SOCIAL MEDIA HEALTHCARE ANALYTICS

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ANALYTICS

EVERYONE IS AN ANALYST

SMALL SILOS

- Small silos of analytics expertise
- Limited data needed
- Primarily desktop based

EVERYWHERE

- All People
- All Data
- Enterprise Wide

Lack of consistency and sharing
Need for governance
Duplication of effort

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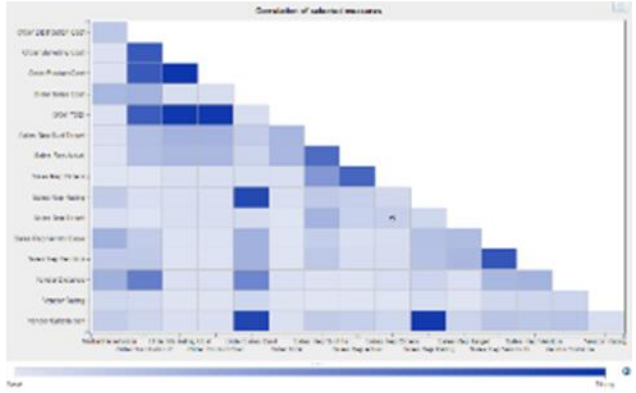
BI/VISUALIZATION | CITIZEN DATA SCIENTIST

BI

- IT centric
- Architecture driven
- Static and slow

Data Visualization



- User centric
- Exploration
- Dynamic

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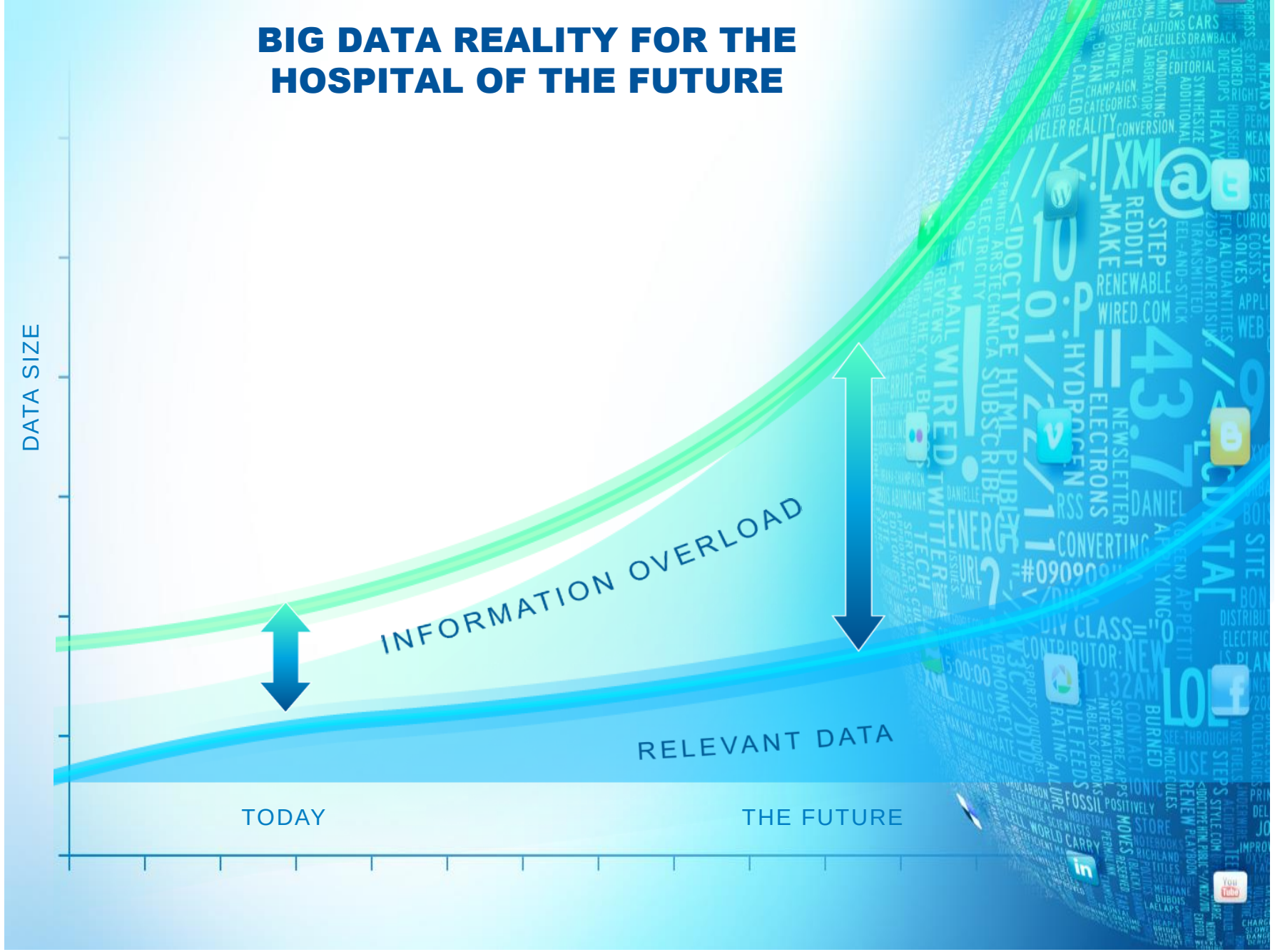
BIG DATA REALITY FOR THE HOSPITAL OF THE FUTURE

