Thinking Big: Web Scale AI

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Cycorp Europe

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March 13th 2009

Mortgage Financing

Patent & Other Rights

Computer File System Management

Management

Traffic Management

Derivative Risk Management

Tracking Scientific Literature

…etc

Overwhelming Problems

Who's online: Limits to power

Human knowledge evolution

People
- Knowledge in minds
- Transfer by speech, sketches

Texts
- Knowledge in books
- Transfer by visiting libraries, public readings

Texts 2.0
- Knowledge in mass market books, films, newspapers, journals, television, radio
- Transfer by replication, broadcast

Web 1.0
- Knowledge in Web pages, pdf/ps files, passive DBs, some audio
- Transfer by authoring then browsing, searching

Web 2.0
- Knowledge in fluid constructs (wikis, complex evolving DBs/RDF stores, blogs, social network pages) , web services across all media, distributed across many sites.
- Transfer by collaborative construction, active notification, alerts, SMSs, social notification, mash-ups …

Web 3.0
- Knowledge understood by the web (KBs, probabilistic KBs, semantically enhanced texts, DBs, services)
- Transferred by assistive, cooperative software that understands users needs, desires, limitations, and assembles/derives the right knowledge services

Scarce

Abundant

Overwhelming

Introduction to Cyc

What's it for?

Logistics

OpenCyc (Current): [http://sw.opencyc.org/concept/Mx4r8qkxXAW-QdmV1JNL5SFyIA]
OpenCyc (Versioned): [http://sw.opencyc.org/2008/06/10/concept/Mx4r8qkxXAW-QdmV1JNL5SFyIA]

Search

OpenCyc Collection: shipping container

Unique ID: [Mx4r8qkxXAW-QdmV1JNL5SFyIA]
English ID: [LargePortableCargoContainer]
English Aliases: ["cargo container", "cargo containers", "portable cargo container", "portable cargo containers", "shipping containers"]

A specialization of StorageConstruct. Each instance of LargePortableCargoContainer is a large (usually about 40' x 8' x 8') metal container used for shipping large quantities of goods across land (e.g., on a large truck) or overseas (e.g., on a cargo ship).

A Type of: storage device

Instance of: spatially disjoint object type, type of object

Subtypes:

Instances:

Same as:
http://umbel.org/umbel/sc/LargePortableCargoContainer

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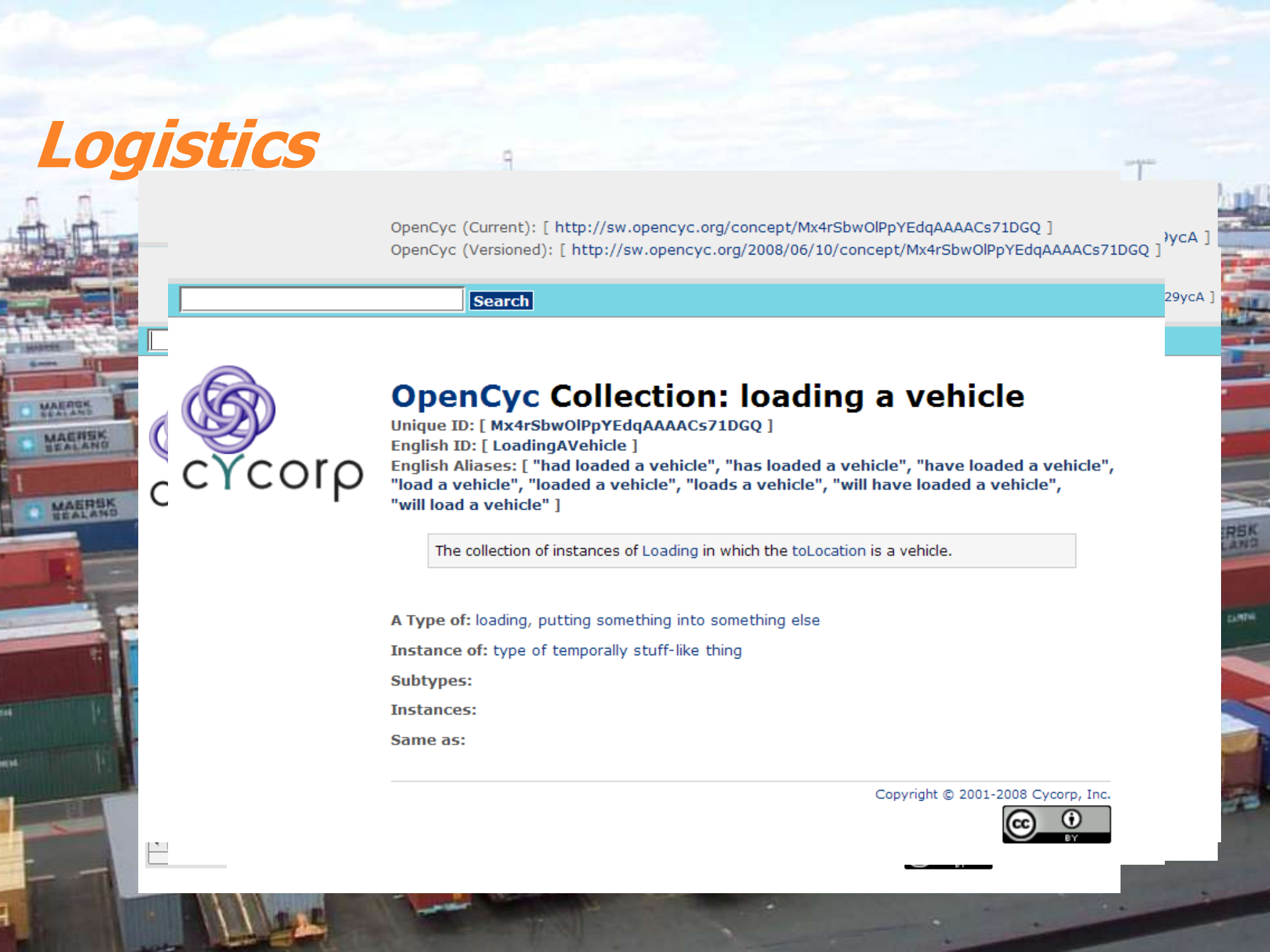
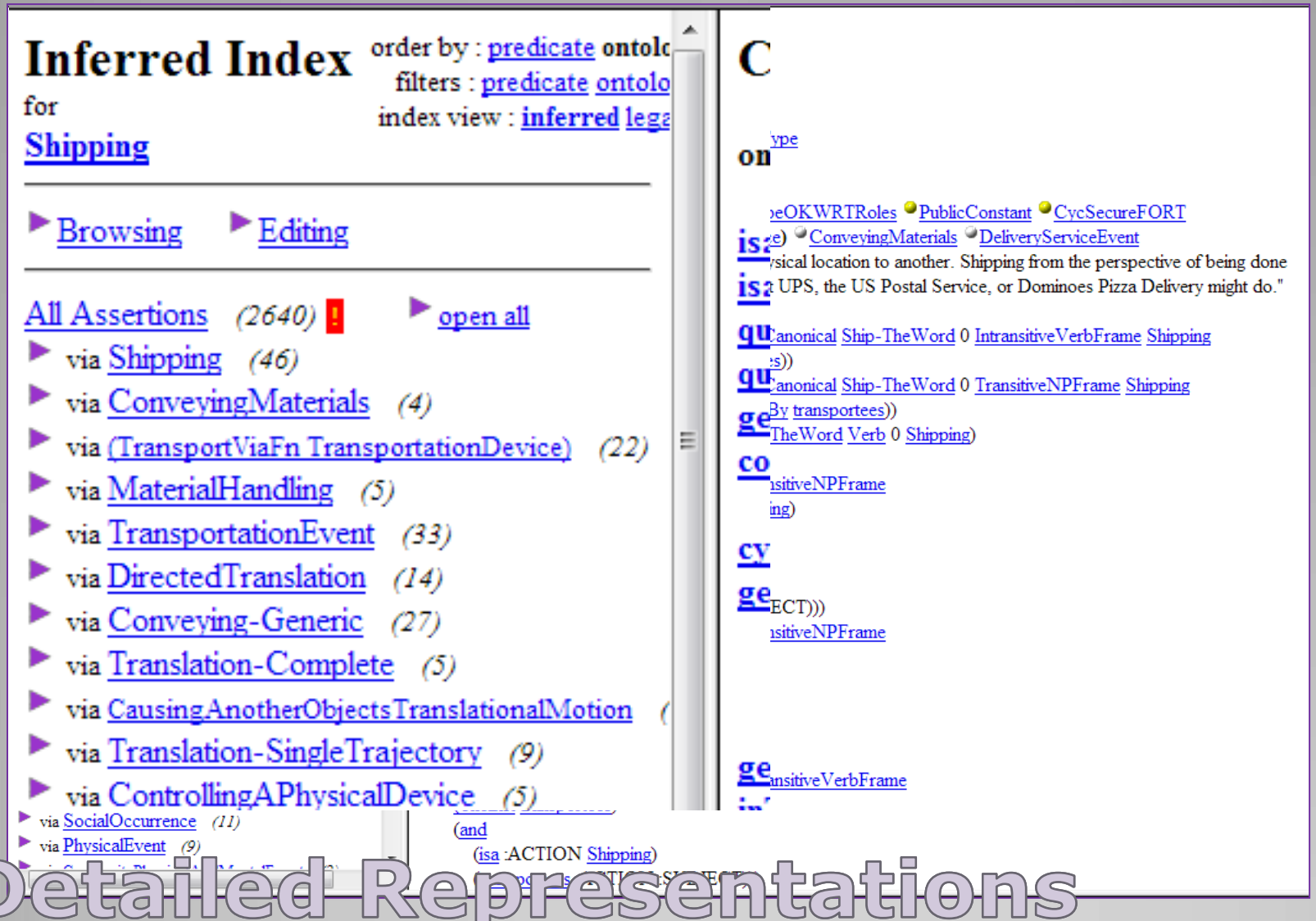
Logistics


OpenCyc (Current): [http://sw.opencyc.org/concept/Mx4rSbwOlPpYEdqAAAACs71DGQ]
OpenCyc (Versioned): [http://sw.opencyc.org/2008/06/10/concept/Mx4rSbwOlPpYEdqAAAACs71DGQ]
Search
cYcorp
OpenCyc Collection: loading a vehicle
Unique ID: [Mx4rSbwOlPpYEdqAAAACs71DGQ]
English ID: [LoadingAVehicle]
English Aliases: ["had loaded a vehicle", "has loaded a vehicle", "have loaded a vehicle", "load a vehicle", "loaded a vehicle", "loads a vehicle", "will have loaded a vehicle", "will load a vehicle"]
The collection of instances of Loading in which the toLocation is a vehicle.
A Type of: loading, putting something into something else
Instance of: type of temporally stuff-like thing
Subtypes:
Instances:
Same as:
Copyright © 2001-2008 Cycorp, Inc.



Detailed Representations

Intelligent Search

Valve Surgery

Search

Semantic Search Results

Intelligent Search

heart valve repair Search

Semantic Search Results

A. Marc Gillinov, M.D.
A. Marc Gillinov, M.D. Specialties: Minimally invasive mitral valve, aortic valve, and tricuspid valve surgery; mitral valve repair, surgical... Gillinov, M.D. has performed 125 heart-valve repair operations at
http://tomcat/html-content/gillinov_GillinovHeartValveRepair.html (cached)

Valve Disease
AV Repair or Replace + Other AV Repair o
Replacements AV = Aortic
http://tomcat/html-content/Valve_Disease_

Nicholas G. Smedira, M.D.
Nicholas G. Smedira, M.D. Specialties: He
replacement, off-pump coronary artery byp
http://tomcat/html-content/smedira_.html (

Joseph F. Sabik III, M.D.
Joseph F. Sabik III, M.D. Specialties: Adult
surgery, off-pump coronary artery bypass s
http://tomcat/html-content/sabik_.html (cac

Eric E. Roselli, M.D.
Eric E. Roselli, M.D. Specialties: Adult card
and replacement, high-risk valve surger
http://tomcat/html-content/roselli_.html (a

Gosta B. Pettersson, M.D., Ph.
aortic and mitral valve repair/replacemen
http://tomcat/html-content/pettersson_.h

A. Marc Gillinov, M.D.

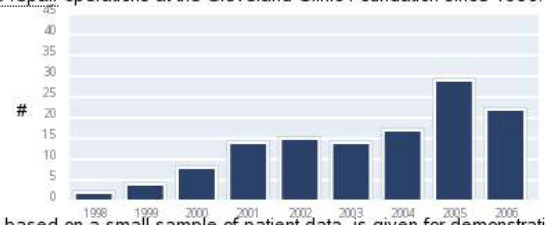
Specialties: Minimally invasive mitral valve, aortic valve, and tricuspid valve surgery; mitral valve repair, surgical treatment and minimally invasive surgery for atrial fibrillation; off-pump coronary artery bypass surgery; and high-risk mitral valve surgery.

Medical Degree: Johns Hopkins University School of Medicine, Baltimore, Maryland

Special Training: Johns Hopkins University School of Medicine, Baltimore, Maryland

A native Clevelander, Dr. Gillinov spent the summers of 1978 to 1980 dividing his time between working at Cleveland Clinic and playing tennis. He still enjoys both activities.

Gillinov, M.D. has performed 125 heart-valve repair operations at the Cleveland Clinic Foundation since 1998.



This graph, based on a small sample of patient data, is given for demonstration purposes only.

