

# Answering the Question Why: Explainable AI



The statistical branch of Artificial Intelligence has enamored organizations across industries, spurred an immense amount of capital dedicated to its technologies, and entranced numerous media outlets for the past couple of years. All of this attention, however, will ultimately prove unwarranted unless organizations, data scientists, and various vendors can answer one simple question: can they provide Explainable AI?

Although the ability to explain the results of Machine Learning models—and produce consistent results from them—has never been easy, a number of emergent techniques have recently appeared to open the proverbial ‘black box’ rendering these models so difficult to explain.

One of the most useful involves modeling real-world events with the adaptive schema of knowledge graphs and, via Machine Learning, gleaning whether they’re related and how frequently they take place together.

When the knowledge graph environment becomes endowed with an additional temporal dimension that organizations can traverse forwards and backwards with dynamic visualizations, they can understand what actually triggered these events, how one affected others, and the critical aspect of causation necessary for Explainable AI.

Read the full article at [AIthority](#).

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# Improving Data Processes with Knowledge Graphs

AllegroGraph Thought Leadership Article from Big Data Quarterly



Knowledge graphs link together data of any variety, structure, or format in business terms via uniform data models. Organizations can then join and traverse all of their data, semantically tagged with unique machine-readable identifiers, making the platform ideal for intelligent systems, machine learning analytics, interoperability, and an array of other benefits influential for AI applications.

The technology is gaining the attention of research firms and consultancies. In 2018 and 2019, knowledge graphs appeared on Gartner's Hype Cycle for Emerging Technologies, acknowledged for their hearty connections to pertinent data. According to Gartner, "These ecosystems developed as digitalization morphed traditional value chains, enabling more seamless, dynamic connections to a variety of agents and entities across geographies and industries. In the future these will include decentralized autonomous organizations (DAOs), which operate independently of humans and rely on smart contracts."

Download the Full White Paper.

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# 100 Companies That Matter in Knowledge Management

Franz Inc., is proud to announce that it has been named to The 100 Companies That Matter in Knowledge Management by KMWorld.

The annual list reflects the urgency felt among many organizations to provide a timely flow of targeted information. Among the more prominent initiatives is the use of AI and cognitive computing, as well as related capabilities such as machine learning, natural language processing, and text analytics.

“Knowledge management software and services providers are embracing a fresh wave of technological innovation to address heightened expectations—among both customers and employees—for the right information to be delivered to the right people at the right time, said Tom Hogan, Group Publisher at KMWorld. “To showcase organizations that are advancing their products and capabilities to meet changing requirements, KMWorld created the annual list of 100 Companies That Matter in Knowledge Management.”

“We are honored to receive this acknowledgement for our efforts in delivering Enterprise Knowledge Graph Solutions,” said Dr. Jans Aasman, CEO, Franz Inc. “In the past year, we have seen demand for Enterprise Knowledge Graphs take off across industries along with recognition from top technology analyst firms that Knowledge Graphs provide the critical foundation for artificial intelligence applications and predictive analytics. Our AllegroGraph Knowledge Graph Platform Solution offers a unique comprehensive approach for helping companies accelerate the creation of Enterprise Knowledge Graphs that deliver new value to their organization.”

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# How To Avoid Another AI Winter

Forbes published the following article by Dr. Jans Aasman, Franz Inc.'s CEO.



Photo: Getty

Although there has been great progress in artificial intelligence (AI) over the past few years, many of us remember the AI winter in the 1990s, which resulted from overinflated promises by developers and unnaturally high expectations from end users. Now, industry insiders, such as Facebook head of AI Jerome Pesenti, are predicting that AI will soon hit another wall—this time due to the lack of semantic understanding.

“Deep learning and current AI, if you are really honest, has a lot of limitations,” said Pesenti. “We are very, very far from human intelligence, and there are some criticisms that are valid: It can propagate human biases, it’s not easy to explain, it doesn’t have common sense, it’s more on the level of pattern matching than robust semantic understanding.”



Read the full article at [Forbes](#).

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# California utilities should have used digital twin technology instead of power shutoffs



Northern California's proactive power outages were not necessary last fall. Digital Twin technology can predict utility line failures and turn off power in milliseconds to avoid the potential of sparks igniting the surrounding area.

