



CYBERSECURITY RISK MEASURE



RUTGERS

Arion Cheong

Going Dark

MORE **FBI**        Search FBI 

SERVICES

Criminal Justice Information Services (CJIS) | CIRG | Laboratory Services | Training Academy | **More**

News | Publications | **Going Dark**

Going Dark



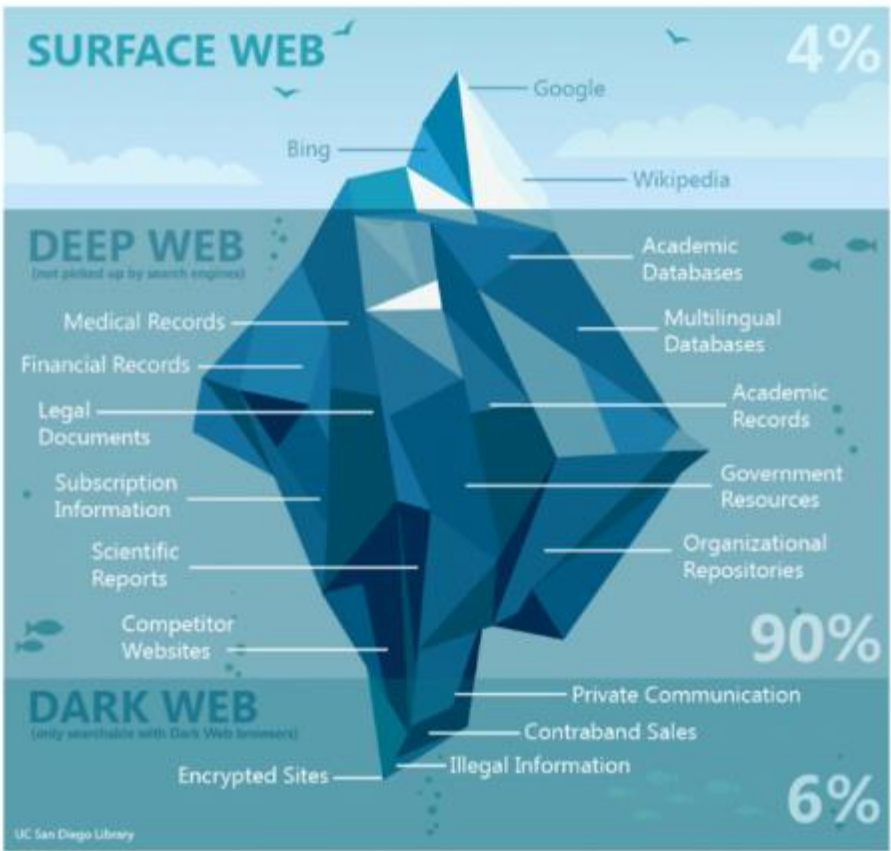
Law enforcement at all levels has the [legal authority to intercept and access communications and information pursuant to court orders](#), but it often lacks the technical ability to carry out those orders because of a fundamental shift in communications services and technologies. This scenario is often called the “Going Dark” problem.

