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splunk>

## Combating Human Trafficking Using Analytics

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### Human Trafficking

"The recruitment, transportation, transfer, harbouring, or receipt of persons by means of threat, force, abduction, fraud, deception, or abuse of power and giving or receiving payments or benefits to exert control over another without their consent for the purpose of exploitation."



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### Human trafficking by numbers



**45.8** million victims currently enslaved



**\$150** billion worldwide annually



**2nd** most profitable crime globally



**11,096** prosecutions in 2018



**7,481** convictions in 2018



**85,613** victims identified in 2018



Leverage Al and advanced analytics to identify patterns and categorize massage parlors based on risk scores developed utilizing various attributes like locations, activities, staff, services offered, online reviews, online ads and imagery.



9,000+

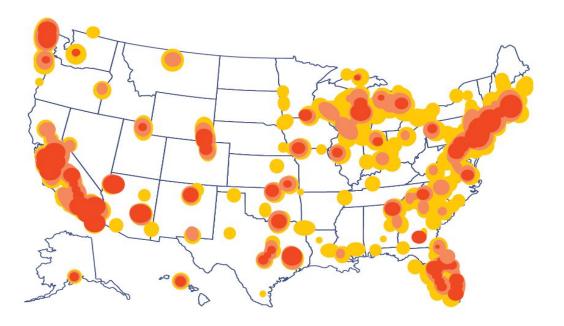
Illicit massage business currently open for business in America



**~\$2.5** Billion annual

revenue

#### **Illicit Massage in the US**



Source: "Human Trafficking in Illicit Massage Businesses," Polaris. 2019.



### Artemis

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|------|---|
| C fe |   |

Automated human trafficking content classifier



Rapidly identify risky businesses, individuals, ads, and reviews



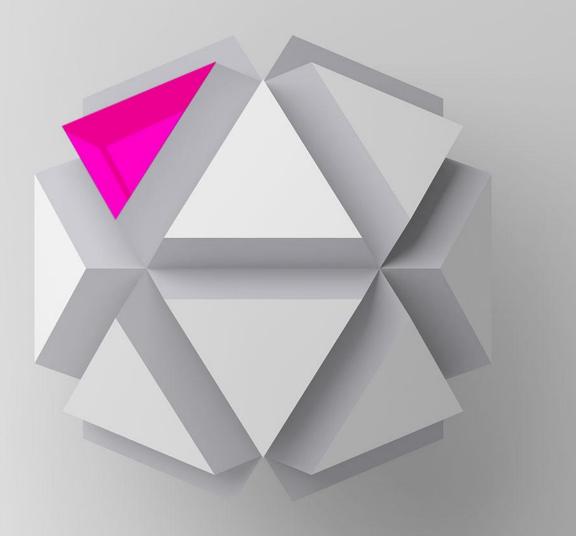
Assist partners mitigate risk and liability