- EMR & HIS
- Unstructured Text & Voice
- Device Generated
- Finance
- Operational
- Environmental
- Social Media
- Research
- Staffing



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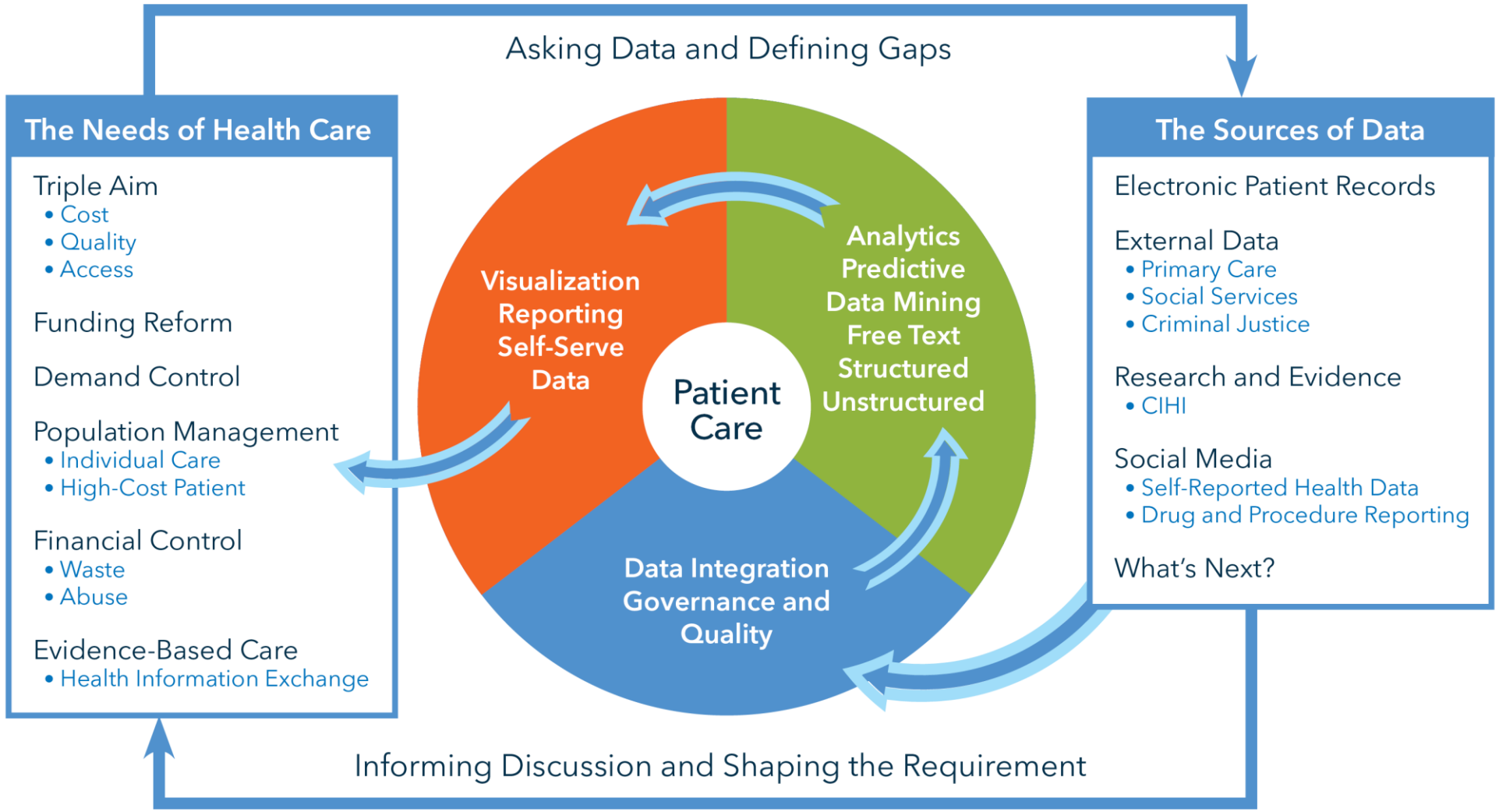
The Who, What, Where and Why of Health Analytics



