Detecting Ransomware Payments

Harry Smith

Goal

Use records of Bitcoin transactions
to detect Ransomware payments

$7.5 billion

from the US economy in 2019

67%

of victims pay

Data

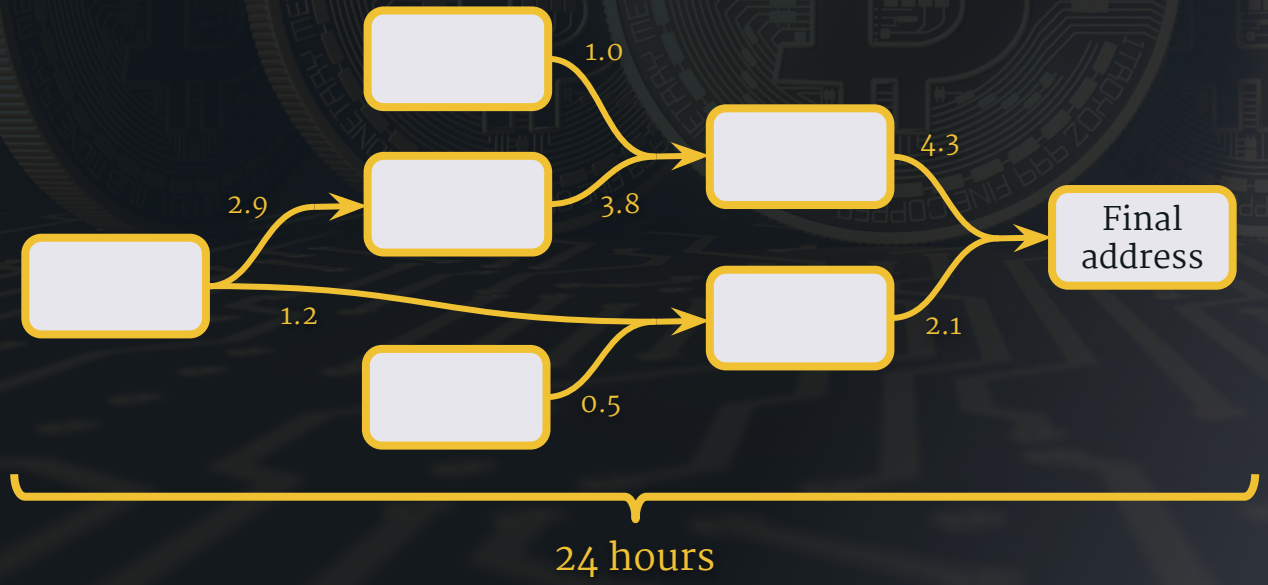
From study at University of Texas, Dallas by Akcora et al.

- Jan 2009 - Dec 2018
- All bitcoin addresses which receive >=0.3 bitcoin in each 24 hour period
- Labels only include **reported** Ransomware addresses