Transparent risk classification

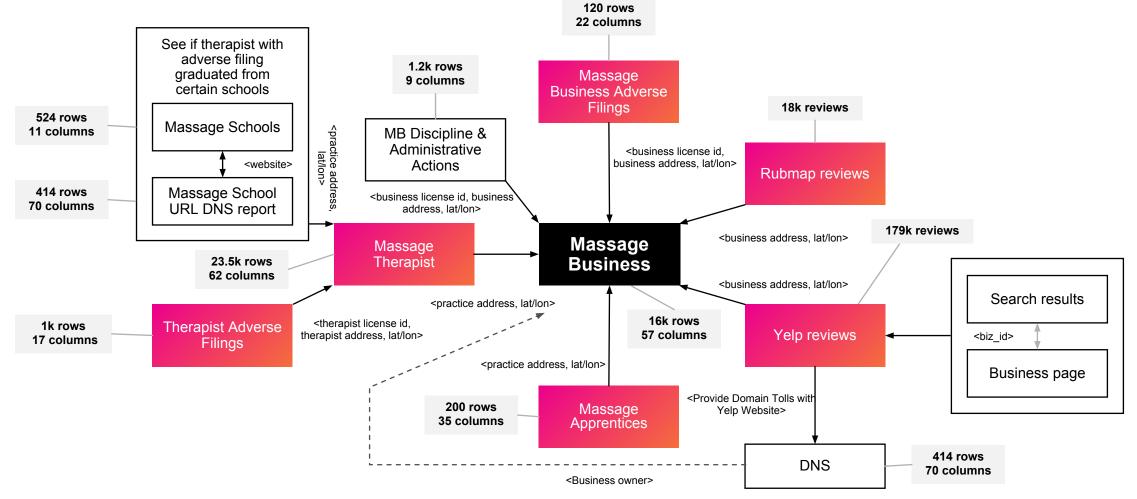


Scalable solution





### Artemis data map



See if the DNS are registered by the same person and if it matches with the MBs



### **Data & modeling workflow**

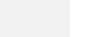
#### Raw data

- Yelp reviews
- Rubmap reviews
- Massage parlors info
- Massage Therapist info
- Massage School info
- Arrest/Conviction charges against Massage Therapist and Massage parlors

#### **Data engineering**

 Ingest data into Splunk and run Google Map API to retrieve lat/lon as universal join key across data sets

splunk>



• Clean and Profile the Data

**Data Profile** 

& Feature

- Create Feature Vector which could be added to vector from Text model and used in classification model
- Python Libraries for Feature Engineering-sklearn, numpy, Pandas, Matplotlib

Jupyterhub

- ELMoBERT

• LDA

GloVe

Word2vec

- Flair
- Python libraries for Text Analytics- NLTK, Gensim, Spacy, TensorFlow

**Text Analytics** 

Remove punctuations,

spaces, Stop words

On Reviews

tokenization

**Pre-process &** 

Lemmatization

**Topic modeling &** 

word embedding

Tokenization

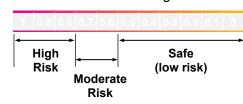




#### Classification

- Random Forest
- Logistic Regression
- SVM
- Keras (CNN)
- Python libraries for Classification- Sklearn, Keras

Output **Risk scores for Massage Parlors** 



Jupyterhub

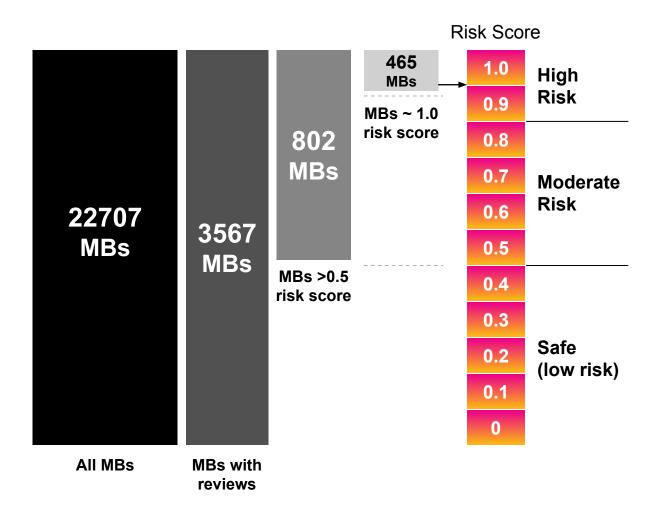
#### Visualization

The integration between Splunk and Graphistry delivers a fully interactive link analysis across all Massage parlors. This will allow to quickly identify how risky massage parlors are linked to other massage parlors, therapist and massage schools.

graphistry splunk≻



### **Final outcome**



### The top 10 businesses likely engaging in human trafficking

|                     | max_prob_all |            |        |                  |
|---------------------|--------------|------------|--------|------------------|
|                     | _reviews_for |            |        |                  |
| mb_norm_id          | _MB          | HT_max_lex | _score | HT_avg_lex_score |
| 26.15940:-80.25681# | 1            |            | 24     | 2.05             |
| 27.94875:-82.50614# | 1            |            | 23     | 3.14             |
| 26.19005:-80.11256# | 1            |            | 21     | 1.9              |
| 28.65647:-81.33989# | 1            |            | 18     | 2.25             |
| 26.09685:-80.13689# | 0.99997      |            | 17     | 4.75             |
| 27.94514:-82.51678# | 1            |            | 17     | 2.82             |
| 28.04587:-82.73772# | 1            |            | 17     | 1.37             |
| 28.55342:-81.35795# | 1            |            | 16     | 2.79             |
| 26.19038:-80.10438# | 1            |            | 16     | 2.29             |
| 28.37833:-80.60498# | 1            |            | 16     | 1.09             |
|                     |              |            |        |                  |