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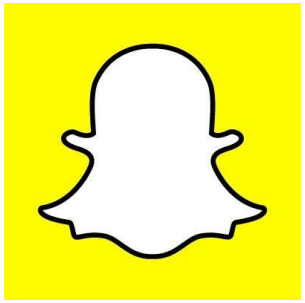
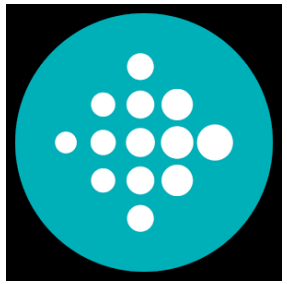
ANALYTICS | DATA SOURCES

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COLLABORATE ENABLING ANALYTICS ACROSS HEALTH CARE STAKEHOLDERS

MOBILE

COLLABORATION APPLICATIONS

DESKTOP APPLICATIONS

WEB

VISUALIZATIONS **REPORTS** **DASHBOARDS** **COMMENTS** **INSIGHTS**

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THE CHALLENGE

- What proportion of Canadian youth (13-17) post about their mental health, and describe experiencing bullying or suicidal thoughts in the past 12 months on social media?

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SOME RESULTS

- 1.1M tweets by teens (13-17 years old) in English language
- In Canada between Jan 6 – Jan 13, 2016

- Topics
  - Feelings: 106k ≈ 10%
  - Bullying: 11k ≈ 1%
  - Suicide: 382 ≈ 0.035% of tweets
- 39% correlation between suicide and bullying
- 12.7% of authors have tweeted at least twice about suicide

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PROCESS

1. Download tweets made in Canada within a specific time frame
2. Detect language and filter English (SAS Contextual Analysis)
3. Score tweets by age and filter 13-17 year olds (SAS Enterprise Miner)
4. Tag tweets by topic (family, bullying, school, suicidal thoughts, feelings, …) (SAS Contextual Analysis)
5. Visualization (SAS Visual Analytics)
   - Relationship between topics
   - Contextual analysis of specific topics

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can someone with my number please text me because i have nobody to talk to and i just want to hut myself so badly and i’m scared