Content adaptation: heart valve repair

Intelligent Search

coronary artery Search

Semantic Search Results

A. Marc Gillinov, M.D.
Gillinov, M.D. has performed 316 coronary artery operations at the Cleveland Clinic... invasive mitral valve, aortic valve, and tricuspid valve surgery; repair, surgical treatment and minimally invasive surgery for atrial fibrillation; off-pump coronary artery bypass surgery
http://tomcat/html-content/gillinov_GillinovCoronaryArtery.html (cached)

Nicholas G. Smedira, M.D.
and heart-lung transplantation, ventric
grafting, myectomy, reoperations, an
http://tomcat/html-content/smedira_.h

Gosta B. Pettersson, M.D., Ph
Adult acquired heart disease (includir
complex coronary artery surgery; aort
http://tomcat/html-content/pettersson_

Joseph F. Sabik III, M.D.
Joseph F. Sabik III, M.D. Specialties: A
surgery, off-pump coronary artery bypa
http://tomcat/html-content/sabik_.html

Coronary Disease
Primary isolated CABG refers to a pat
images... excellent long-term patency
http://tomcat/html-content/Coronary_D

Bruce W. Lytle, M.D.
Bruce W. Lytle, M.D. Chairman, D pa
diseases, reoperations, diseases of th
http://tomcat/html-content/lytle_.html (

A. Marc Gillinov, M.D.

Specialties: Minimally invasive mitral valve, aortic valve, and tricuspid valve surgery; mitral valve repair, surgical treatment and minimally invasive surgery for atrial fibrillation; off-pump coronary artery bypass surgery; and high-risk mitral valve surgery.

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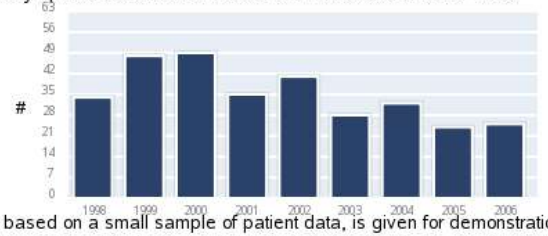
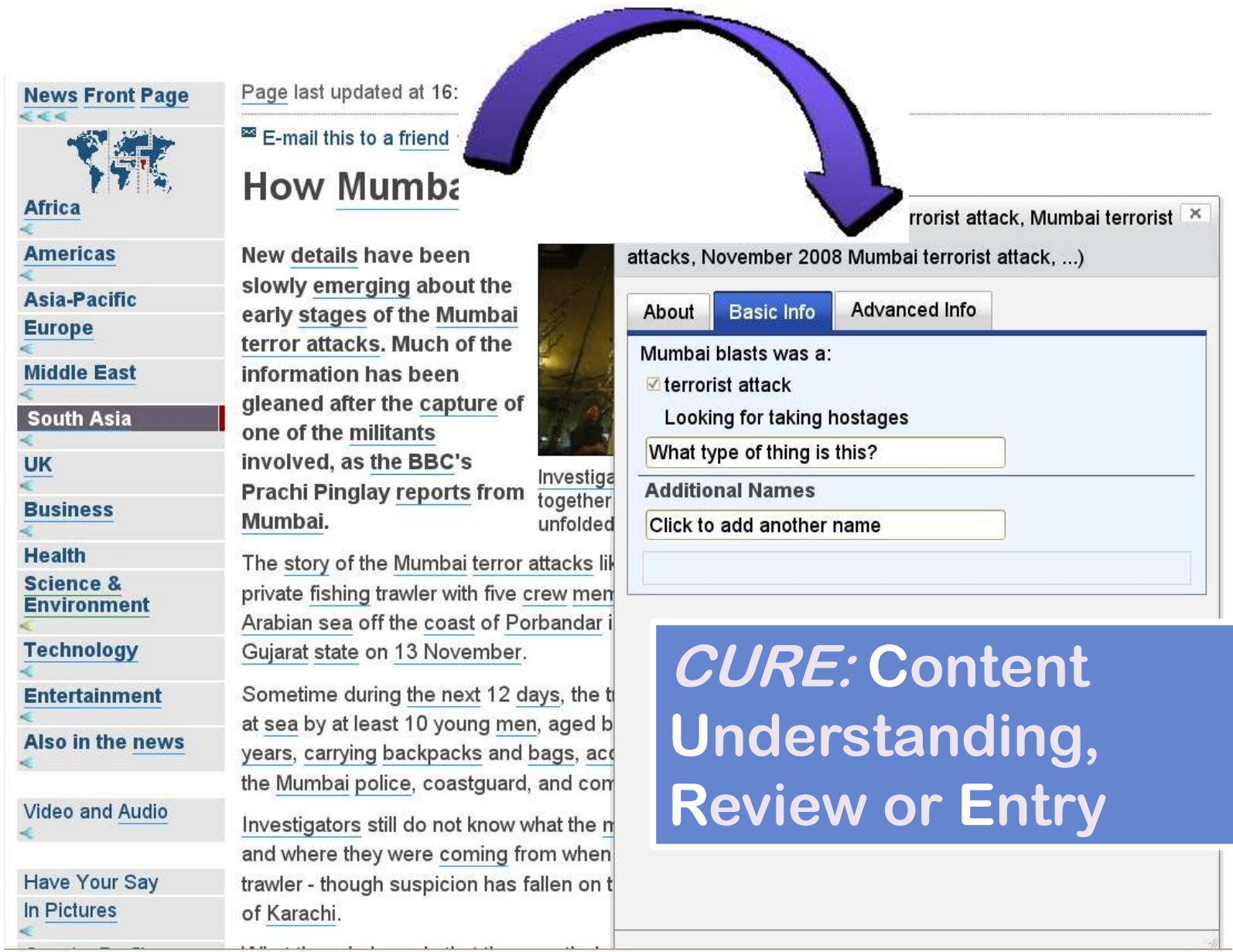


This graph, based on a small sample of patient data, is given for demonstration purposes only.

Content adaptation: coronary artery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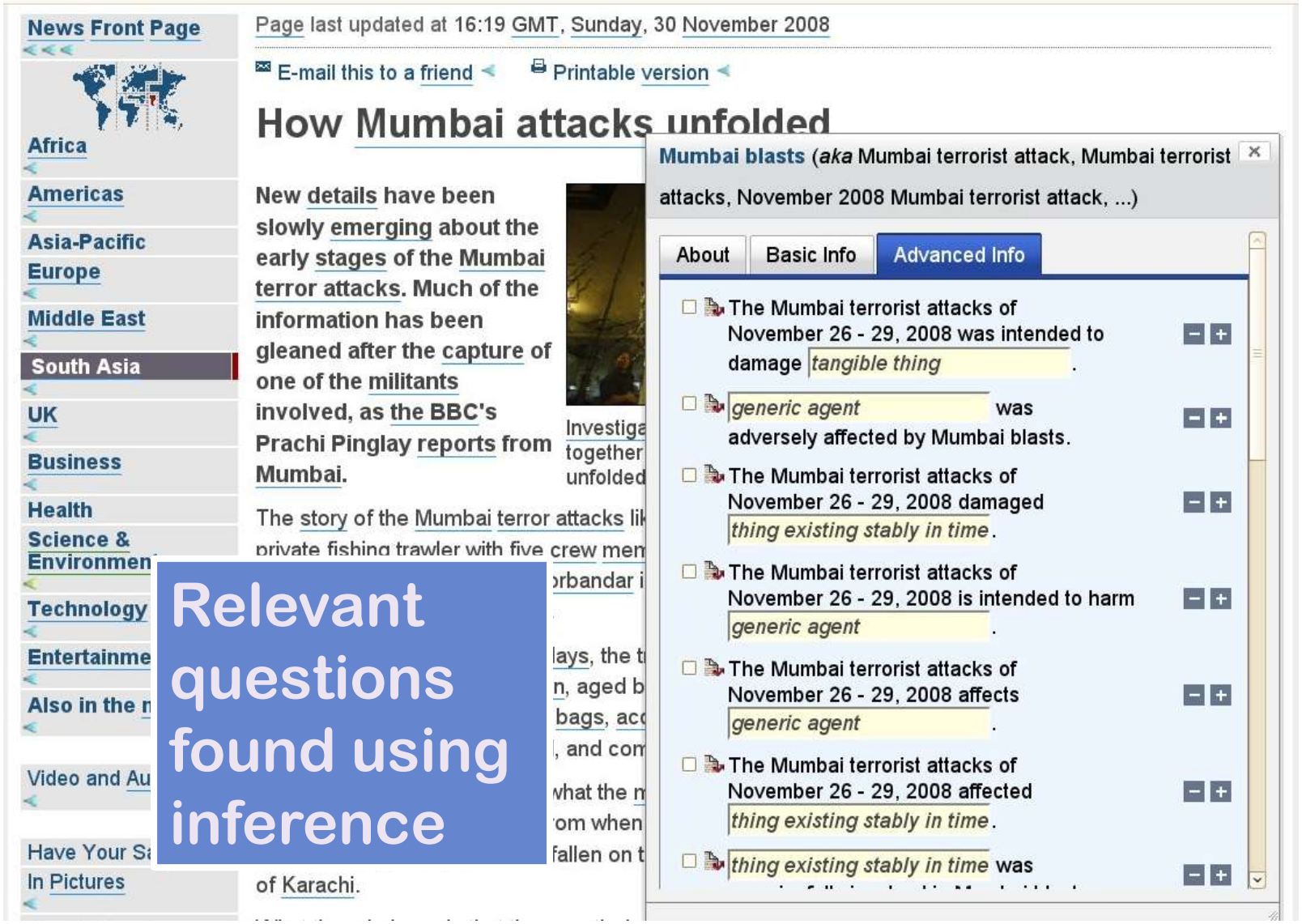
How Mumba
New details have been slowly emerging about the early stages of the Mumbai terror attacks. Much of the information has been gleaned after the capture of one of the militants involved, as the BBC's Prachi Pinglay reports from Mumbai.
Investiga
together
unfolded
The story of the Mumbai terror attacks lik
private fishing trawler with five crew men
Arabian sea off the coast of Porbandar i
Gujarat state on 13 November.
Sometime during the next 12 days, the t
at sea by at least 10 young men, aged b
years, carrying backpacks and bags, acc
the Mumbai police, coastguard, and com
Investigators still do not know what the m
and where they were coming from when
trawler - though suspicion has fallen on t
of Karachi.
rrorist attack, Mumbai terrorist
attacks, November 2008 Mumbai terrorist attack, ...)
About
Basic Info
Advanced Info
Mumbai blasts was a:
terrorist attack
Looking for taking hostages
What type of thing is this?
Additional Names
Click to add another name
CURE: Content Understanding, Review or Entry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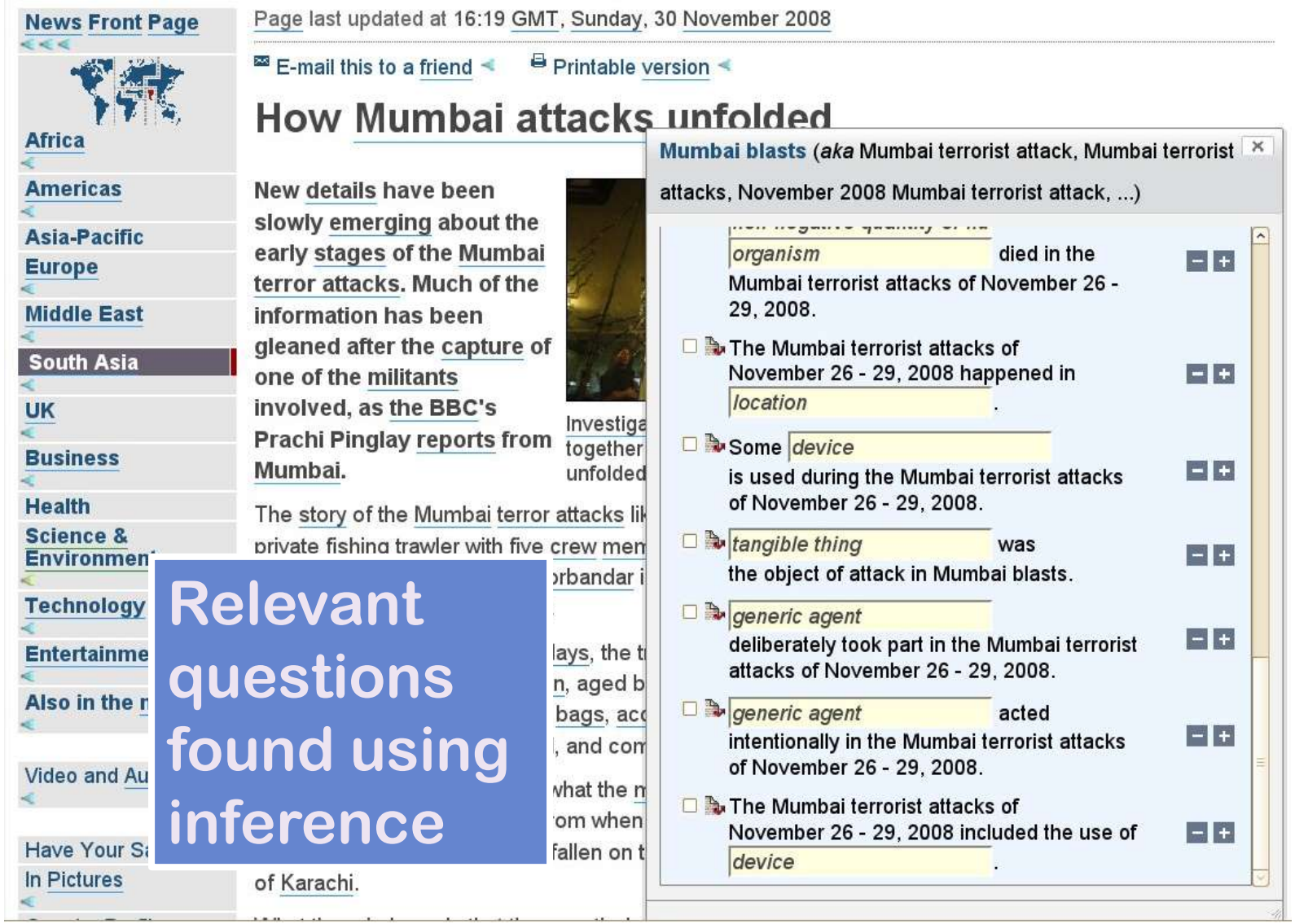
How Mumbai attacks unfolded
New details have been slowly emerging about the early stages of the Mumbai terror attacks. Much of the information has been gleaned after the capture of one of the militants involved, as the BBC's Prachi Pinglay reports from Mumbai.
Investigation together unfolded
The story of the Mumbai terror attacks
private fishing trawler with five crew
Orbandar
days, the
n, aged
bags, acc
, and com
what the
om when
fallen on
of Karachi.
Relevant questions found using inference
Mumbai blasts (aka Mumbai terrorist attack, Mumbai terrorist attacks, November 2008 Mumbai terrorist attack, ...)
About
Basic Info
Advanced Info
The Mumbai terrorist attacks of November 26 - 29, 2008 was intended to damage tangible thing .
generic agent was adversely affected by Mumbai blasts.
The Mumbai terrorist attacks of November 26 - 29, 2008 damaged thing existing stably in time .
The Mumbai terrorist attacks of November 26 - 29, 2008 is intended to harm generic agent .
The Mumbai terrorist attacks of November 26 - 29, 2008 affects generic agent .
The Mumbai terrorist attacks of November 26 - 29, 2008 affected thing existing stably in time .
thing existing stably in time was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of Karachi.
Mumbai blasts (aka Mumbai terrorist attack, Mumbai terrorist attacks, November 2008 Mumbai terrorist attack, ...)
organism died in the Mumbai terrorist attacks of November 26 - 29, 2008.
The Mumbai terrorist attacks of November 26 - 29, 2008 happened in location .
Some device is used during the Mumbai terrorist attacks of November 26 - 29, 2008.
tangible thing was the object of attack in Mumbai blasts.
generic agent deliberately took part in the Mumbai terrorist attacks of November 26 - 29, 2008.
generic agent acted intentionally in the Mumbai terrorist attacks of November 26 - 29, 2008.
The Mumbai terrorist attacks of November 26 - 29, 2008 included the use of device .
Relevant questions found using inference