**Dark
Market**

Dark Web

**Hacktivist
Forum**

Darkweb



Source; <http://stuffboxnews.com/wp-content/uploads/2017/10/DeepWeb.png>

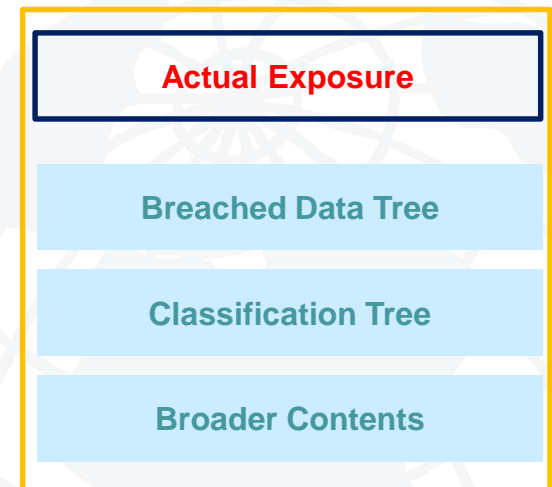
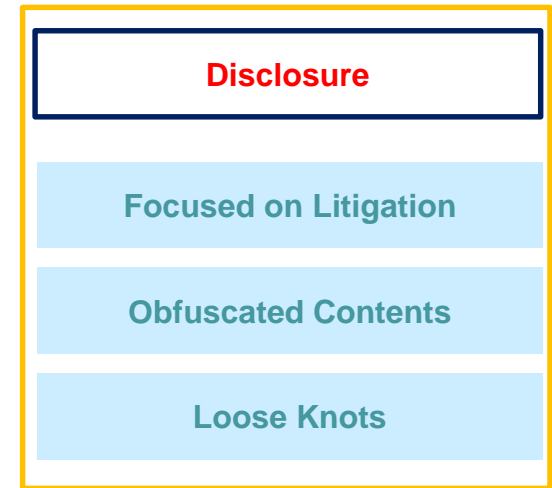
Internal Information