Digital twin technologies are gaining traction across industries and use cases. Initially devised as a means of monitoring assets and production settings in manufacturing, this technology has quietly seeped into other verticals like hospitality, construction, and building management and soon, electricity delivery.

The premier problem digital twins will solve is predicting power grid failure, which would alleviate the social, economic, and political issues that resulted from efforts to reduce the incidence and degree of catastrophes, property loss, and deaths stemming from downstream effects of power grid failure—such as recurring wildfires.



Digital twins can allay these concerns because they're based on real-time signals from a comprehensive set of factors that could be indicative of power grid

woes related to environmental, meteorological, or technology concerns. Moreover, they can deliver accurate predictions for

each of these factors well in advance of failure—in some cases as much as 28 days.

Read the full article at [PowerGrid International](#).

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## Franz Inc. to Present at The Global Graph Summit and Data Day Texas

Dr. Jans Aasman, CEO, Franz Inc., will be presenting, “Creating Explainable AI with Rules” at the Global Graph Summit, a part of Data Day Texas. The abstract for Dr. Aasman’s presentation:



*“There’s a fascinating dichotomy in artificial intelligence between statistics and rules, machine learning and expert systems. Newcomers to artificial intelligence (AI) regard machine learning as innately superior to brittle rules-based systems, while the history of this field reveals both rules and probabilistic learning are integral components of*

*AI. This fact is perhaps nowhere truer than in establishing explainable AI, which is central to the long-term business value of AI front-office use cases.”*

*“The fundamental necessity for explainable AI spans regulatory compliance, fairness, transparency, ethics and lack of bias – although this is not a complete list. For example, the effectiveness of counteracting financial crimes and increasing revenues from advanced machine learning predictions in financial services could be greatly enhanced by deploying more accurate deep learning models. But all of this would be arduous to explain to regulators. Translating those results into explainable rules is the basis for more widespread AI deployments producing a more meaningful impact on society.”*

The Global Graph Summit is an independently organized vendor-neutral conference, bringing leaders from every corner of the graph and linked-data community for sessions, workshops, and its well-known before and after parties. Originally launched in January 2011 as one of the first NoSQL / Big Data conferences, Data Day Texas each year highlights the latest tools, techniques, and projects in the data space, bringing speakers and attendees from around the world to enjoy the hospitality that is uniquely Austin. Since its inception, Data Day Texas has continually been the largest independent data-centric event held within 1000 miles of Texas.

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## **Franz's 2020 Predictions in the News**

Looking to the future of AI, KnowledgeGraph and Semantics we

had a number of publications cover our views of where AllegroGraph is headed.

**Datanami**

## **20 AI Predictions for 2020**

*We're still in the midst of a fake news crisis, and with the emergence of deep fakes, it will likely get worse. Luckily, we have the technology available to begin to address it, says Dr. Jans Aasman, the CEO of Franz.*

"Knowledge graphs, in combination with deep learning, will be used to identify photos and video that have been altered by superimposing existing images and videos onto source images," Aasman says. "Machine learning knowledge graphs will also unveil the origin of digital information that has been published by a foreign source. Media outlets and social networks will use AI knowledge graphs as a tool to determine whether to publish information or remove it."

**DBTA**

## **Ten Predictions for AI and Machine Learning in 2020**

*AI Knowledge Graphs will Debunk Fake News: "Knowledge Graphs in combination with deep learning will be used to identify photos and video that have been altered by superimposing existing images and videos onto source images. Machine learning knowledge graphs will also unveil the origin of digital information that has been published by a foreign source. Media outlets and social networks will use AI Knowledge Graphs as a tool to determine whether to publish information or remove it." – Dr. Jans Aasman, CEO of Franz, Inc.*



## **SD Times**

### **Software predictions for 2020 from around the industry**

*Jans Aasman, CEO of Franz, Inc.*

*Digital immortality will emerge: We will see digital immortality emerge in 2020 in the form of AI digital personas for public figures. The combination of Artificial Intelligence and Semantic Knowledge Graphs will be used to transform the works of scientists, technologists, politicians and scholars into an interactive response system that uses the person's actual voice to answer questions. AI digital personas will dynamically link information from various sources – such as books, research papers and media interviews – and turn the disparate information into a knowledge system that people can interact with digitally. These AI digital personas could also be used while the person is still alive to broaden the accessibility of their expertise.*