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New details have been slowly emerging about the early stages of the Mumbai terror attacks. Much of the

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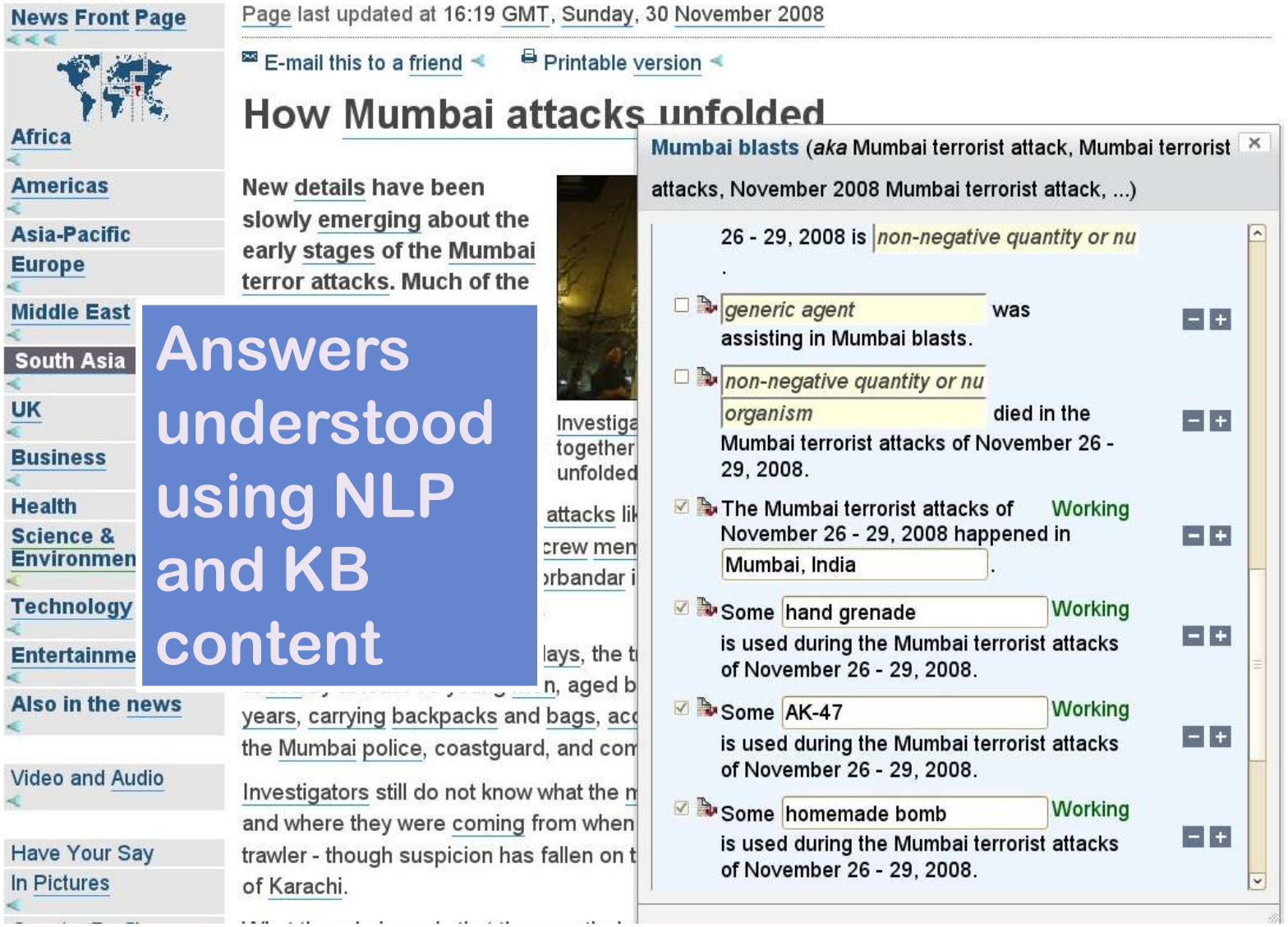
years, carrying backpacks and bags, acc
the Mumbai police, coastguard, and com

Investigators still do not know what the m
and where they were coming from when
trawler - though suspicion has fallen on t
of Karachi.

Answers understood using NLP and KB content

Mumbai blasts (*aka* Mumbai terrorist attack, Mumbai terrorist attacks, November 2008 Mumbai terrorist attack, ...)

- *thing existing stably in time* was meaningfully involved in Mumbai blasts.
- *intelligent agent* was a perpetrator in the Mumbai terrorist attacks of November 26 - 29, 2008.
- the Taj Mahal Hotel is the Working intended target of the Mumbai terrorist attacks of November 26 - 29, 2008.
- The Mumbai terrorist attacks of November 26 - 29, 2008's date is Working 11/26/2008 -11/29/2008.
- The number of *organism* who are injured in the Mumbai terrorist attacks of November 26 - 29, 2008 is *non-negative quantity or nu* .
- *generic agent* was assisting in Mumbai blasts.
- *non-negative quantity or nu*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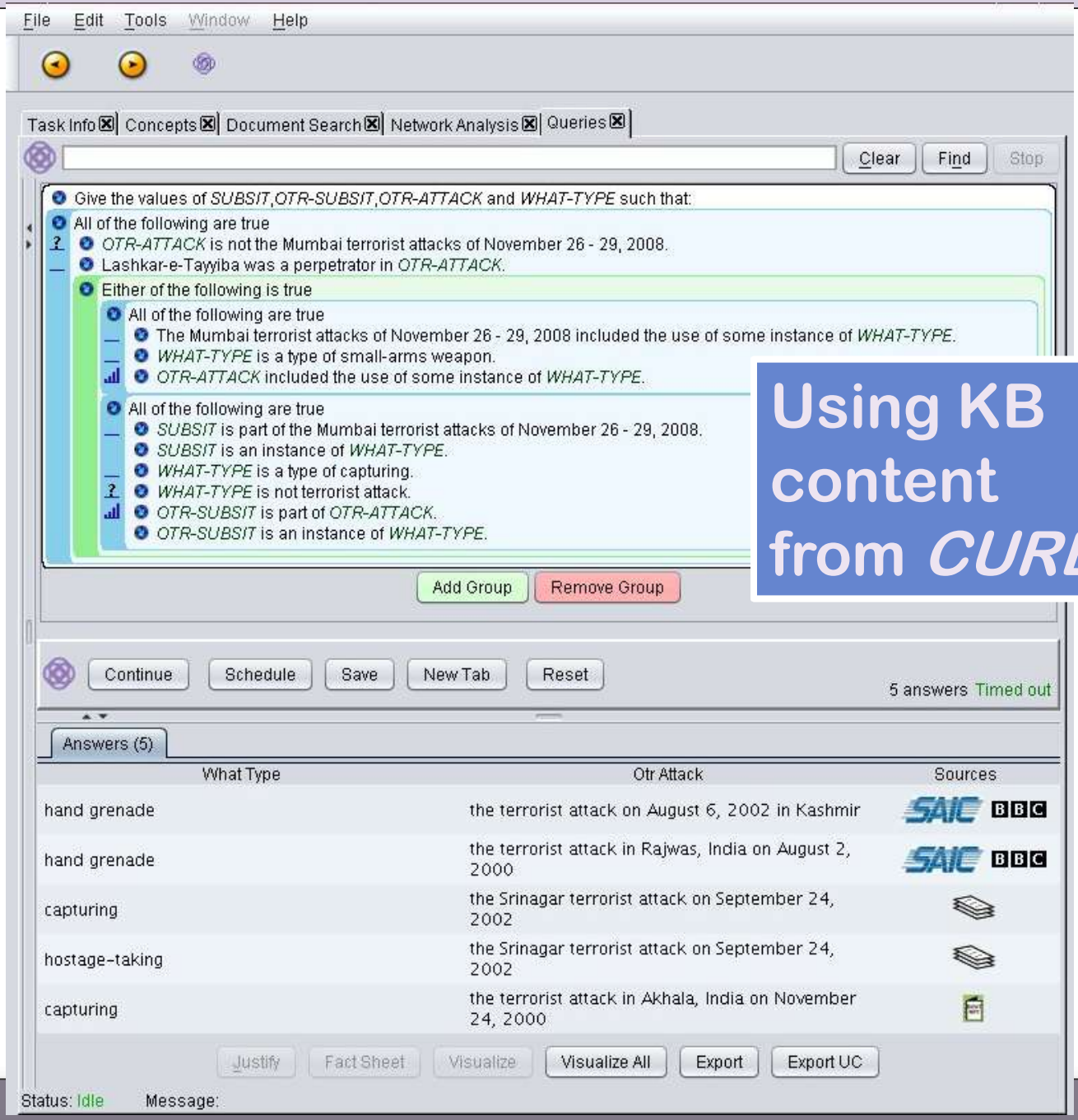
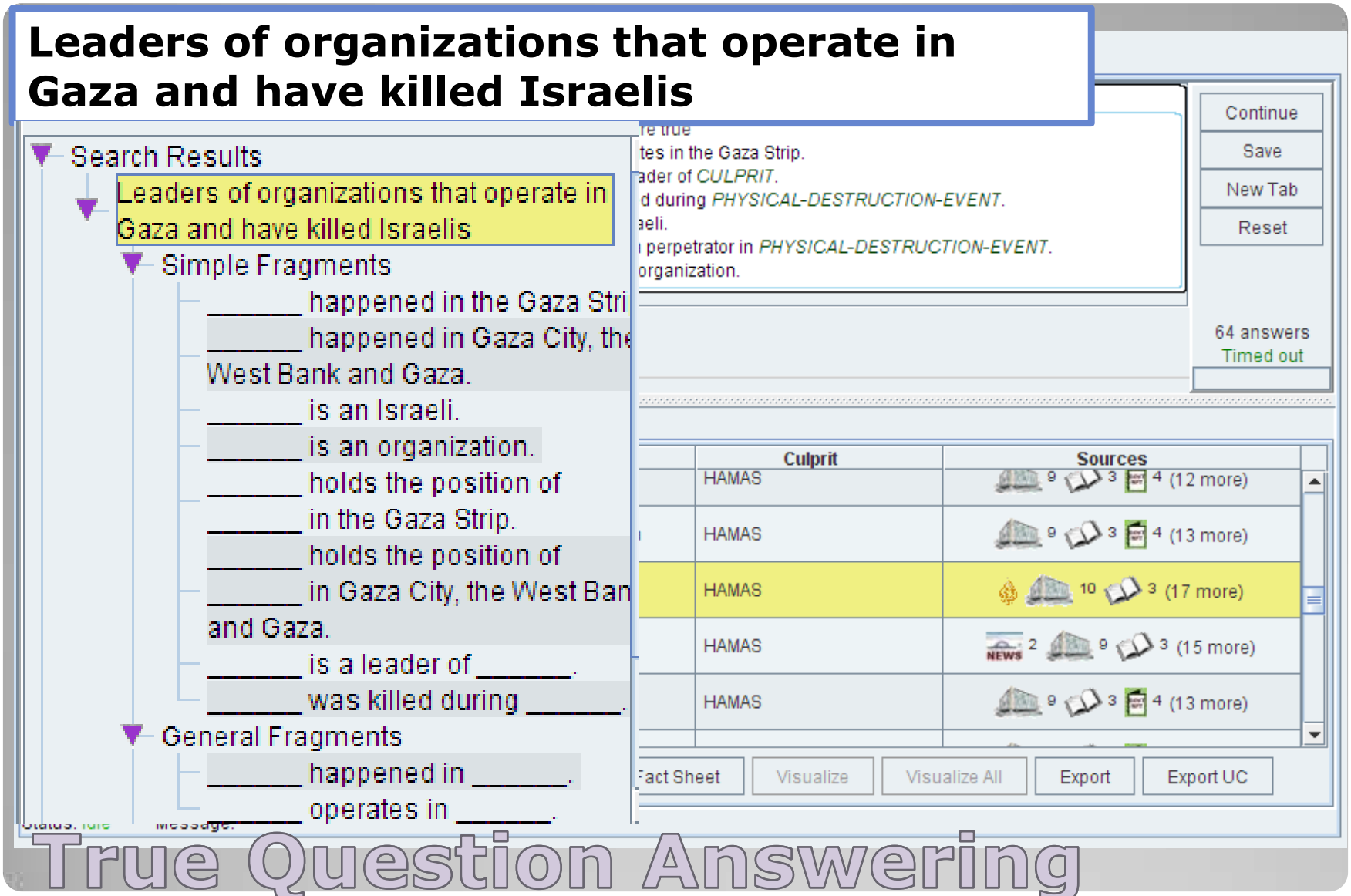
trawler - though suspicion has fallen on t
of Karachi.
Answers understood using NLP and KB content
Mumbai blasts (aka Mumbai terrorist attack, Mumbai terrorist attacks, November 2008 Mumbai terrorist attack, ...)
26 - 29, 2008 is non-negative quantity or nu
.
generic agent was assisting in Mumbai blasts.
non-negative quantity or nu
organism died in the Mumbai terrorist attacks of November 26 - 29, 2008.
The Mumbai terrorist attacks of November 26 - 29, 2008 happened in Mumbai, India. Working
Some hand grenade is used during the Mumbai terrorist attacks of November 26 - 29, 2008. Working
Some AK-47 is used during the Mumbai terrorist attacks of November 26 - 29, 2008. Working
Some homemade bomb is used during the Mumbai terrorist attacks of November 26 - 29, 2008. Working