EDI Documents

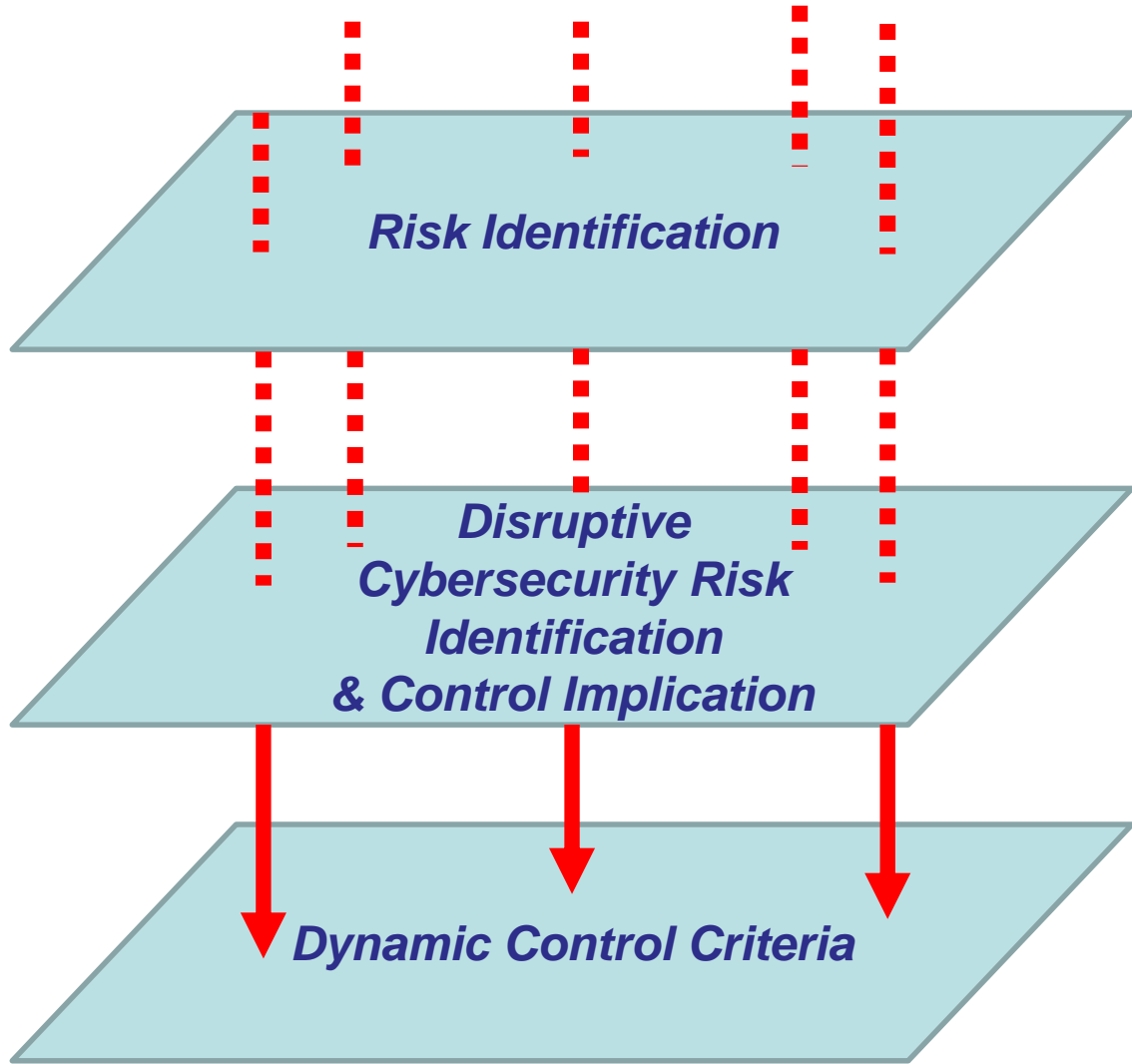
Protected Personal Information

Cybersecurity Risk Classification Method

Level		Topic	Keywords
Application-User Level	V2	-	Topic 6 Employee, Procedure, Policy, Malfeasance, Event
			Topic 7 Liability, Litigation, Disclosure, Cost, Employee
			Topic 15 Target, Client, Sabotage, Cost, Change
Business Level	V6	Litigation Risk	Topic 1 Health, Law, Privacy, Regulation, HIPAA
			Topic 2 Reputation, Litigation, Disclosure, Misappropriation, Liability
	V4	Litigation Cost	Topic 0 Individual, Government, Claim, Law, Payment
			Topic 3 Management, Recovery, Plan, Vendor, Threat
			Topic 11 Claim, Cost, Expense, Event, Market
Technical Level	V3	Firm Factor	Topic 4 Software, Attempt, Transaction, Process, Error
			Topic 14 Infrastructure, Encryption, Interruption, Operating, Sophistication
			Topic 16 Threat, Encryption, Vulnerability, Resource, Provider
	V5	External Factor	Topic 10 Break, Interruption, Power, Incident, Event
			Topic 13 Power, Disaster, Interruption, Intrusion, Terrorism
Control	V1	-	Topic 5 Infrastructure, Reputation, Industry, Standard, Control
			Topic 8 Employee, Software, Product, Market, Client
			Topic 9 Resource, Facility, Software, Cost, Capital
			Topic 12 Ability, Encrypt, Development, Product, Change