## **Dataversity**

### **Semantic Web and Semantic Technology Trends in 2020**

*“The big-name Silicon Valley companies (LinkedIn, Airbnb, Apple, Uber) are all building knowledge graphs. But more importantly, Fortune 500 companies, especially banks, are also investing in knowledge graph solutions.”*

*IoT gets into the picture too. Aasman points to “digital twins,” which can be thought of as specialized knowledge graphs, as an exceptionally lucrative element of the technology with an applicability easily lending itself to numerous businesses. Its real-time streaming data, simulation capabilities, and relationship awareness may well prove to be the ‘killer app’ that takes the IoT mainstream, he said. As an example, by consuming data transmitted by IoT sensors, digital twins will inform the monitoring, diagnostics, and prognostics of power grid assets to optimize asset performance and*

utilization in near real-time.

## **InsideBigData**

### **2020 Trends in Data Modeling: Unparalleled Advancement**

*Shapes Constraint Language (SHACL): SHACL is a framework that assists with data modeling by describing the various shapes of data in knowledge graph settings, which produces the desirable downstream effect of enabling organizations to automate “the validation of your data,” remarked Franz CEO Jans Aasman. SHACL operates at a granular level involving classifications and specific data properties.*

## **Workflow**

### **2020 Trends in CyberSecurity**

*Software-defined perimeter transmissions also guard information at the data layer by utilizing Datagram Transport Layer Security (DTLS) encryption and Public Key Authentication. Fortifying information assets at the data layer is likely the most dependable method of protecting them, because it's the layer in which the data are actually stored. It's important to distinguish data layer security versus access layer security. The latter involves a process known as security filtering in which, based on particular roles or responsibilities, users can access data. “You can specify filters where for a particular user or a particular role whether you could see or not see particular [data],” Franz CEO Jans Aasman said. “You could say if someone has the role administrator, we're telling the system ‘administrators cannot see [certain data]’.”*

*Moreover, triple attributes can be based on compliance needs specific to regulations – which is immensely utilitarian in*

*the post-GDPR data landscape. “For the government you could have a feature of whether you’re a foreigner or not,” Aasman said. “HIPAA doesn’t care whether you’re a foreigner or not, but you can do a separate mechanism for it.”*

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# Bitcoin RDF Model in AllegroGraph

For more examples visit  
– <https://github.com/franzinc/agraph-examples>

## Introduction

This example demonstrates an RDF model for Bitcoin chain data as well as a Python tool to pull the data from a Bitcoin node into an instance of an AllegroGraph graph database. The model description itself can be found in the Turtle file `model.ttl`.

The following Turtle example demonstrates how this RDF model can be used to represent complete chain entities (given example is a genesis block – the first block in the mainnet Bitcoin chain; script strings omitted for brevity):

```
@prefix :  
<https://raw.githubusercontent.com/franzinc/agraph-examples  
/master/data/bitcoin/model.ttl#>  
@prefix btc: <bitcoin://>  
  
btc:blk0  
:height 0;  
:hash  
"000000000019d6689c085ae165831e934ff763ae46a2a6c172b3f1b60a
```

```
8ce26f";
:time 1231006505;
:version 1;
:transaction
btc:4a5e1e4baab89f3a32518a88c31bc87f618f76673e2cc77ab2127b7
afdeda33b.

btc:4a5e1e4baab89f3a32518a88c31bc87f618f76673e2cc77ab2127b7
afdeda33b
:lockTime 0;
:input [:unlockScript "..."];
:output [:amount 5000000000; :lockScript "..."].
```

## Setup

The following examples assume AllegroGraph triple store and assume it is already installed and running on the target machine. The following AG instance settings settings are assumed as well:

```
host: localhost (default);
port: 10035 (default);
username: aguser;
password: agpassword.
```

We also assume the following bitcoind settings:

```
host: localhost (default);
port: 8332 (default);
username: btcuser;
password: btcpassword.
```

First, install the tool by cloning this repository, setting up virtual environment and installing the dependencies:

```
git clone http://github.com/franzinc/agraph-examples
cd agraph-examples/data/bitcoin
python3 -m venv .
source ./bin/activate
pip3 install -r requirements.txt
```

The following command starts the process of loading bitcoin chain data into an AG repository named bitcoin using 4 loader processes:

```
./convert.py \  
-source=http://btcuser:btcpassword@localhost:8332 \  
-destination=http://aguser:agpassword@localhost:10035 \  
-name=bitcoin \  
-workers=4 \  
-clear
```