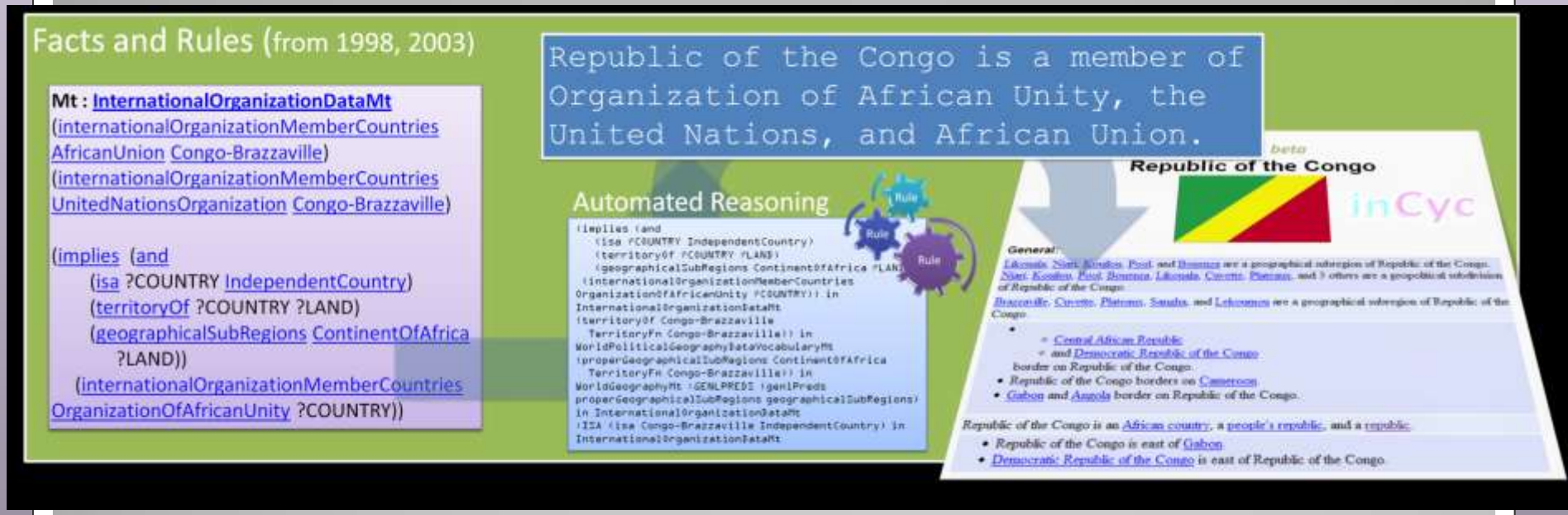


Using KB content from *CURE*

Leaders of organizations that operate in Gaza and have killed Israelis



True Question Answering



Knowledge for People

Poland Train Ticket
Get instant online tickets and reservations from RailEurope.com
www.RailEurope.com

Fly Cheap to Poland
70% off Poland Air Fare Compare Poland Flights - Save
Poland.Flights.Asia.com

Warsaw Hotels, Poland
Discounts in February! Apartments in City Center and Old Town.
www.hotelinwarsaw.com

Ads by Google

inCyc beta

Warsaw, Poland

Documentation:

Comment: The #$capitalCity and one of the majorCities of Poland-AtPresent.

General:

Warsaw, Poland is a Polish city and a capital.

Warsaw, Poland's latitude is 52.25 degrees. Warsaw, Poland's longitude is 21 degrees.

Warsaw, Poland is in Poland. Warsaw is the capital of Poland.

Affiliations:

Warsaw, Poland is in Poland. Warsaw is the capital of Poland.

Miscellaneous:

Warsaw, Poland is a city. Warsaw, Poland's population is 1,600,000. Warsaw, Poland is where Stanislaw Lesniewski died. Alfred Tarski was born in Warsaw, Poland.

Okecie Airport services Warsaw, Poland.[1] Some subway is located in Warsaw, Poland.

[1] AvInfo's IATA/ICAO airport and airline codes webpage

How was this page created?

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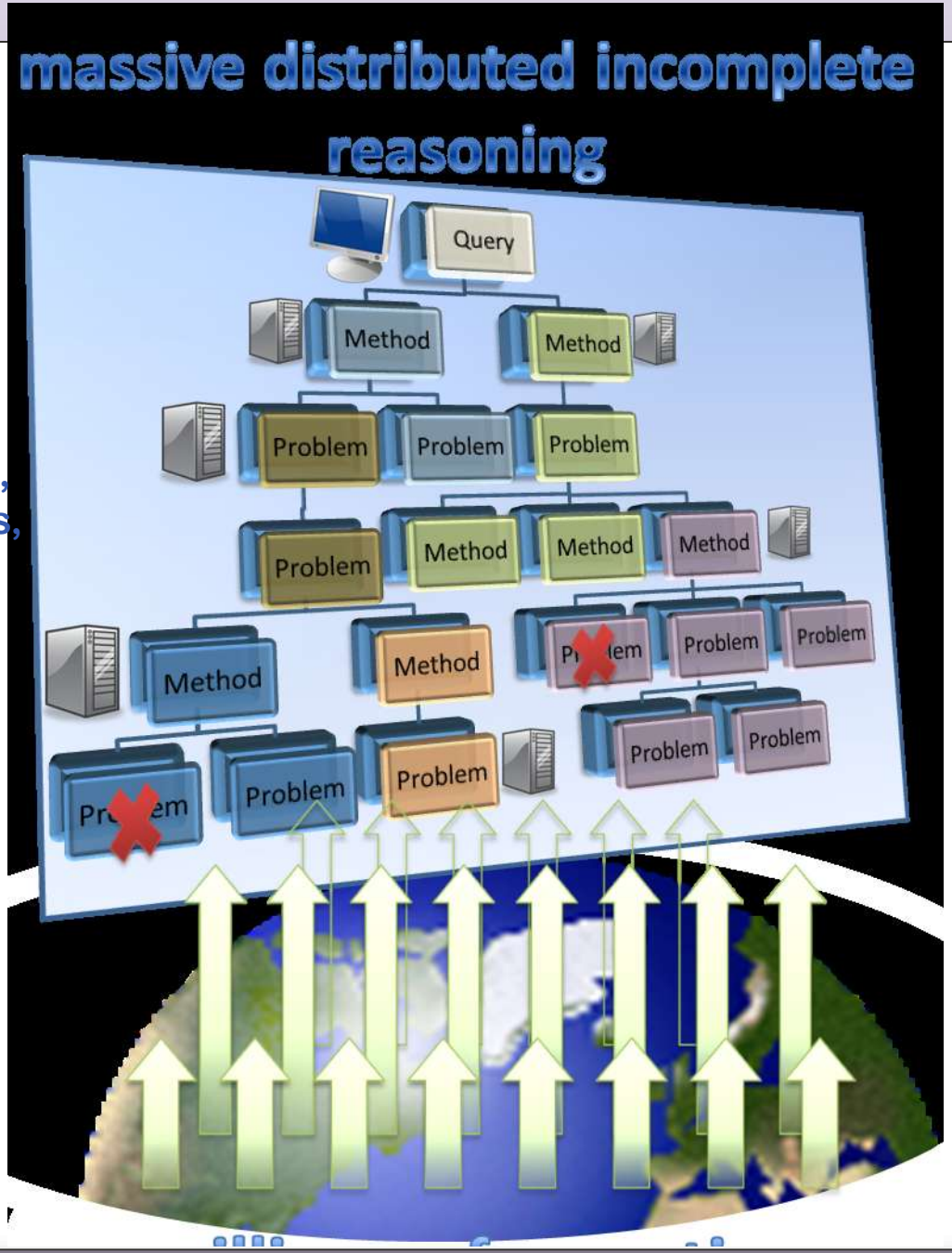
Knowledge representations, inference methods, KA tools, for broad domain reasoning

Platform for infinitely scalable reasoning on the web



Use Case: City on-line

- **Our cities face many challenges**
- **Urban Computing** is the ICT way to

Urban Land Institute

improve the quality of life

Is public trans

Personal:
Will I be late for my 9:45am talk?
Can I stop at my favourite café?
Should I drive, take bus, or metro?
Take an umbrella?

e are right now

trating?

Where is traffic moving?

Use ca

- **Probl**
  devel

FDA white paper Innovation or Stagnation (March 2004):

"developers have no choice but to use the **tools of the last century** to assess this century's candidate solutions."

"industry scientists o
entire product area,
used in **areas other**

*"Show me any potential l
compound's drug class, to*

$(Q_1$

Q_1

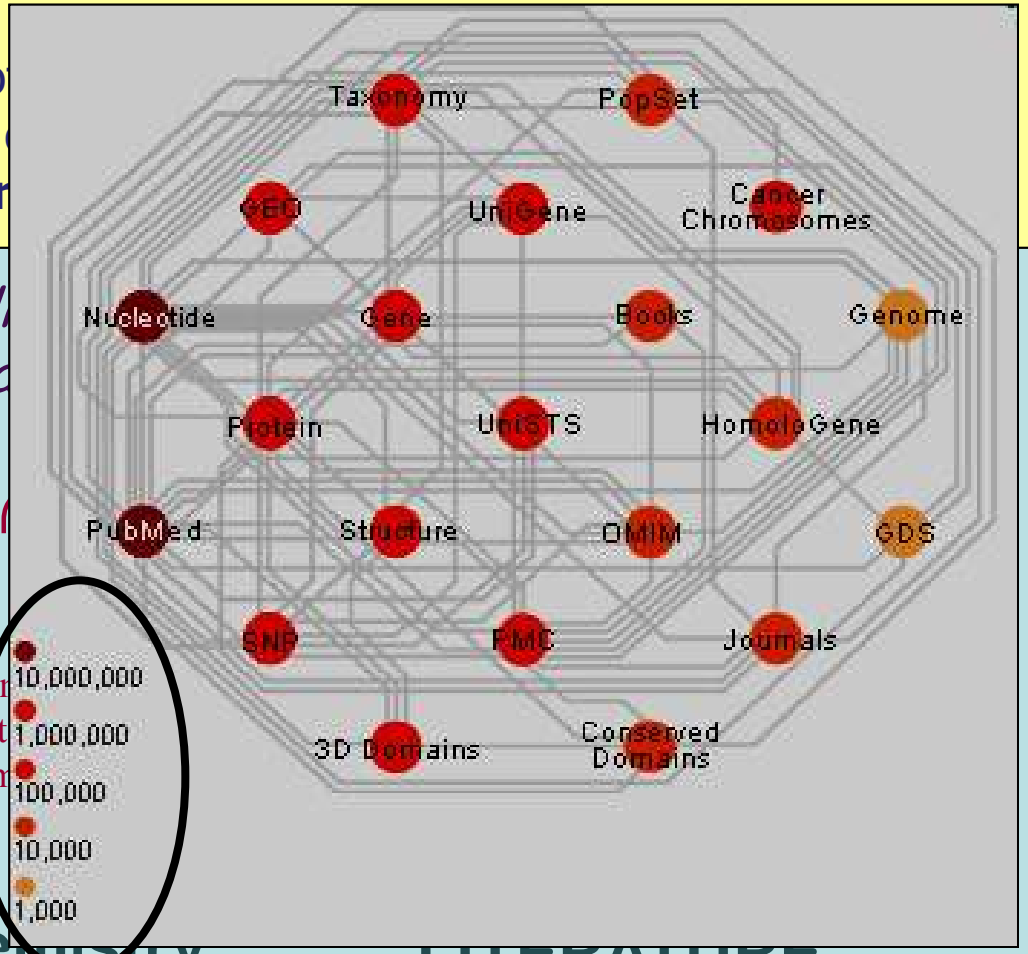
Show me all liver toxicity associated with the target or the pathway.