Informativeness of Cybersecurity Risk Disclosure



**Mapping
Exposed Data to
Cybersecurity Risk**

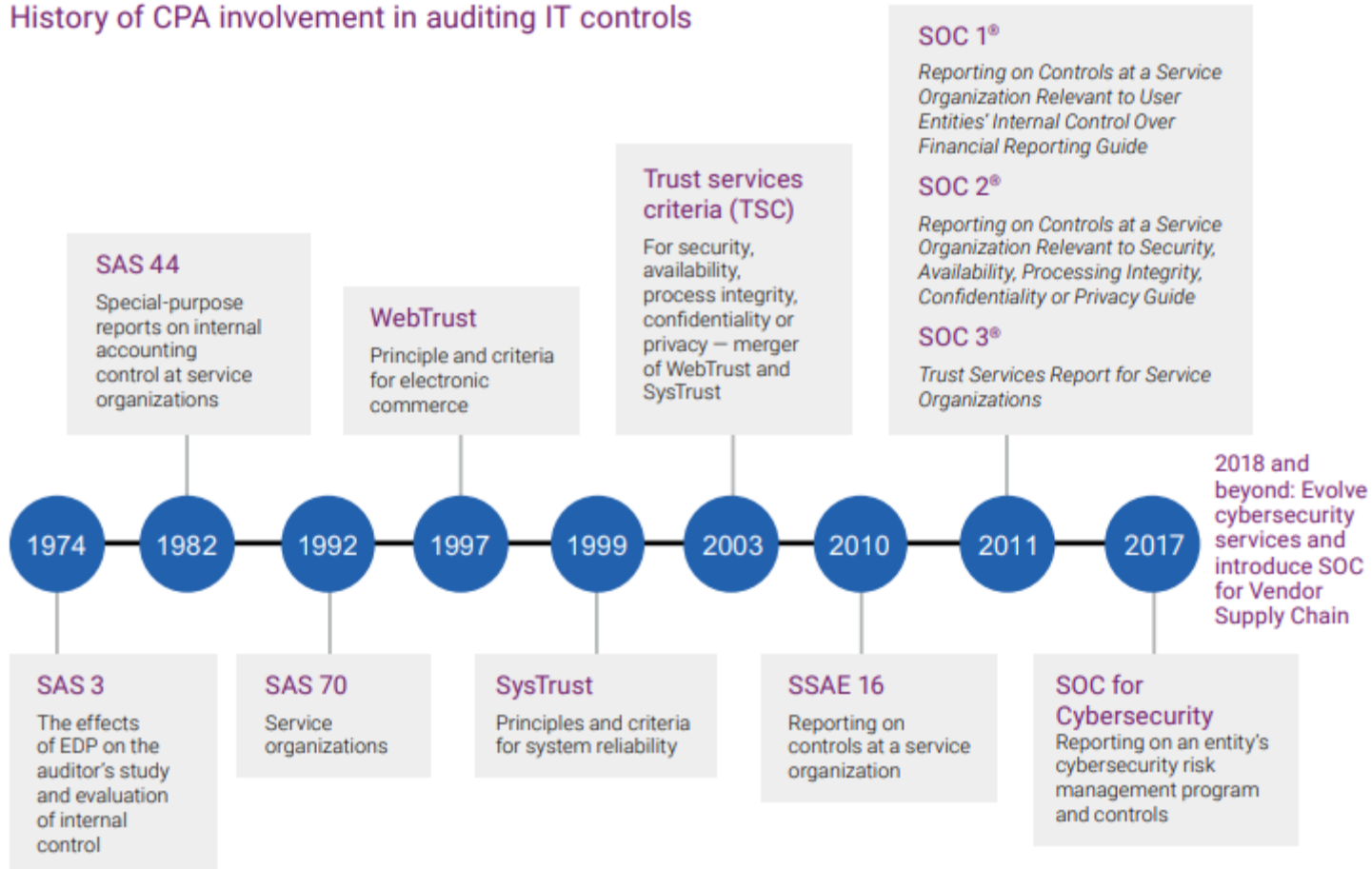
vs. Management Description

**Focus on the
Pre-existing
Control Criteria**

**Structuring
Firm-specific
Control Criteria**

Traditional Approach

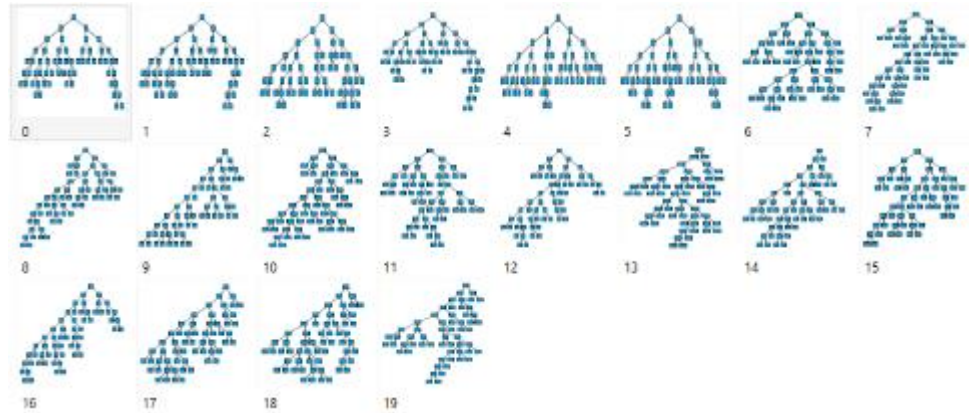
History of CPA involvement in auditing IT controls