### Example queries

Following are the examples of using SPARQL to extract different information about block data:

- number of known blocks:

```
PREFIX :  
<https://raw.githubusercontent.com/franzinc/agraph-examples/  
/master/data/bitcoin/model.ttl#>  
SELECT (COUNT(*) AS ?count) WHERE { ?b a btcm:Block. }
```

- total number of transactions:

```
PREFIX :  
<https://raw.githubusercontent.com/franzinc/agraph-examples/  
/master/data/bitcoin/model.ttl#>  
SELECT (COUNT(*) AS ?count) WHERE { ?tx a btcm:Transaction.  
}
```

- transaction in block 400:

```
PREFIX :  
<https://raw.githubusercontent.com/franzinc/agraph-examples/  
/master/data/bitcoin/model.ttl#>  
SELECT ?txid  
WHERE {  
  ?b a :Block.  
  ?b :height "570001"^^xsd:int.  
  ?b :transaction ?tx.
```

```
?tx :txid ?txid.  
}
```

- transactions sending more than 1000 BTC:

```
PREFIX :  
<https://raw.githubusercontent.com/franzinc/agraph-examples/master/data/bitcoin/model.ttl#>  
SELECT ?tx  
WHERE {  
  ?b a :Block.  
  ?b :transaction ?tx.  
  ?tx :output ?out.  
  ?out :amount ?amt.  
}  
GROUP BY ?tx  
HAVING (SUM(?amt) > 1000000000000)
```

- transactions sending BTC to Pirate Bay's address:

```
PREFIX :  
<https://raw.githubusercontent.com/franzinc/agraph-examples/master/data/bitcoin/model.ttl#>  
SELECT ?tx  
WHERE {  
  ?tx :output ?out.  
  ?out :lockScript ?s.  
  FILTER REGEX (?s, "<tpb address>").  
}
```

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# 2020 Trend Setting Products – AllegroGraph

Franz Inc. is proud to announce that it has been named to the 2020 Trend Setting Products in Data Management by Database Trends and Application Magazine.

*Database Trends and Applications (DBTA)* magazine announced its seventh annual list of trend-setting products in data management and analysis. The list, “DBTA Trend-Setting Products for 2020,” recognizes products in the marketplace that are both innovative and effective in helping customers address evolving challenges and opportunities. In all, 100 products are highlighted in the special December edition of *Database Trends and Applications* magazine and on the DBTA website, [www.dbta.com](http://www.dbta.com).

“The world of data management and analytics continues to evolve rapidly with new technologies and strategies,” remarked Thomas Hogan, Group Publisher of *Database Trends and Applications*. “Cutting through the hype and identifying products that deliver results in the real world is more important than ever. This list highlights products that are truly transformative in bringing greater agility, efficiency and innovation to market.”

“We are honored to receive this acknowledgement for our efforts in delivering Enterprise Knowledge Graph Solutions,” said Dr. Jans Aasman, CEO, Franz Inc. “In the past year, we have seen demand for Enterprise Knowledge Graphs take off across industries along with recognition from top technology analyst firms that Knowledge Graphs provide the critical foundation for artificial intelligence applications and predictive analytics. Our AllegroGraph Knowledge Graph Platform Solution offers a unique comprehensive approach for helping companies accelerate the creation of Enterprise

Knowledge Graphs that deliver new value to their organization.”

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# Loving Common Lisp, or the Savvy Programmer's Secret Weapon

This is the fifth edition (released September 2019) of Mark Watson's "Loving Common Lisp, or the Savvy Programmer's Secret Weapon."

From the website – "I removed some of the older material from the earlier editions and added application examples for deep learning, back-propagation and Hopfield neural networks, using the CLML machine learning library, heuristic search, and using Common Lisp clients for: MongoDB, Solr, and relational databases. For the older 3rd edition I added a chapter using my Natural Language Processing (NLP) library and a short chapter on information gathering. For the 5th edition I added an example application for generating Knowledge Graph data (RDF and Cypher for Neo4j graph database), and hybrid examples for using Python deep learning libraries (using a web service interface).

The purpose of this book is to provide a quick introduction to Common Lisp and then provide the user with many fun and useful examples for using Common Lisp.

[Link to the Book](#)