my own father told me I deserved being killed. I hate him

there's not one day I don’t think of killing myself

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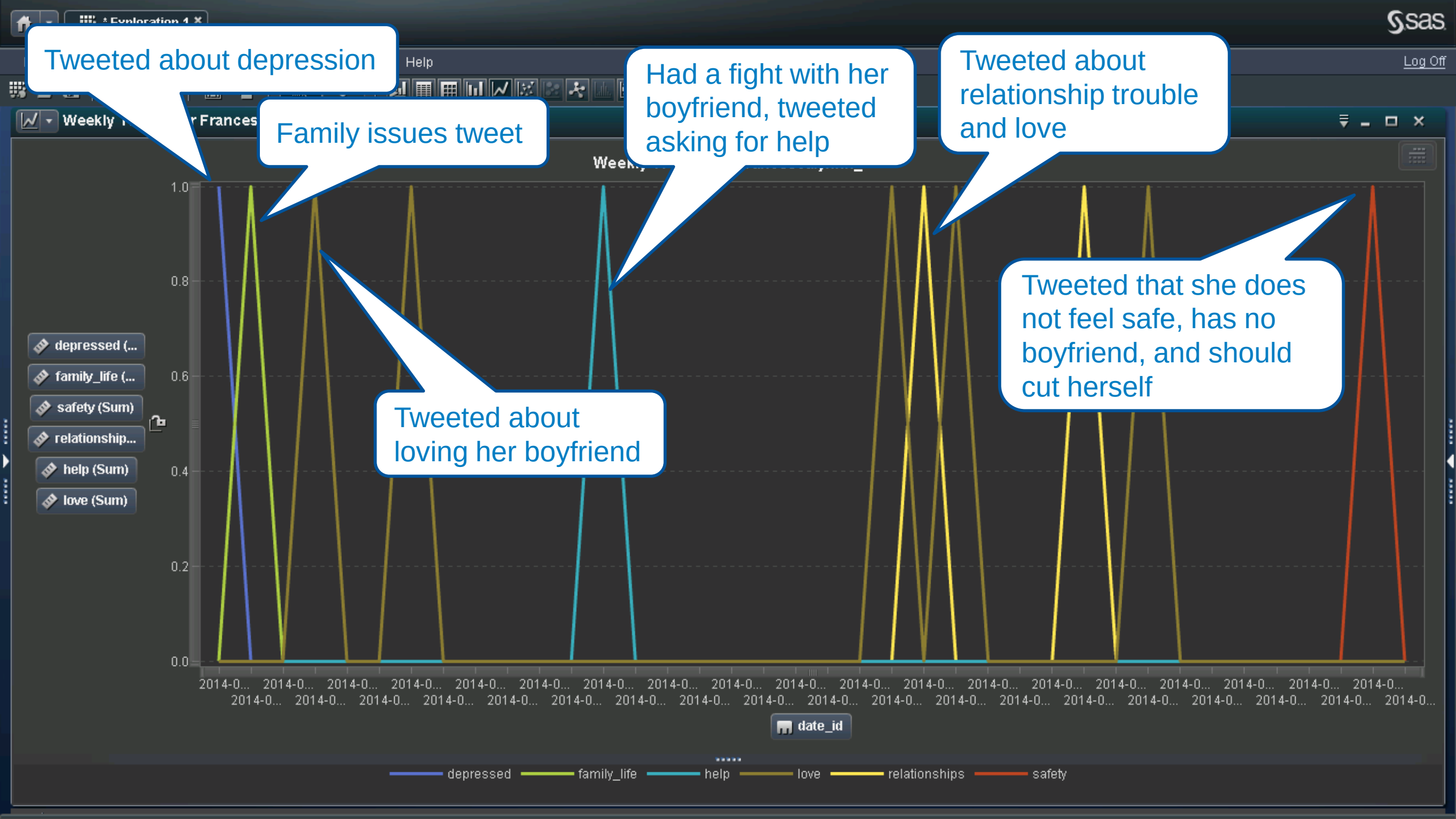
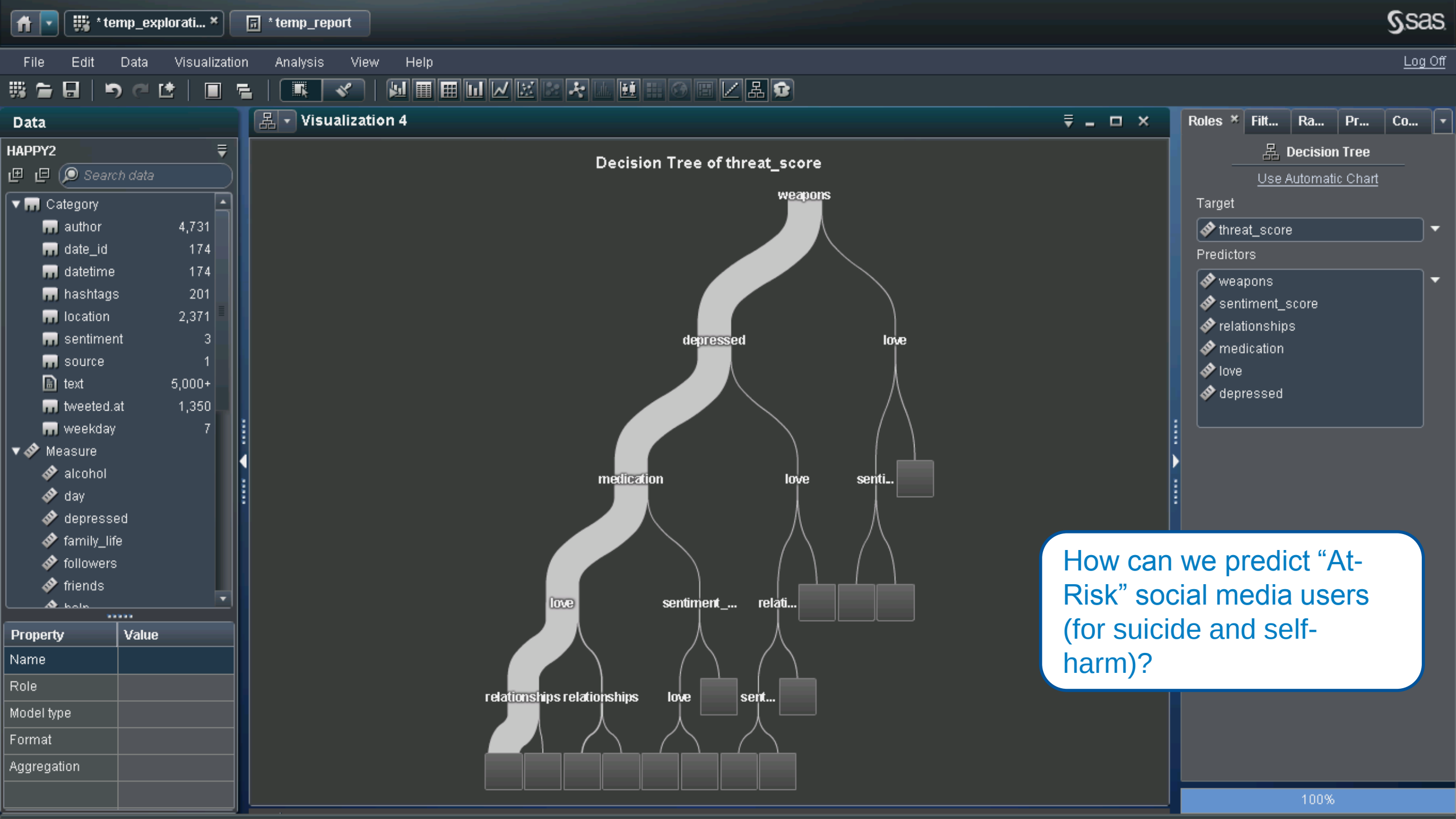