Classification

Cybersecurity Risk Classification Tree

Exposed
Data



Actual Exposure

Breached Data Tree

Classification Tree

Broader Contents

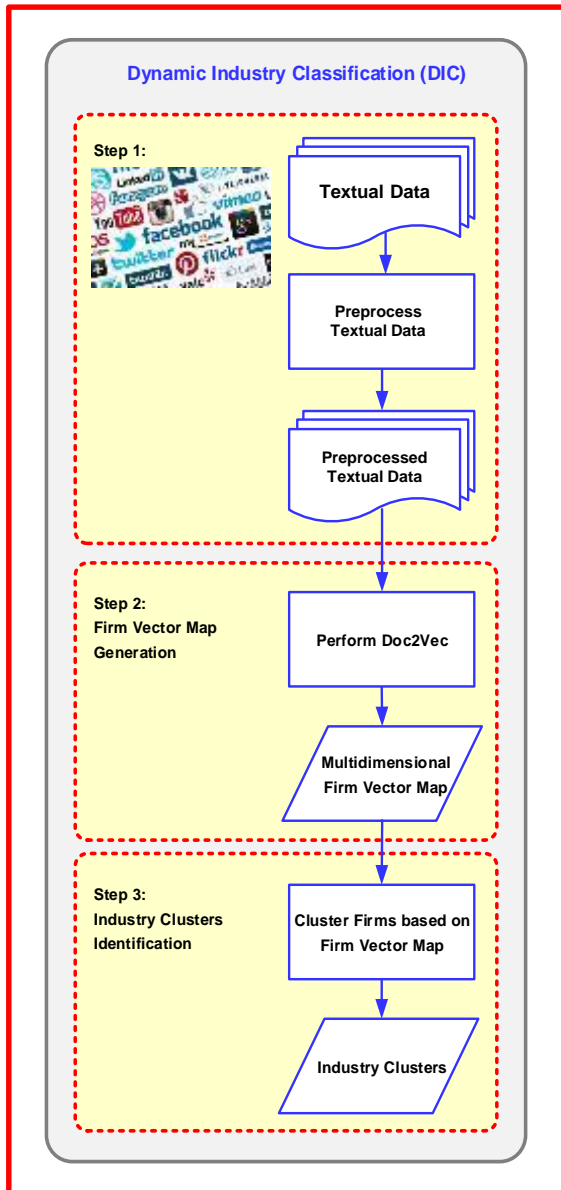
Risk Description


Risk Severity

Relevant
Control

Litigation Cost

Peer Group Analysis





SIC: 5961 (Retail-Catalog & Mail-Order Houses)

2013: Retail	2014: Platform	2015: Cloud Service
Target	Twitter	Alphabet
eBay	eBay	Adobe
Walmart	Apple	Microsoft