Q_2

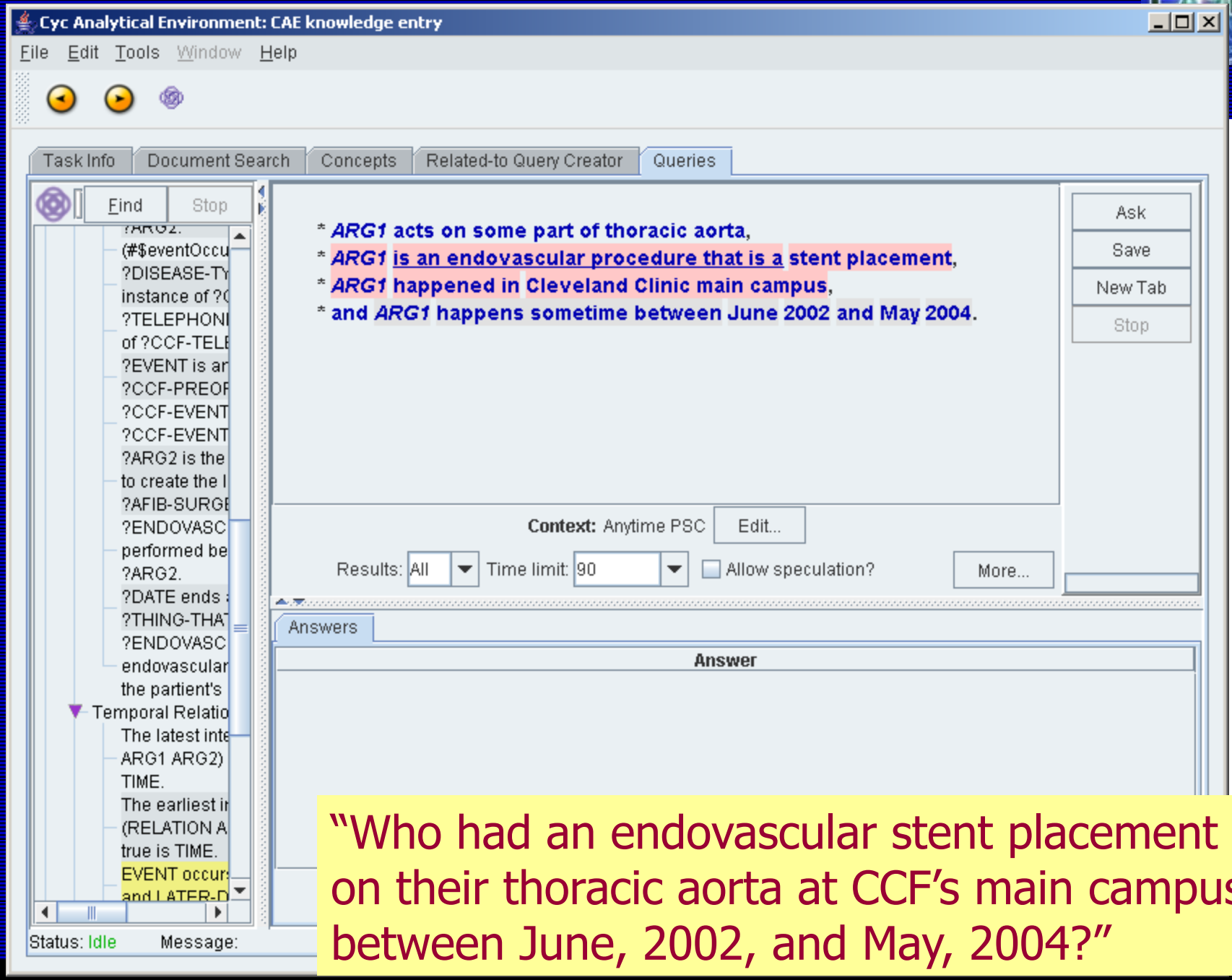
"Show
associat
with sim

Genetics

Che

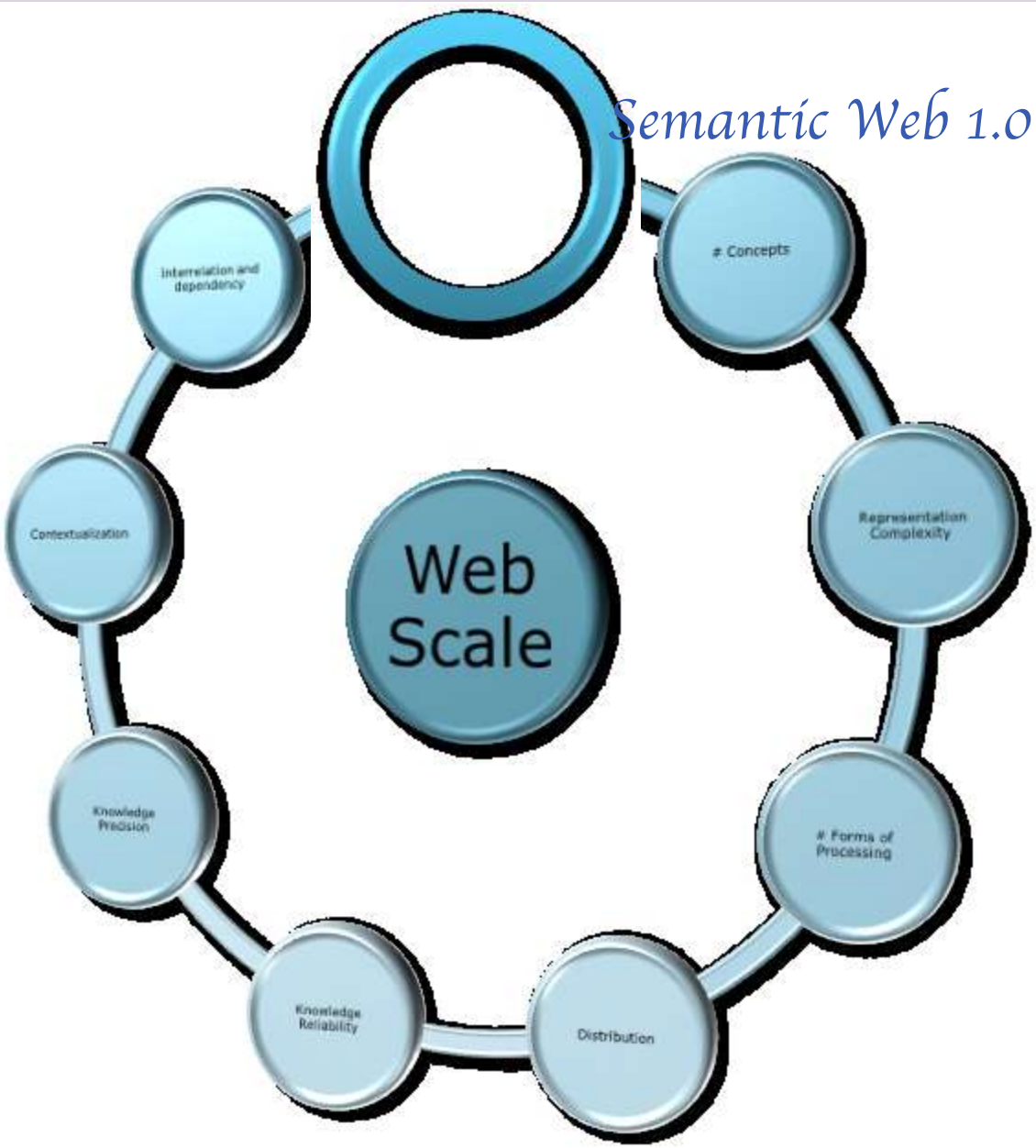


Current: linking but no inference

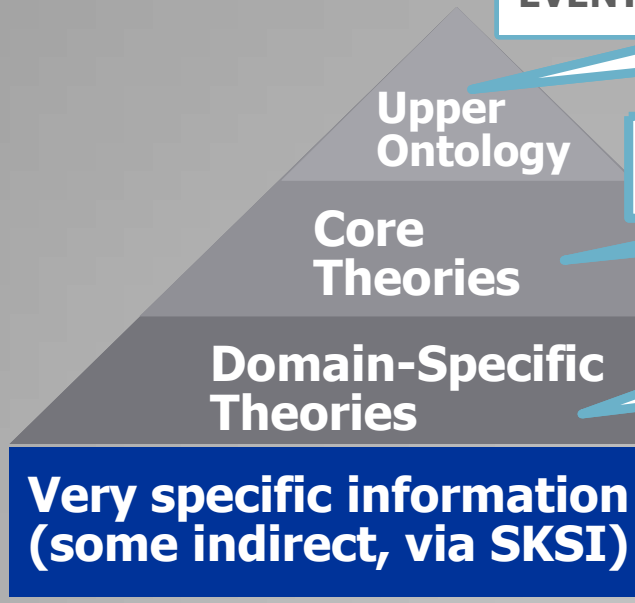


"Who had an endovascular stent placement on their thoracic aorta at CCF's main campus between June, 2002, and May, 2004?"

Semantic Web 1.0



Elements of Scale



EVENT ⊃ TEMPORAL-THING ⊃ PARTIALLY-TANGIBLE-THING

(∀*a, b*) *a* ∈ EVENT ∧ *b* ∈ EVENT ⇒
causes(*a, b*) ⇒ precedes(*a, b*)

(∀m, a) m ∈ MAMMAL ∧ a ∈ ANTHRAX ⇒
causes(exposed-to(m, a), infected-by(m, a))

(ist FtLaudHolyCrossERCase#403921
(caused CutaneousAnthrax
(SkinLesions Ahmed_al-Haznawit)))

First Order Predicate Calculus: unambiguous; enable mechanical reasoning

Every American has a president.
Every American has a mother.

∃y.∀x. Amer(x) ⇒ president(x,y)
∀x.∃y. Amer(x) ⇒ mother(x,y)

Higher Order Logic: contexts, predicates as variables, nested modals, reflection,…

Formal Representation for Reasoning

Syntactic Power

First Order

- (isa ASBFinancialCorp PubliclyHeldCorporation)
- (corporateOfficers ASBFinancialCorp GeraldRJenkins)

With Context

- In Mt : FinancialTransactionMt
  (relationAllExists performedBy RepurchaseProgram PubliclyHeldCorporation)

Rule

- In Mt: FinancialTransactionMt
  (forAll ?X (implies
  (isa ?X RepurchaseProgram)
  (thereExists ?Y (and (isa ?Y PublicallyHeldCorporation) (performedBy ?X ?Y)))))

Second Order

- (implies
  (and (isa ?SET Set-Mathematical) (cardinality ?SET 1) (elementOf ?THING ?SET))
  (equals ?SET (TheSet ?THING)))

Modal

- (believes Israel (relationInstanceExists possesses Syria ClusterBomb))

Meta

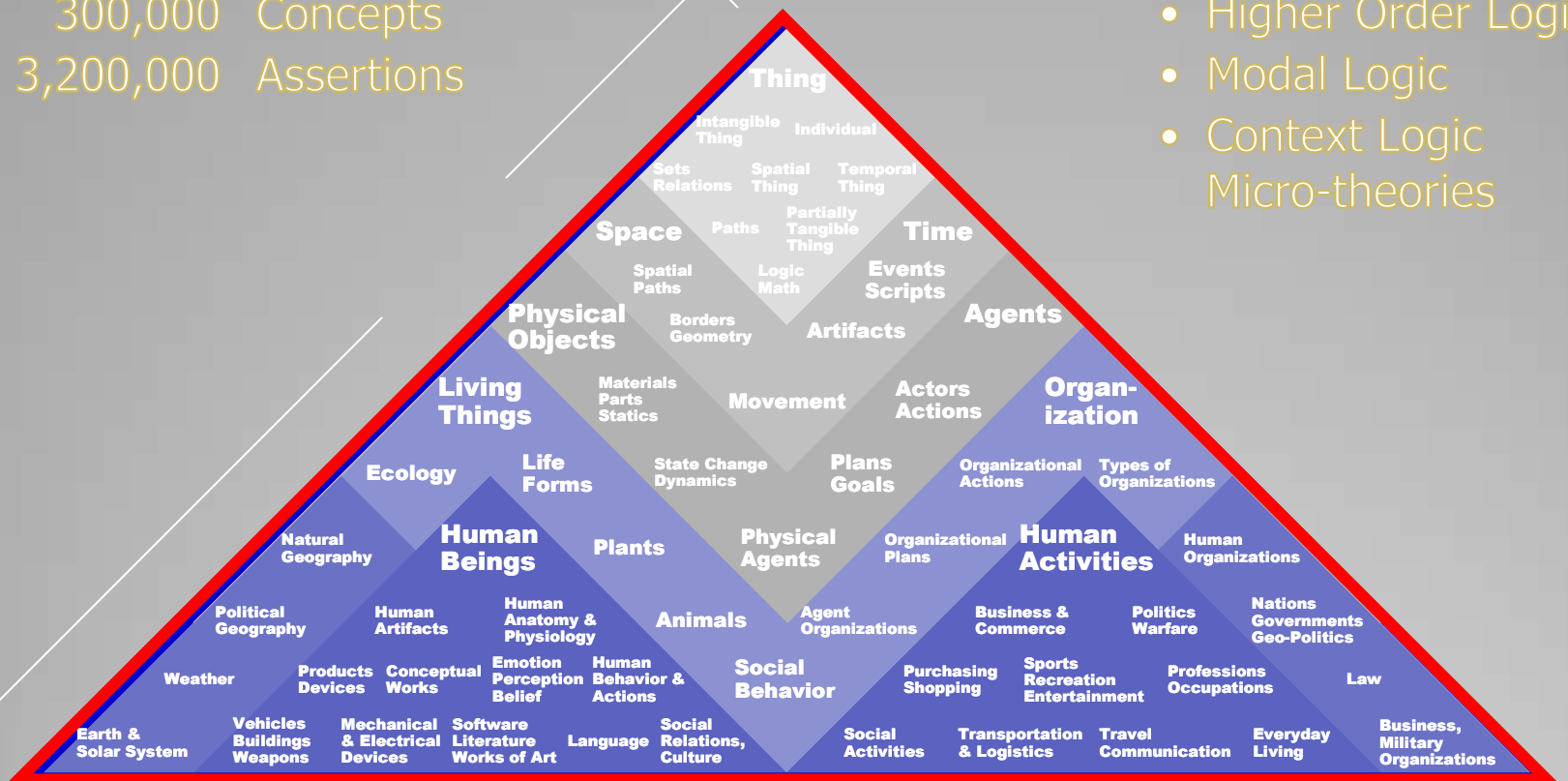
- (opaqueArgument believes 2)

Cyc contains:

15,000 Predicates
300,000 Concepts
3,200,000 Assertions

Represented in:

- First Order Logic
- Higher Order Logic
- Modal Logic
- Context Logic
- Micro-theories