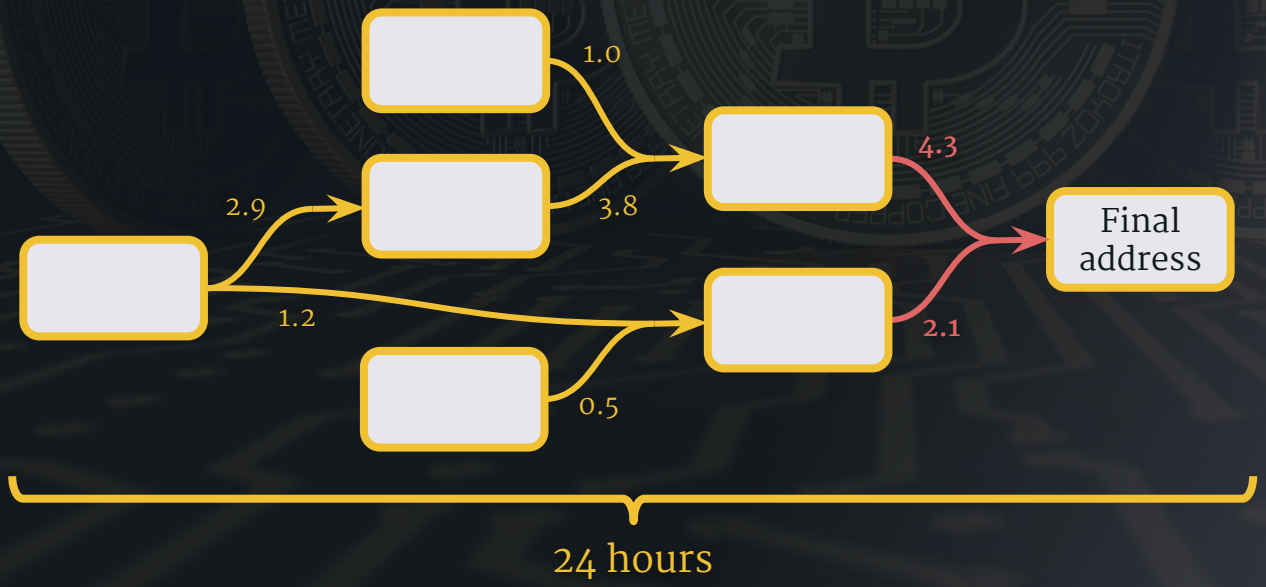
Data

Final address

Data

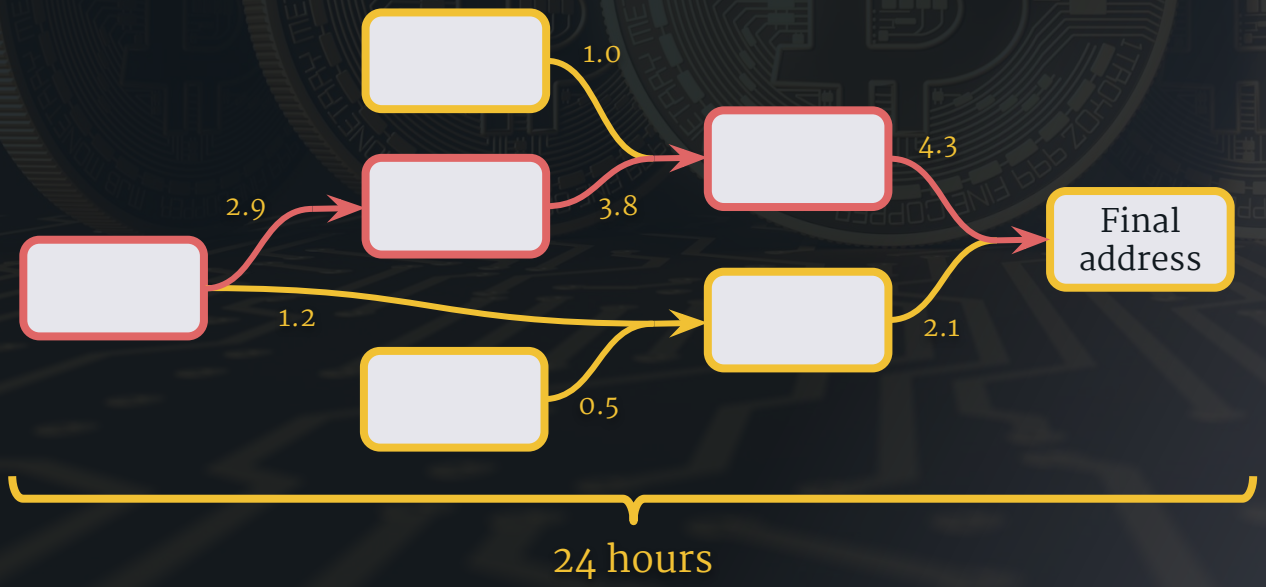


Data



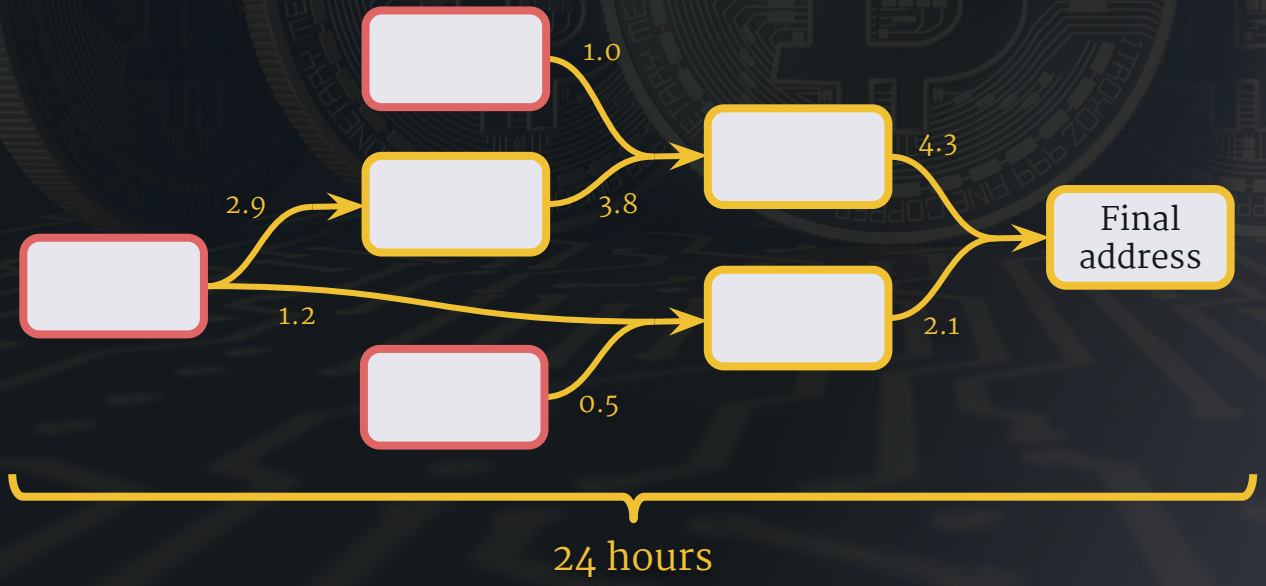
Feature	Row data
Income	6.4

Data



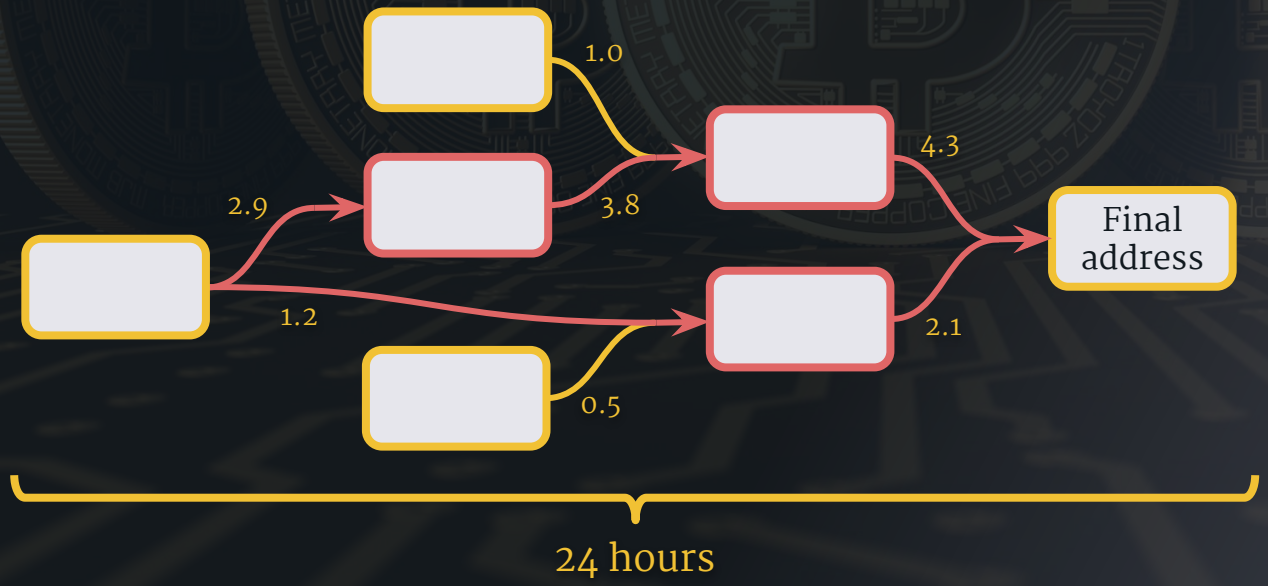
Feature	Row data
Income	6.4
Length	3

Data



Feature	Row data
Income	6.4
Length	3
Count	3

Data



Feature	Row data
Income	6.4
Length	3
Count	3
Loop	1

Modelling

Round 1

- Uploaded data onto Spark cluster on AWS
- Modelling done with PySpark
- Final model was a Gradient Boosted Tree Classifier:

  Accuracy = 66.7%
  Recall = 34.5%

Frequency of Attacks

First Wave

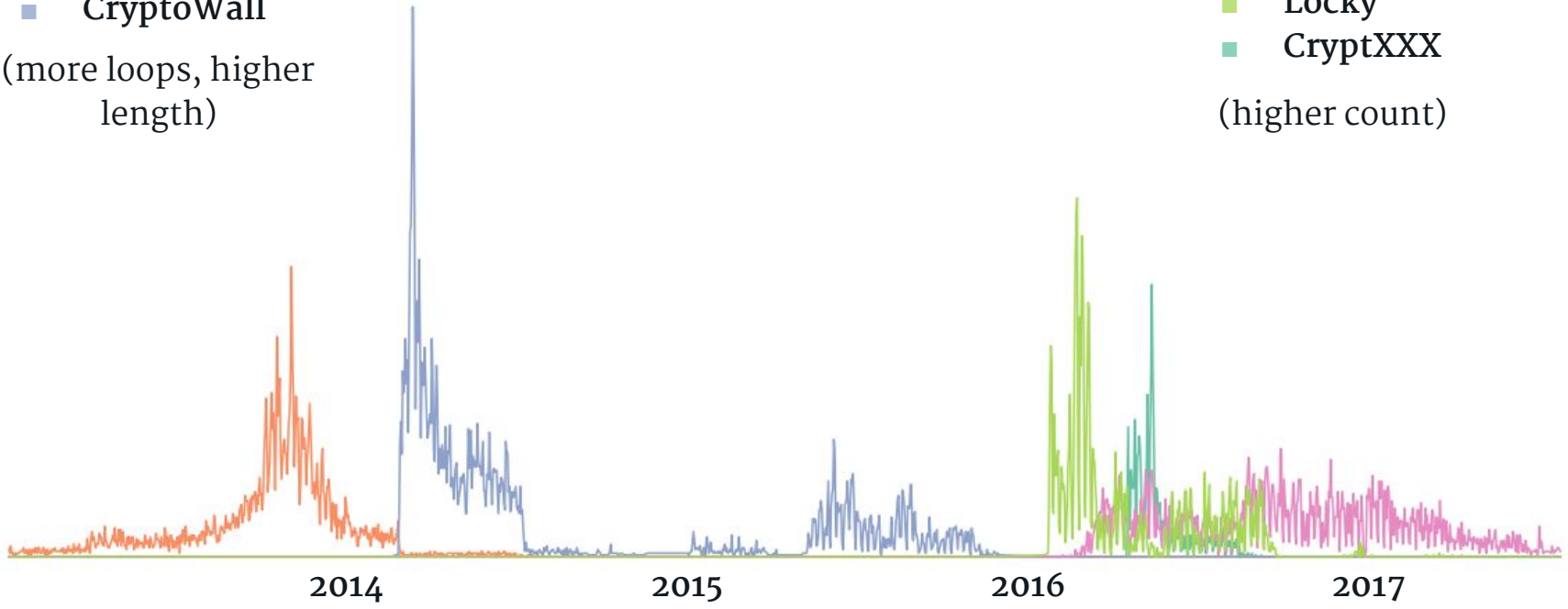
- CryptoLocker
- CryptoWall

(more loops, higher length)

Second Wave

- Cerber
- Locky
- CryptXXX

(higher count)



Modelling

Round 2

Modelled with scikit-learn, Random Forest Classifier

First Wave:

- Accuracy = 71.7%
- Recall = 59.4%
- 30 false positives for each true positive

Modelling

Round 2

Modelled with scikit-learn, Random Forest Classifier

Second Wave:

- Accuracy = 66.3%
- Recall = 83.4%
- 15 false positives for each true positive

Conclusion

- Ransomware has exhibited different patterns of behaviour over time
- Ability to detect Ransomware payments is greatly improved by targeting groups with similar behaviour

Thank you for watching

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