Tweeted about depression
Family issues tweet
Had a fight with her boyfriend, tweeted asking for help
Tweeted about relationship trouble and love
Tweeted about loving her boyfriend
Tweeted that she does not feel safe, has no boyfriend, and should cut herself
depressed (...
family_life (...
safety (Sum)
relationship...
help (Sum)
love (Sum)
1.0
0.8
0.6
0.4
0.2
0.0
date_id
depressed
family_life
help
love
relationships
safety


* temp_explorati...
* temp_report
File
Edit
Data
Visualization
Analysis
View
Help
Log Off
Data
HAPPY2
Search data
Category
author 4,731
date_id 174
datetime 174
hashtags 201
location 2,371
sentiment 3
source 1
text 5,000+
tweeted.at 1,350
weekday 7
Measure
alcohol
day
depressed
family_life
followers
friends
Property
Value
Name
Role
Model type
Format
Aggregation
Visualization 4
Decision Tree of threat_score
weapons
depressed
love
medication
love
senti...
love
sentiment_...
relati...
relationships
relationships
love
sent...
Roles
Filt...
Ra...
Pr...
Co...
Decision Tree
Use Automatic Chart
Target
threat_score
Predictors
weapons
sentiment_score
relationships
medication
love
depressed
How can we predict “At-Risk” social media users (for suicide and self-harm)?
100%