General Knowledge about Various Domains

Specific data, facts, and observations

- isa 596215
- genls 99198
- disjointWith 6114
- resultIsa 4277
- resultGenl 1206
- argIsa 35617
- argGenl 5398
- arg1Isa 16748
- arg1Genl 2354
- arg2Isa 14114
- arg2Genl 2283
- arg3Isa 3486
- argFormat 5493
- arg2Format 3320
- functionalInArgs 1427
- arity 16416
- arityMin 958
- comment 57305
- genlPreds 7440
- negationInverse 990
- genlMt 26078
- denotationInEnglish 409745
- synonymousExternalConcept 13916

Open Cyc Predicate Populations

Open and Research

- OpenCyc (www.opencyc.org)
  - The Cyc Ontology made 100% freely available (yes, 100% free even for commercial purposes)
  - Available for download on SourceForge and on opencyc.org
  - Over 30,000 accesses
- ResearchCyc (researchcyc.cyc.com)
  - OpenCyc + millions of hand-engineered assertions
  - Free for R&D purposes
  - Current users: 300 research groups (about 1/2 academic)

Assertion Count

rapidly growing Li… a cl…
already many …

every book sold by Amazon

any CD ever recorded (almost)

basic facts on every country on the planet

common s… hierarchical dictionaries (UK, FR, NL)

scientific bibliographies

names of artists & art works (10.000's)

Geographic names (millions)

Encyclopedia

Representational and Conceptual Complexity

For my own Part, I swam as Fortune directed me, and was pushed forward by Wind and Tide. I often let my Legs drop, and could feel no Bottom: but when I was almost gone, and able to struggle no longer, I found myself within my Depth; and by this Time the Storm was much abated. The Declivity was so small, that I walked near a Mile before I got to the Shore, which I conjectur'd was about eight a-clock in the Evening. I then advanced forward near half a Mile, but could not discover any sign of Houses or Inhabitants; at least I was in so weak a Condition, that I did not observe them. I was extremely tired, and with that, and the Heat of the Weather, and about half a Pint of Brandy that I drank as I left the Ship, I found myself much inclined to sleep. I lay down on the Grass, which was very short and soft, where I slept sounder than ever I remember to have done in my Life, and, as I reckoned, above Nine Hours; for when I awakened, it was just Day-light.

http://www.jaffebros.com/lee/gulliver/bk1/chap1-1.html

I swam, pushed forward by time and current, and when I was almost put to an end, I saw land, and discovered myself in water that was not deep. At about eight o'clock in the nightfall, I got to the edge of the sea and walked for nearly half a mile without seeing any houses. Too tired to go father, I got down on my back in the grass, which was very short and soft. There I slept soundly till morning.

Put into Basic English by the Basic English Institute
http://ogden.basic-english.org/lilliput.html

850 words: 600 nouns, 150 adjectives, 100 syntactic operators

Gulliver's Travels in Basic English

Travels into Several Remote Nations of the World, in Four Parts. By Lemuel Gulliver, First a Surgeon, and then a Captain of several Ships, Jonathan Swift, London, Benj. Motte, 1726

Basic English: A General Introduction with Rules and Grammar.
Ogden, Charles Kay. Small format, hardcover.
Publisher: Paul Treber & Co., Ltd. London, 1930.

Is it attached to the inside of the outer object?

– Yes -- Try **#$connectedToInside**

Can it be removed by pulling, if enough force is used, without damaging either object?

– No -- Try **#$in-Snugly** or **#$screwedIn**

Does the inner object stick into the outer object?

–Yes – Try **#$sticksInto**

Senses of 'In'

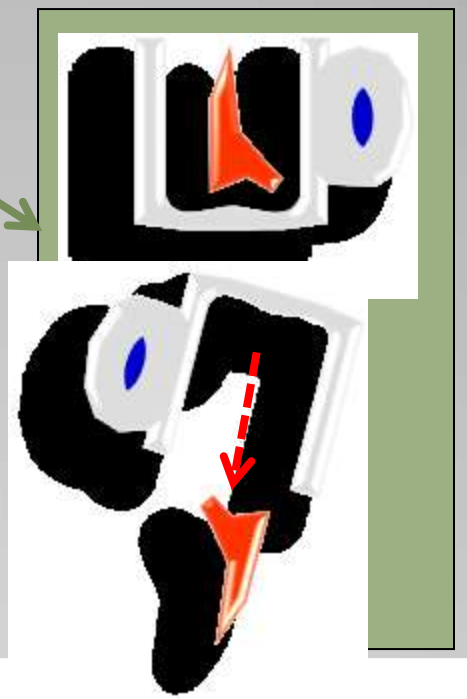
Cycorp © 2007

- Does part of the inner object stick out of the container?
  - None of it.
    #$in-ContCompletely
  - Yes
    #$in-ContPartially
  - No
    #$in-ContClosed

- If the container were turned around could the contained object fall out?

  Yes

  #$in-ContOpen



For Inference:
Senses of 'In'

Cycorp © 2008

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  - Yes
    #$in-ContPartially
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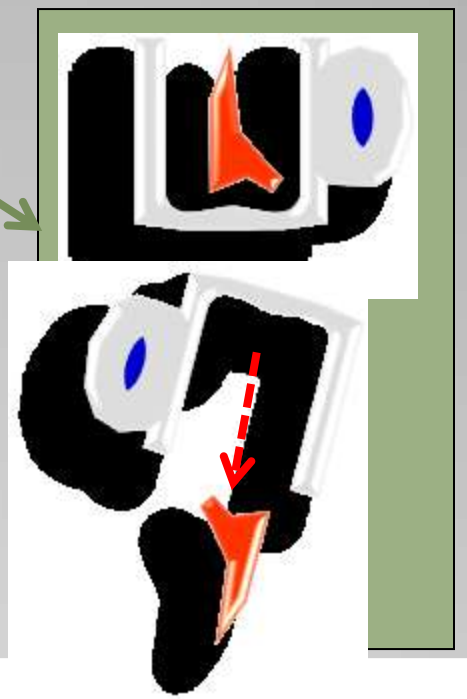
  Yes

  #$in-ContOpen



For Inference: Senses of 'In'

Cycorp © 2008

Senses of 'In'

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Can it be removed by pulling, if enough force is used, without damaging either object?

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Cycorp © 2007

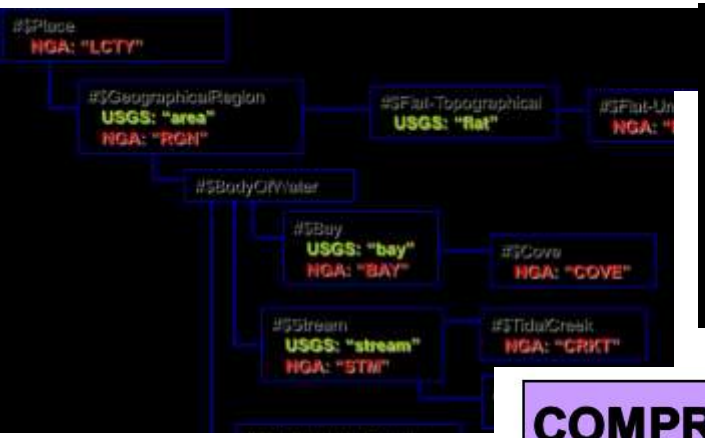
- #$TransportationEvent
- #$ControllingATransportationDevice
- #$TransportWithMotorizedLandVehicle
- (#$SteeringFn #$RoadVehicle)
- #$TransporterCrashEvent
- #$VehicleAccident
- #$CarAccident
- #$Colliding
- #$IncurringDamage
- #$TippingOver
- #$Navigating
- #$EnteringAVehicle …

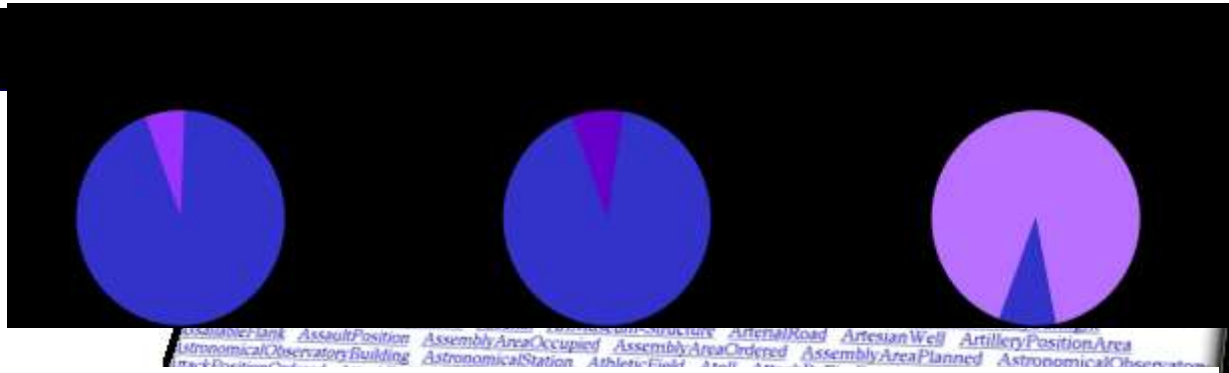
Some Transportation Event Types

- #$performedBy
- #$causes-EventEvent
- #$objectPlaced
- #$objectOfStateChange
- #$outputsCreated
- #$inputsDestroyed
- #$assistingAgent
- #$beneficiary
- #$fromLocation
- #$toLocation
- #$deviceUsed
- #$driverActor
- #$damages
- #$vehicle
- #$providerOfMotiveForce
- #$transportees …

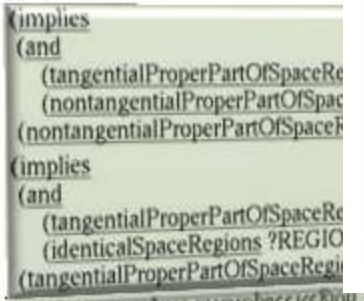
Over 400 more.

Relating Events and Participants


#$Place
NGA: "LCTY"
#$GeographicalRegion
USGS: "area"
NGA: "RGN"
#$Flat-Topographical
USGS: "flat"
#$BodyOfWater
#$Bay
USGS: "bay"
NGA: "BAY"
#$Cove
NGA: "COVE"
#$Stream
USGS: "stream"
NGA: "STM"
#$TidalCreek
NGA: "CRKT"