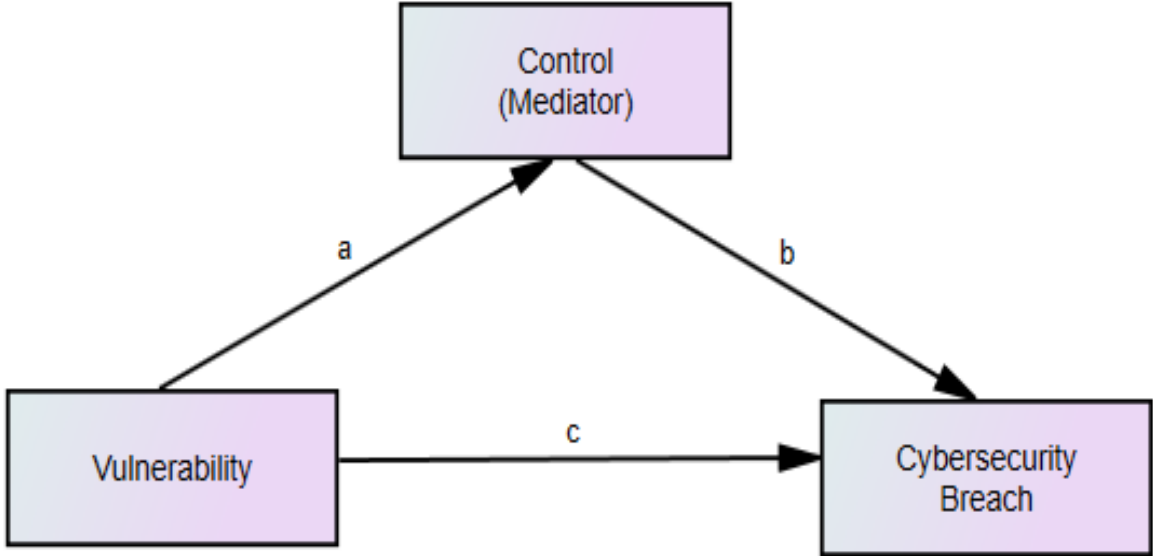
Risk Identification

3rd Party Risk Monitoring	Business Activities
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Mapping with control

General Control	Specific Control
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Dynamic Control Assessment



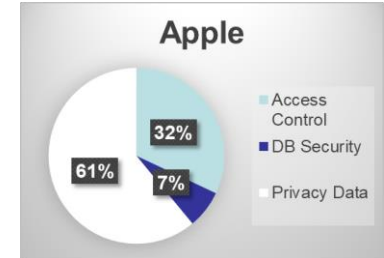
Vulnerability
Risk Assessment
Risk Type
Risk Severity