DATA SOURCES & METHODOLOGY

Web-Based Media Sources

- Forums
- Chat Rooms
- Face Book
- Twitter
- Documents/Narrative

Data Aggregation and Analysis Methods

- Web/Document Crawling
- Bag of Words Approach
  - Statistical/Mathematical
- Natural Language Processing
  - Dictionary/Taxonomy/Ontology
- Sentiment Analysis
- Predictive Model Building

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FURTHER METHODOLOGY

Clustering

- Let maths decide topics
- Best for exploring data
- Manual refinement and topic labeling

Classification

- Humans decide topics of interest
- Automatic refinement using algorithms
- Best if you have a starting point on what to look for

Get more data

- Partnering with Twitter/Facebook/Snapchat
- Partnering with Demographical institutions/police reports
- Building predictive models for analyzing risk

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SOLUTION FRAMEWORK

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HOW DO WE MANAGE DATA IN THE PHYSICAL WORLD?

1. Acquire

2. Determine Relevance

3. Store

Trash

Cache

Storage

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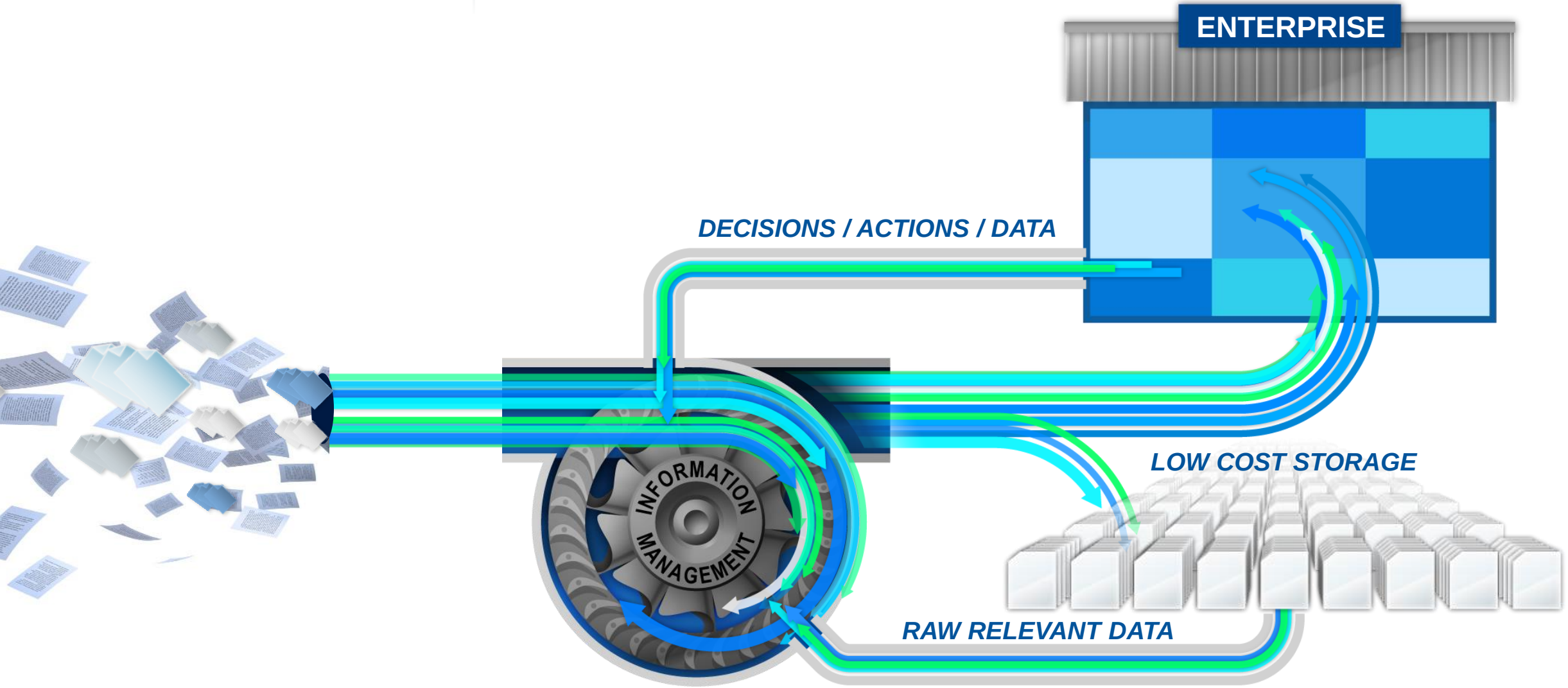
How to ingest TONS of DATA