(codeMapping FACC-FeatureType-CMLS "EA020" Hedge)
(codeMapping FACC-FeatureType-CMLS "AK101" DrivingRan
(codeMapping FACC-FeatureType-CMLS "AM011" StorageCo
(codeMapping FACC-FeatureType-CMLS "BH070" FoodInStre
(codeMapping FACC-FeatureType-CMLS "BH180" Waterfall)
(codeMapping FACC-FeatureType-CMLS "CA020" RidgeLine-
(codeMapping FACC-FeatureType-CMLS "GB015" Apron-Air
(codeMapping FACC-FeatureType-CMLS "AK060" Campgrou
(codeMapping FACC-FeatureType-CMLS "AT030" PowerLine
(codeMapping FACC-FeatureType-CMLS "GB065" SeaplaneS
(codeMapping FACC-FeatureType-CMLS "GB005" Airport-Pl
(codeMapping FACC-FeatureType-CMLS "AN050" Railway-S
(codeMapping FACC-FeatureType-CMLS "EA050" Vineyard)
(codeMapping FACC-FeatureType-CMLS "GB010"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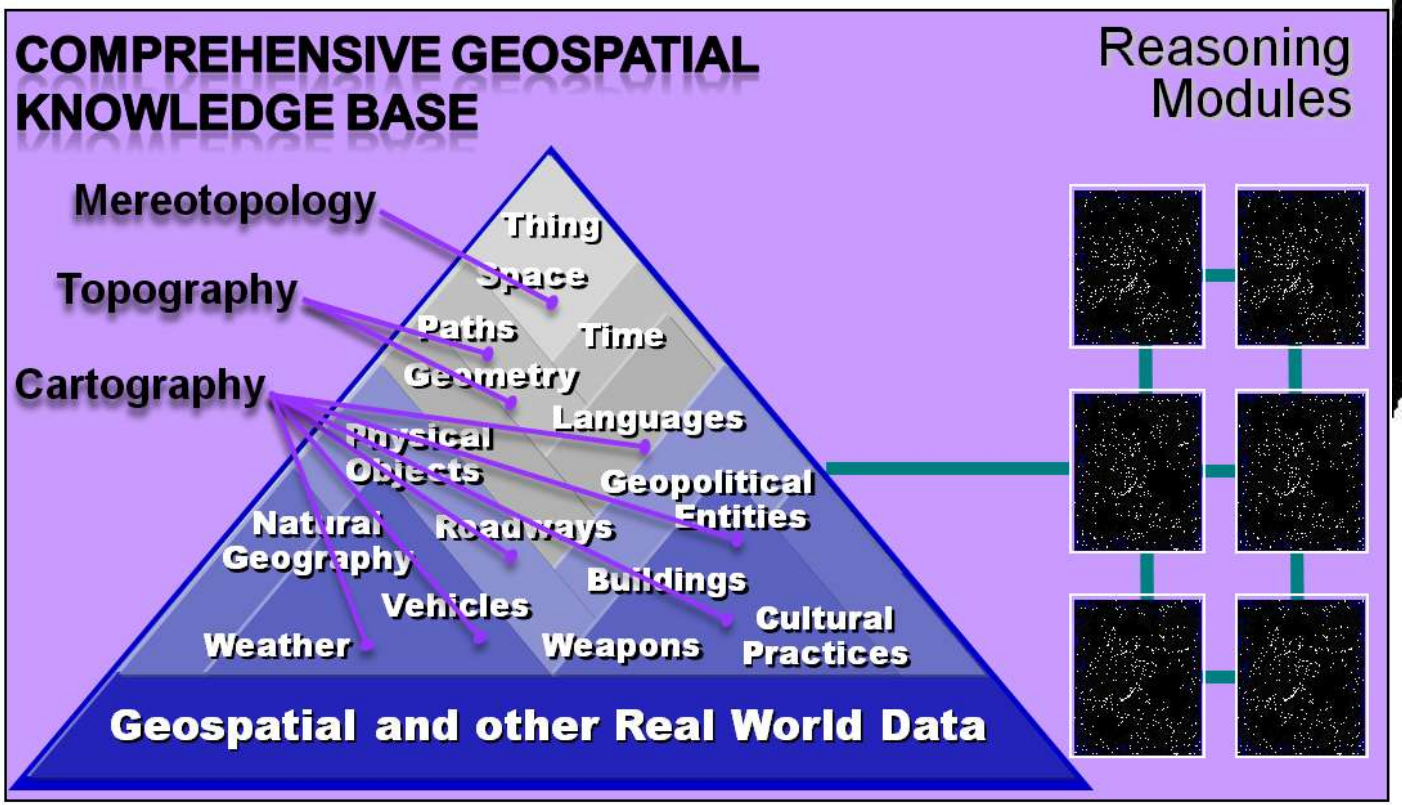
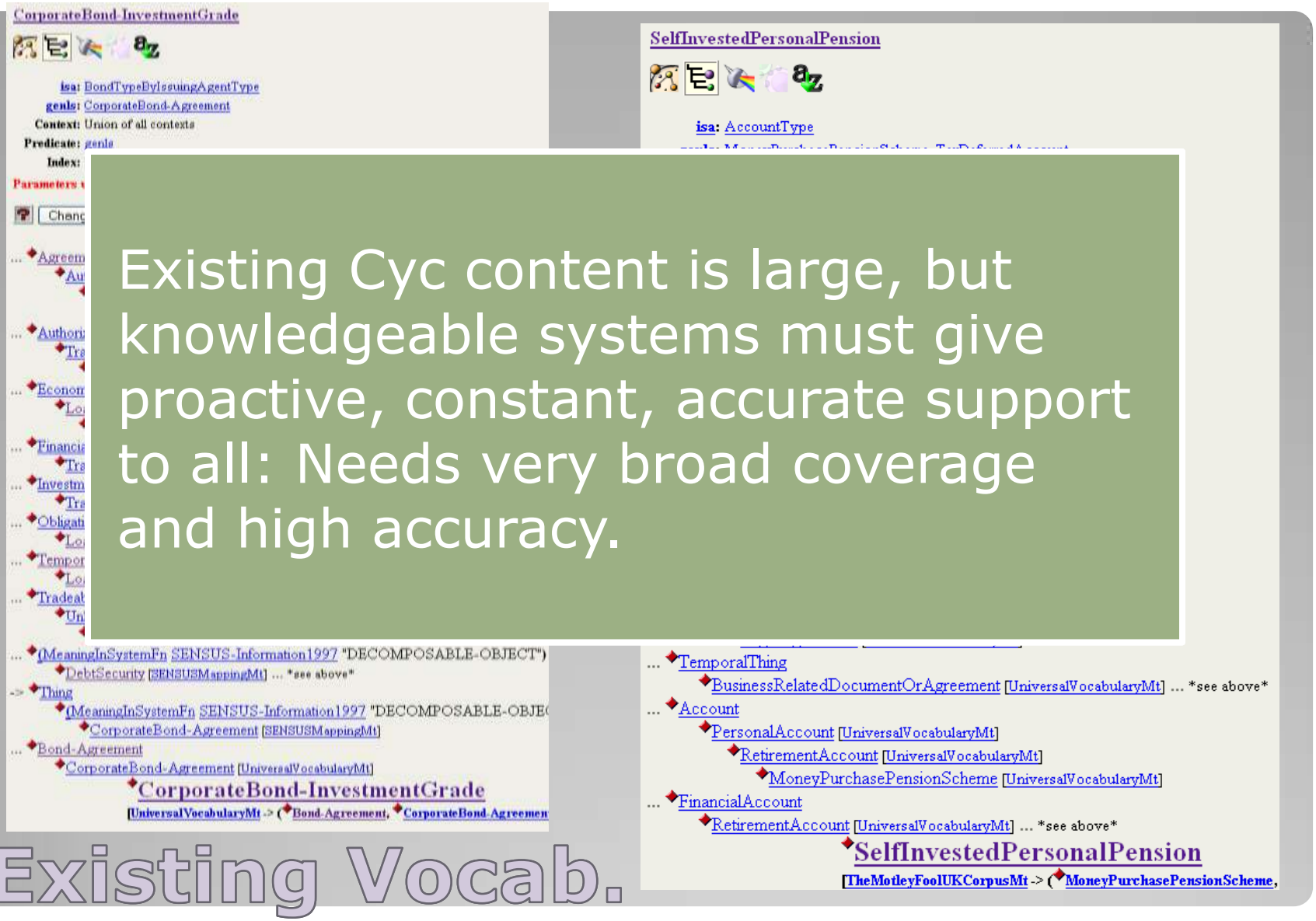

COMPREHENSIVE GEOSPATIAL KNOWLEDGE BASE
Reasoning Modules
Mereotopology
Topography
Cartography
Thing
Space
Paths
Time
Geometry
Languages
Physical Objects
Geopolitical Entities
Natural Geography
Roadways
Buildings
Vehicles
Cultural Practices
Weather
Weapons
Geospatial and other Real World Data



Existing Cyc content is large, but knowledgeable systems must give proactive, constant, accurate support to all: Needs very broad coverage and high accuracy.

Existing Vocab.

Web 3.0 Systems start from Web 2.0-style learning.
Acquire ground facts, test rule inferences.

Another CURE example.

FOXNEWS.COM HOME > WORLD

Hamas Leader's Son Among 19 Killed in Israeli-Palestinian Conflicts

Tuesday, January 15, 2008

Associated Press

E-Mail | Print | Digg This! | del.icio.us

GAZA CITY, Gaza Strip — Israeli troops killed a son of Gaza's most powerful leader along with 18 other Palestinians on Tuesday in the bloodiest day of fighting in the coastal area since Hamas militants seized control last summer.

As fighting raged in Gaza, a Hamas sniper shot and killed an Ecuadorean volunteer working in the potato fields of an Israeli border farm. That killing, and Tuesday's high death toll, stoked the flames of violence at a time when Israel and Palestinian moderates are making halting attempts to talk peace.

• **Click here to view photos.**

Tuesday's bloodshed began before dawn when Israeli infantry, tanks and helicopters pushed into northern Gaza in what the military said was a routine operation aimed at Palestinian militants who launch rocket barrages at Israeli towns near Gaza almost every day.

Three Palestinian civilians were killed in the ensuing fighting, along with 14 armed militants — one of them Hussam Zahar, 24, the son of hard-line Hamas leader Mahmoud Zahar. The Israelis pulled out Tuesday with no casualties. A later airstrike on militants firing rockets into Israel killed two more Hamas men.

http://www.foxnews.com/story/0,2933,322785,00.html

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As ...cuadorean volunteer working in the pot...'s high death toll, stoked the flames of viol...making halting attempts to talk peace.

• C...

Tue..., tanks and helicopters pushed into nor...aimed at Palestinian militants who laur...y day.

Thr...ong with 14 armed militants — one of the...ahmoud Zahar. The Israelis pulled out Tue...ockets into Israel killed two more Har...

...Hospital in Gaza City, a weeping Mahmoud Zahar held his lifeless son's bloodied head in his

Mahmoud Zahar

Known | Teach | Followups

person

Hamas leader

Click to suggest something else

Additional Names

Click to add another name

FOXNEWS.COM HOME > WORLD

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Tuesday, January 15, 2008

Associated Press

E-Mail | Print | Digg This! | del.icio.us

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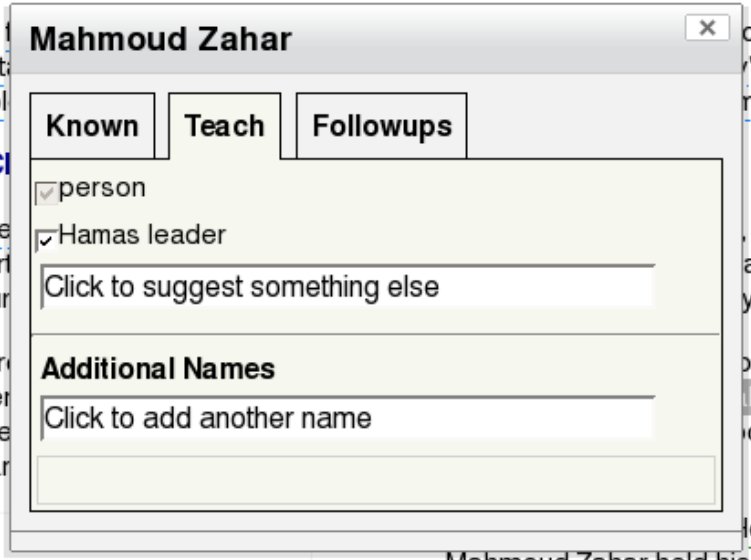

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Thr ong with 14 armed militants — one of ther hmoud Zahar. The Israelis pulled out Tue ckets into Israel killed two more Har

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FOXNEWS.COM HOME > WORLD

Hamas Leader's Son Among 19 Killed in Is

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them Hussam Zahar, 24, the son of hard-line Hamas leader Mahmoud Zahar. The Israelis pulled out Tuesday with no casualties. A later airstrike on militants firing rockets into Israel killed two more Hamas men.

Individual : MahmoudZahar

Bookkeeping Assertions :

(myCreator MahmoudZahar CycAdministrator) in BookkeepingMt
(myCreationTime MahmoudZahar 20080118) in BookkeepingMt
(myCreationSecond MahmoudZahar 165058) in BookkeepingMt

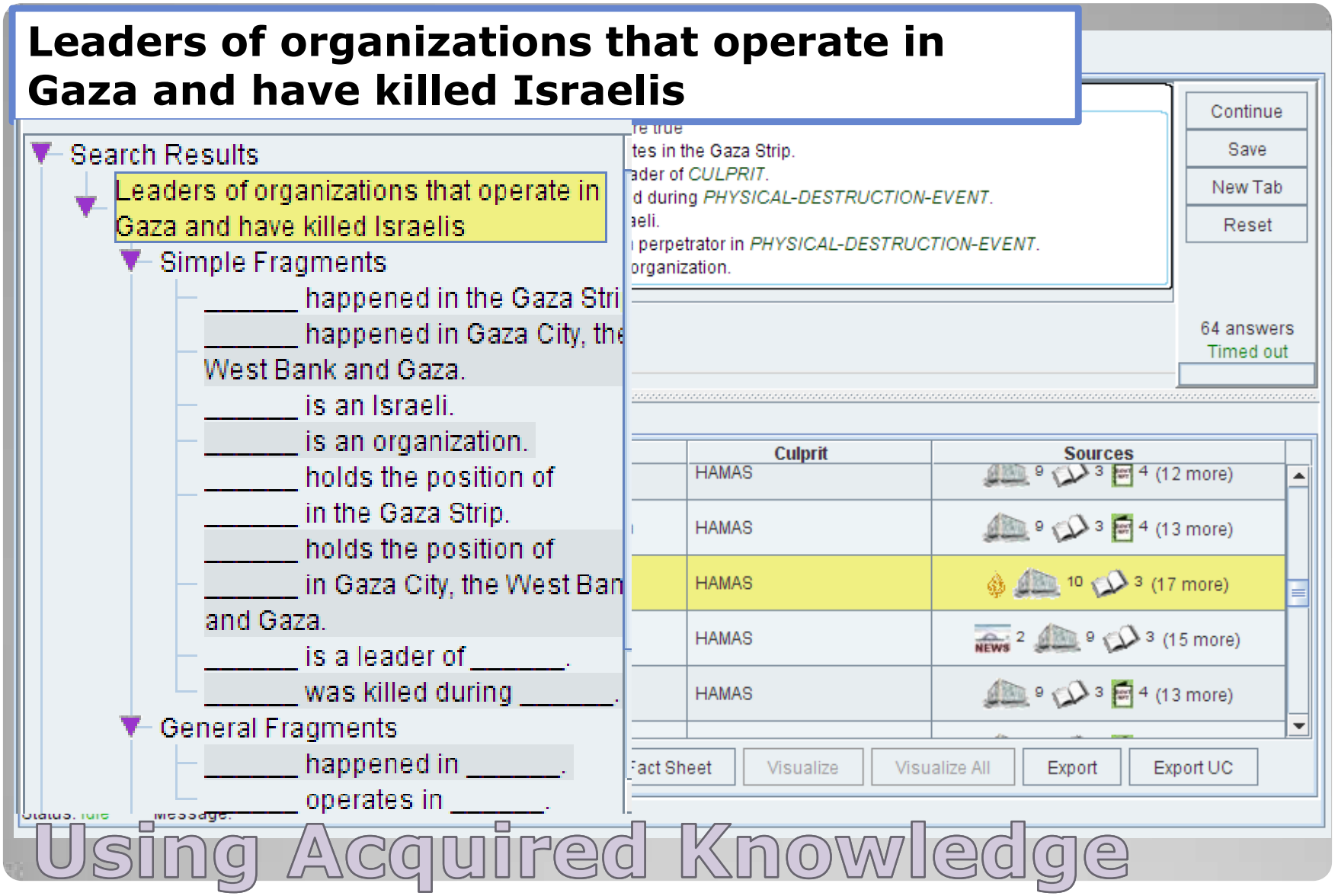
GAF Arg : 1

Mt : UniversalVocabularyMt
isa : Individual

Mt : (ContextOfPCWInterpretationFn CWSentence--7 CycAdministrator (DayFn 18 (MonthFn January (YearFn 2008))))
isa : (SubcollectionOfWithRelationToFn Person hasLeaders Organization-Hamas)

Mt : UniversalVocabularyMt
(inProgressTerm MahmoudZahar)