Control
Dynamic Control Criteria
Mapped Control

Cybersecurity Breach
Opinion
Materiality
Controllability

Informativeness of Cybersecurity Risk Disclosure

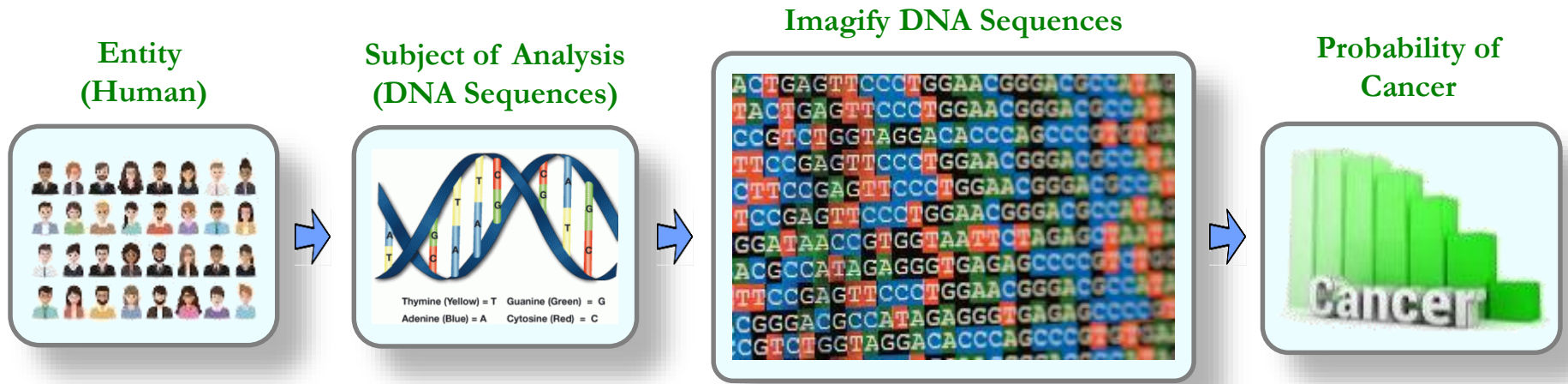
Multicollinearity



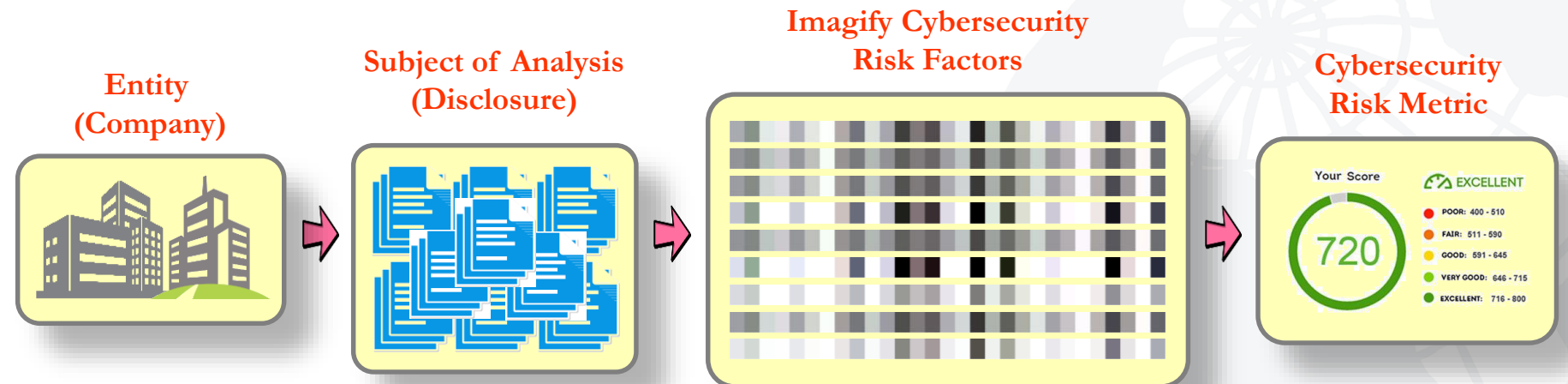
	$\vec{\lambda}_2: 22\%$		
Access Control DB Security Privacy Data	$\vec{\lambda}_1: 21\%$	<	$\vec{\lambda}_1: 32\%$
	$\vec{\lambda}_2: 22\%$	>	$\vec{\lambda}_2: 7\%$
	$\vec{\lambda}_3: 57\%$	<	$\vec{\lambda}_3: 61\%$
Overall Cybersecurity Score	825 out of 1000	?	739 out of 1000

Regression Analysis ?

Informativeness of Cybersecurity Risk Disclosure

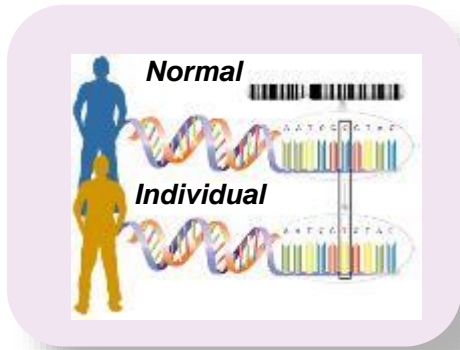


FGA-Google DeepVariant

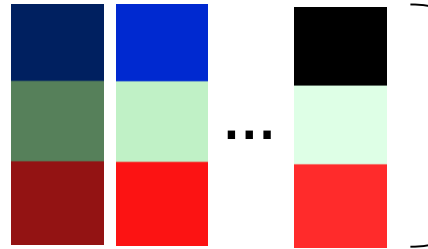


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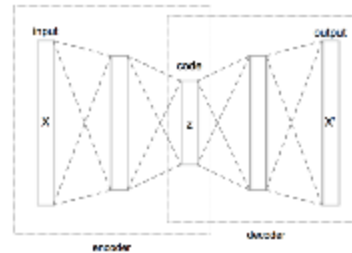
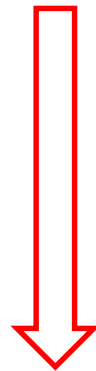
Imagify DNA Sequence



Prob (Cancer)

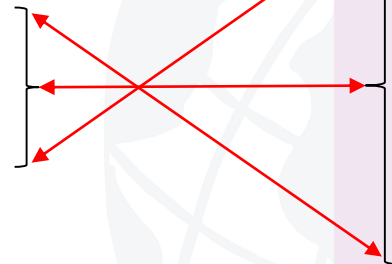


Images of Non-breached Firms



Autoencoder
(Semi-supervised)

Normal
Pattern of
Risk Image



Cybersecurity
Risk Metric

87.9%



amazon