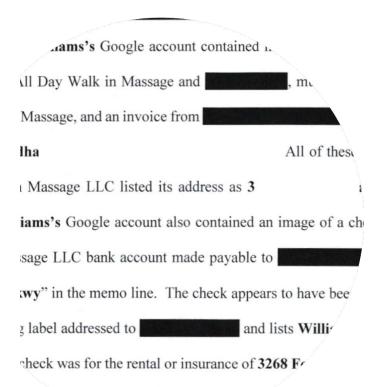
They have a nice selection of pretty chicks. My usual girl Candy wasn't there so I decided to get Mimi. Her legs were beautiful and toned and she had about some prett<sup>1</sup> Vimi came in the room once I was settled, d laying on my stomach. She started my massage by rubbing my teet first, then moving up to my nd last my back and shoulders. I enjoyed when she rubbed on my ecause her hands were soft and she had a firm way of doing the massage. When I flipped around, we agreed on getting straight to s

\_. She grabbed a \_\_\_\_\_\_ and rolled it down on me before sticking every inch of m' \_\_\_\_\_\_ (inside of her mouth. She me like I was the last supper. When she was done sucking, she told me she wanted to do I \_\_\_\_\_\_. She laid on the table and I put her legs up in the air. I stuck m \_\_\_\_\_\_ inside of her tight wet [ and went to work.









| Asian Full Body Deep Tissue Massage \$40 1/2hr \$60 1hr \$90/90min | \$20 Table Shower | Free Hot Stones | Hot Towels | All Natural Organic Chinese Oil | Couples Massage | 4 Hands Massage | Swedish Massage | Shiatsu Massage | All Of Our Licensed Staff Are Certified Oriental Tui Na Masters | Fresh Linen | Super Clean



### **NLP: Illicit Reviews**

#### 26.30681:-80.09441#

Sorta strange encounter back Florida business wanted challenge adventure picking relatively unknown spa well shoulda stuck usual haunts floida business saw ad bp never seen majestic Asian spa Japanese spa thought would check thinking might totally refreshing discovery brand spanking new spa mamas an Taiwan said girl Japanese im sure heard short conversation Chinese guess possible girl Japanese spoke Chinese anyway girl utterly devoid English language English words heard "sorry sorry" understanding word said even understand question "what name" repeated several times one time asked name drew diagram looked sorta like Japanese Chinese character much name sorry guys new game skills rough first thought knew nothing massage felt might training started hard massage total lack English understand wanted lighten never smiled kept going hard massage sensitive sensitive right way kissing yet seemed trying innocent best good job shes nearly ready prime time especially lack English idea girls would go back try different girl girl easily undressed good sign others may would good another monger try place report finding

| 0 | 2 King - Denotes ownership of trafficked victims                         |   |  |
|---|--|---|--|
| 0 | 0 (rose) currency  |   |  |
| 0 | 2 (cherry) Describing a younger/underage victim                          |   |  |
| 0 | 0 (69) where both partners perform                                       | simultaneously  |  |
| 0 | 2 Queen - Trafficked victim  |   |  |
| 0 | 0 No/Forbidden   |   |  |
| 0 | 2 (airplane) "new in town" - Indicative of movement of trafficked victim |   |  |
| 0 | 2 Sparkling new  |   |  |
|   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                                     | 00 (rose) currency02 (cherry) Describing a younger/underage victim00 (69)02 Queen - Trafficked victim00 No/Forbidden02 (airplane) "new in town" - Indicative of movement of |  |



### **Ex-Boca spa owner pleads guilty** in prostitution sting, avoids lengthy prison sentence

| Place Of Birth (City/State/Country)   | a Date Of Birth (Month/Day/Yea                 |                                       |
|---------------------------------------|--|---------------------------------------|
| Race And Netional Ørigin              | Caucasian                                      | Hispanic                              |
| Native American Black                 | G Oriental                                     | Other:                                |
| Physical Description: (Color of Eyes) | (Color of Hair)<br>Black                       | (Height) 5 1, (Weight)<br>5 5 120 LBS |
| (Other Means of Identification)       | (Oriver's License Number)<br>2000-940-63-749-0 |                                       |



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### Our team

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