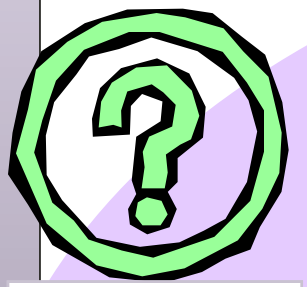
Leaders of organizations that operate in Gaza and have killed Israelis



Using Acquired Knowledge

Task Info
Document Search
Concepts
Network Analysis
Queries
Israelis
killed
Gaza
organizatior
Leaders
Search Resul
Leaders o
Gaza and
Simple
Status: Idle
Continue
Save
New Tab
Reset
64 answers
Timed out
2 more)
3 more)
7 more)
15 more)
3 more)
Query: What values of X and CULPRIT are there such that
some Asian was killed during some physical destruction event,
CULPRIT operates in the Gaza Strip,
CULPRIT was a perpetrator in that physical destruction event,
and X is a leader of CULPRIT?
Answer:
CULPRIT: HAMAS
X: Mahmoud Zahar
Because:
HAMAS's headquarters is in the Gaza Strip. 1
Mahmoud Zahar was a leader of HAMAS on January 15, 2008. 2
HAMAS was a perpetrator in the Jerusalem, Israel terrorist attack on August 19, 2003. 3, 4
Avraham Bar-Or was killed during the Jerusalem, Israel terrorist attack on August 19, 2003. 5
Avraham Bar-Or was an Israeli. 5
Detailed Justification:
External Sources:
1 SAIC Legacy Assertions, Science Applications International Corporation .
2 Hamas Leader's Son Among 19 Killed in Israeli-Palestinian Conflicts .
3 "Patterns of Global Terrorism 2003", United States Department of State, April 2004, http://www.state.gov/
.
4 Encyclopedia of the Orient, LexicOrient.com, http://www.i-cias.com/e.o/hamas.htm .
5 TKB Fact Entry Source Sit Report Fatal Terrorist Attacksin Israelsincethe Declarationof Principles 6

Fact Gathering & Verification



Query

Google

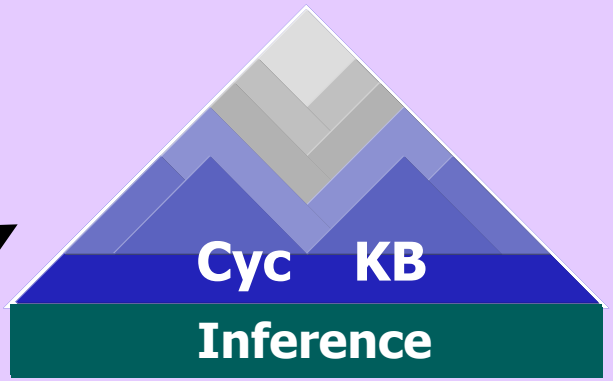
Search

"George Washington, cofounder of the United States…"

→

(foundingAgent GeorgeWashington UnitedStatesOfAmerica)

Parse



Review

+ Google

Consistency & Verification

Query

"What are symptoms of Whooping Cough?"

→

(symptomOfAilment WhoopingCough *?SYMP*)

NL Generation

Partial English sentences

"A symptom of whooping cough is ___"

"Whooping cough can cause ___"

"A symptom of Pertussis Bordetella is ___"

"Symptoms (such as ____) of whooping cough"

Learning Facts by Search

Michael Witbrock © Cycorp 2008

Looking for something that matches the argument constraints on the predicate…

"… symptoms of pertussis such as fever and a dry cough …"

Parse back into existing CycL concepts

(symptomOfAilment WhoopingCough Fever)
(symptomOfAilment WhoopingCough Coughing-AilmentCondition)

Parsing Results

KB Consistency Check

- Explicitly: perform one step of inference to throw out facts inconsistent with KB
- Implicitly: don't even look at things that don't match argument constraints

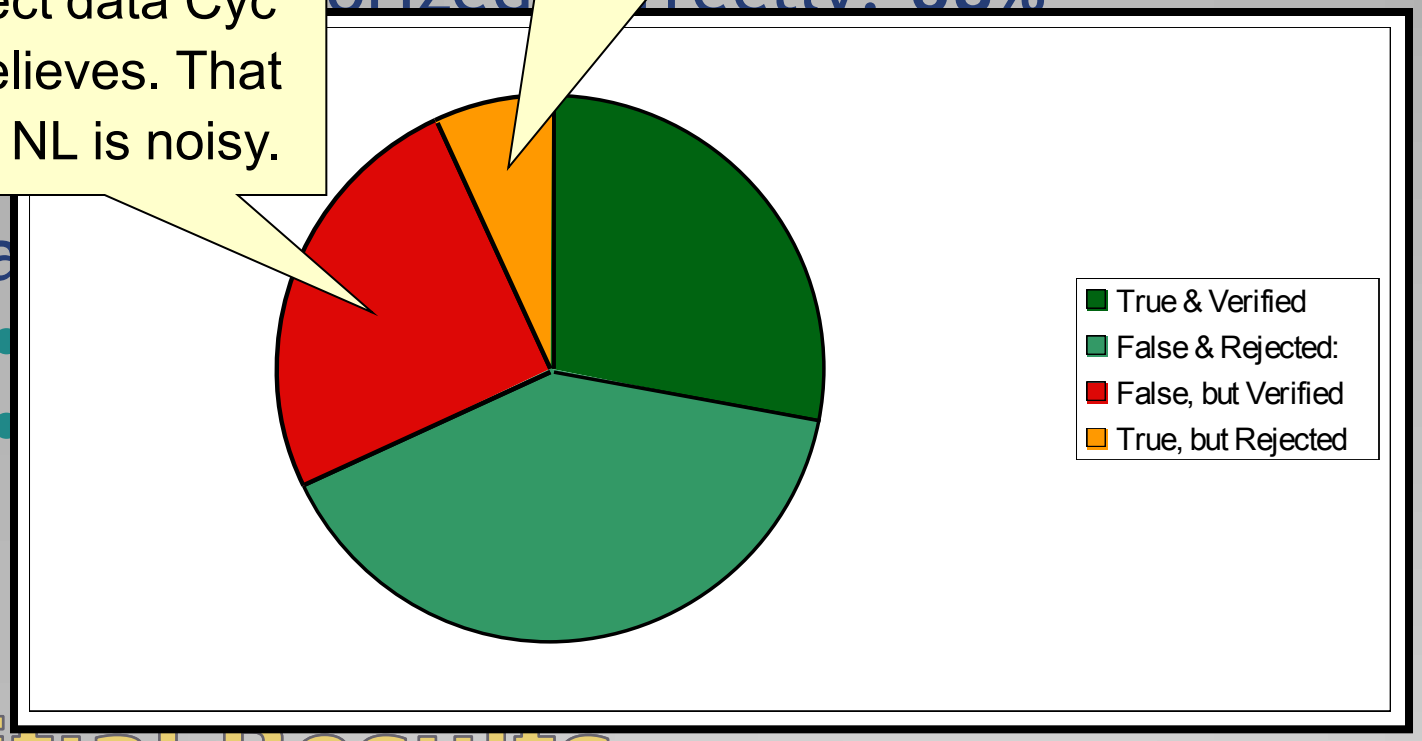
Throw out **provably wrong** answers

Skip already known (**provably right**) knowledge

- On Review of 114 results
  - 61 “verified” s
  - 53 “rejected” mly chosen)
  - orized rectly: 68%

Data Cyc could have got but didn’t—not so bad.

Incorrect data Cyc now believes. That *is* bad. NL is noisy.



- Fa

Initial Results

Train

```
 +-------------------------------------------Xp-------------------------------------------+
 +------------Wd------------+           +--------------------MVp---------------------+    |
 |        +--------A--------+           |         +------Jp-----+----Mp----+         |    |
 |        |      +--G--+--G-+--Ss--+---Os---+--Mp-+    +--Dmcn--+     +N Sa+    +-Js-+    |
 |        |      |     |    |      |        |     |    |        |     |    |    |    |    |
LEFT   Royal.a Dutch Shell Plc halted.v output.n of 455,000 barrels.n a  day.p in Nigeria .
```

```
(#$and (#$isa (#$TheFn #$DecreaseEvent)
          (#$DecreaseInValueReturnedByFn (#$ExportRateOfByFn #$Petroleum-CrudeOil) #$Nigeria))
       (#$doneBy (#$TheFn #$DecreaseEvent) #$RoyalDutchShell)
       (#$quantityChangeAmount (#$TheFn #$DecreaseEvent) (#$BarrelsPerDay 455000)))
```

emplate

```
 +-------------------------------------------Xp-------------------------------------------+
 +------------Wd------------+           +--------------------MVp---------------------+    |
 |                          +           |         +------Jp-----+                    |    |
 |              +-----------+--Ss--+---Os---+--Mp-+             +                +-Js-+    |
 |              |                  |        |     |             |                |    |    |
LEFT        [Agent]            halted.v output.n of         [Quantity]         in  [Locn] .
```

```
(#$and (#$isa (#$TheFn #$DecreaseEvent)
          (#$DecreaseInValueReturnedByFn (#$ExportRateOfByFn #$Petroleum-CrudeOil) [Locn]))
       (#$doneBy (#$TheFn #$DecreaseEvent) [Agent])
       (#$quantityChangeAmount (#$TheFn #$DecreaseEvent) [Quantity]))
```

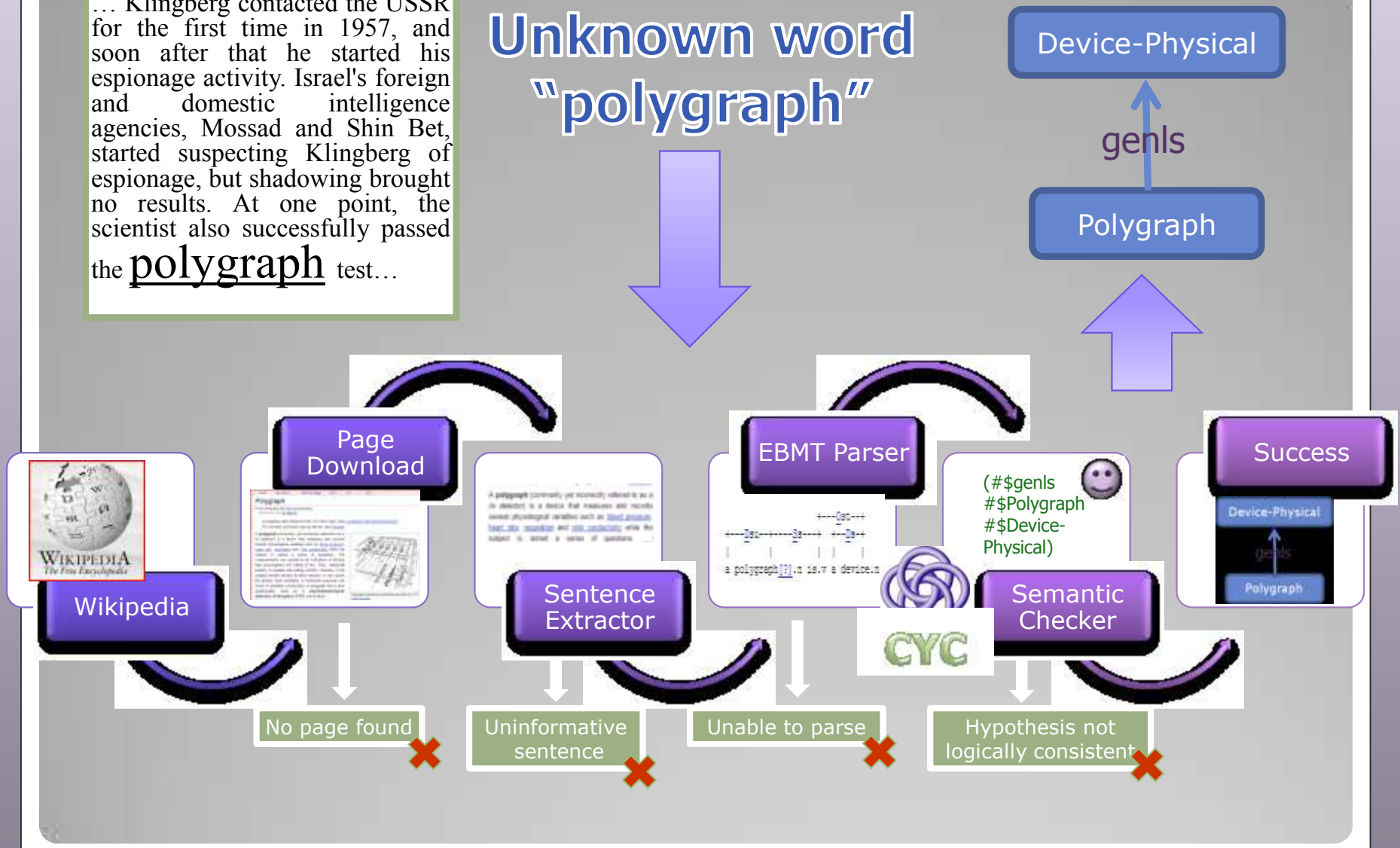
Use

Petróleos de Venezuela S.A. halted output of 760 000 barrels a week in Maracaibo.

```
(#$and (#$isa (#$TheFn #$DecreaseEvent)
          (#$DecreaseInValueReturnedByFn (#$ExportRateOfByFn #$Petroleum-CrudeOil)
                                                  #$CityOfMaracaiboVenezuela))
       (#$doneBy (#$TheFn #$DecreaseEvent) #$PetroleosdeVenezuelaSA
       (#$quantityChangeAmount (#$TheFn #$DecreaseEvent) (#$BarrelsPerWeek 760000)))
```

… Klingberg contacted the USSR for the first time in 1957, and soon after that he started his espionage activity. Israel's foreign and domestic intelligence agencies, Mossad and Shin Bet, started suspecting Klingberg of espionage, but shadowing brought no results. At one point, the scientist also successfully passed the polygraph test…

Unknown word "polygraph"



Verification by Volunteers

game.cyc.com

CYC