Stream It, Score It, Store It



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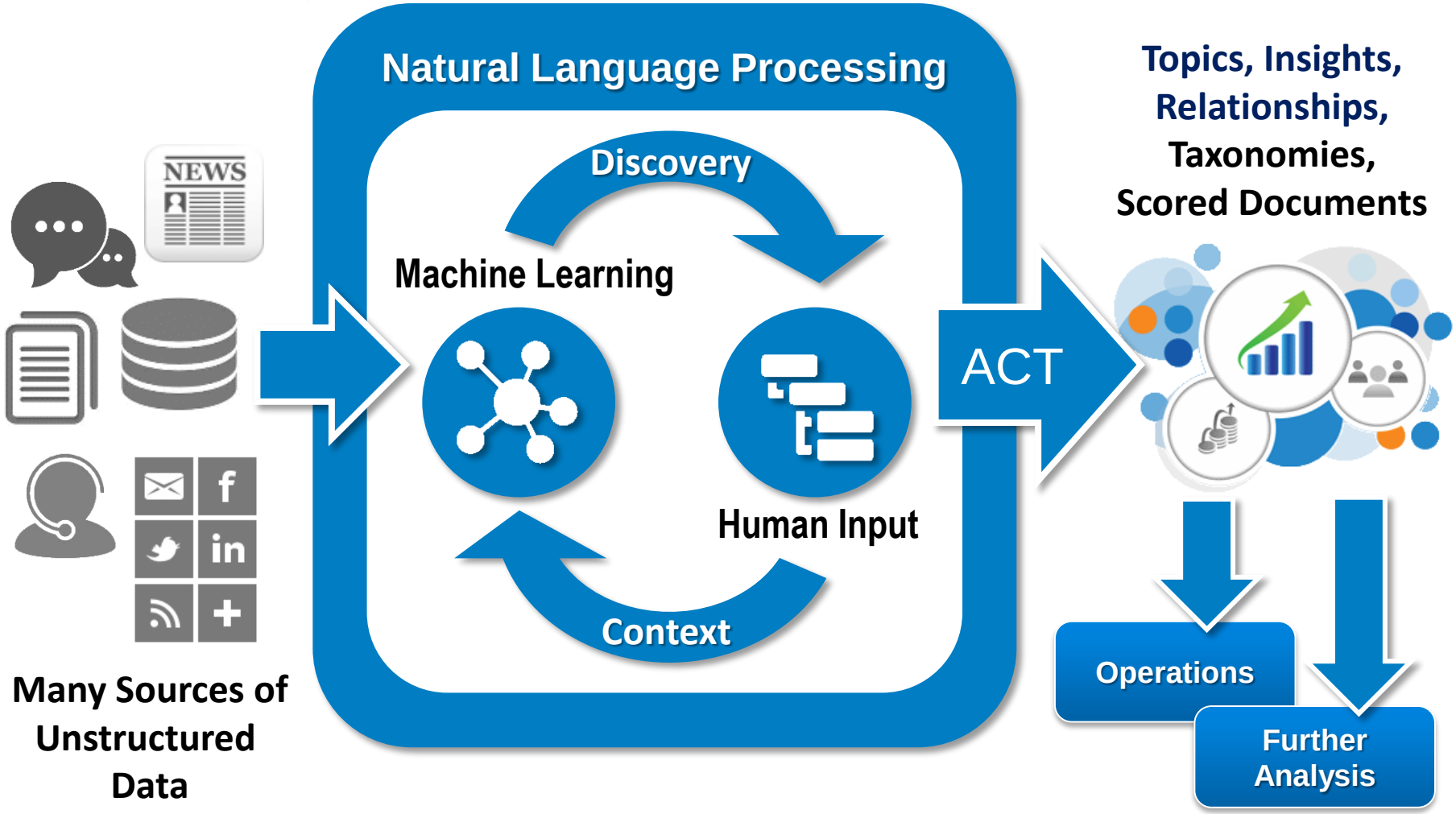
The SAS Aproach



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Questions

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