, you're a pirate, so you're used to trouble. Just be sure to drink plenty of schnapps and sing a lot of sea shanties.

Now, me heartie, I know these directions are a bit... rambunctious, but I guarantee you'll find your way to Berlin. Just be sure to pack plenty of rum and a good sense of adventure. And always remember, the best way to get to Berlin is by following the wind in your hair and the devil in your heart. Avast, me heartie, let's raise a glass to the high seas and the wicked city of Berlin!"

# Prompt:

using the schema first\_name Last\_name and account\_num  
extract in JSON the features firstname lastname and account  
number from "hello my name is david lock and my account  
number is 1234567"

OI **Gemma:Latest** 09/04/2024 11:57

Sure, here is the extracted JSON data:

json

Copy Code

```
{
  "first_name": "David",
  "Last_name": "Lock",
  "account_num": "1234567"
}
```

This extracted JSON data includes the first name, last name, and account number from the provided text.





# Feature Entity Recognition

- Determines part of text
- For security we are looking for PII (Personal Identifiable Information)
- Can identify names, address and other information
- There are multiple routes that can be taken:
  - Libraries
    - SpaCy
    - Flair
    - Stanford
  - LLM's
  - Regex
  - Lookup dictionaries
  - Scripting / code



# Pipeline



**Text**



**Tag**



**Token**



**Model**



# Conclusion

- **Never ask a drunk pirate for directions**
- **Security is key for LLMs (and all AI)**
- **Tokenising data does not impact results**
- **Feature Entity Recognition can be used to real time tokenise data**
- **SecurDPS should be part of any AI pipeline**

Avast, me heartie, let's raise a glass to the high seas and the wicked city of Berlin!"



# SECURE YOUR GROWTH

---

[www.comforte.com](http://www.comforte.com)