Graph Technology: AI's Missing Link

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Biography

Emil Eifrem is CEO and co-founder of Neo4j (http://neo4j.com). Emil famously sketched out what today is known as the property graph model on a flight to Mumbai in 2000. Since then Emil has devoted his professional life to building and evangelising graph databases.

He is a frequent conference speaker and a well-known author and blogger on NoSQL and graph databases, as well as co-author of the agreed Bible on graph databases, O'Reilly's Graph Databases (http://graphdatabases.com/).

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Abstract

Graph enhancements to Artificial Intelligence and Machine Learning are changing the landscape of intelligent applications. Beyond improving accuracy and modeling speed, graph technologies make building AI solutions more accessible. In this article, the author discusses why graph software could be the missing link to help you store and understand data to power up your Artificial Intelligence endeavours.

Introduction

AI (Artificial Intelligence) and Machine Learning (ML) absolutely have the potential to change our world, rethinking the way we work, play, date and who knows what else. The problem is that all our current breakthroughs are highly domain specific – and, despite all the hype, AI remains little more than a series of spectacular one-offs.

Despite having roots that stretch back to Alan Turing's work in the 1930s, AI is very much in its early adolescence and has some way to go especially in understanding social and contextual awareness.

The truth is that computers are only as clever as the data we give them to work on – that is to say the data we use to train smart algorithms. But it's us fallible humans that are choosing those datasets, a fact which has already thrown up some worrying anomalies. In one of the best-known recent examples Amazon had to shut down an AI-based recruiting tool, designed to search candidates for technical roles, after it reportedly stacked the odds against women. When developers looked under the bonnet, they found that the system had taught itself to give preference to male over female candidates and was not reacting in the gender-neutral way that its

creators envisaged, as it was trained on CVs from men, reflecting male dominance in the tech industry.

The power of connections

Maybe we shouldn't be too hard on the machines. Maybe we are the problem? After all, we are fallible humans, and not as 'rational' and data-driven as we would like to think. Maybe a better way would be to work with the computer to express our hidden blind spots and learn together?

We certainly need to do something to make AI to work in a 'smarter' way. Here lies the next problem: faster, more powerful, computers will not help solve this one, as software has no comprehension of context. So there is bit of a gaping hole here in terms of getting the right data results when one crucial and somewhat obvious pivotal point is missing – relationships.

Clearly, to get meaningful insight from data, it must be connected. Here is where something called graph technology[1], which is great at working with relationships, can help. Graph databases put data relationships front and centre, and then capture evidence that attributes to the strengths of these relationships. For instance, interconnections among people, groups and organizations in a social network can more accurately predict whether you are a smoker than more common socio-economic factors.

The strength of collaborative filtering

Just imagine what you can do if you link the power of graph technology with AI. For example, with a connections-first approach, it would quickly become apparent that that Amazon algorithm was skewing towards male candidate CVs, for example – a crucial first step in addressing the biases introduced in the algorithm training.

How does graph technology do this? It is because at the architectural level, graphs differ from conventional relational databases in that they document connections between data elements. This enables you to map relationships that would be impractical or even impossible in other databases – and it is a unique capability that makes graph technology and AI a perfect match: graph software supplies the context and makes it more explicit – aiding the algorithm, but also the trainer to see what is missing.

Given the strengths of graph technology, it is clear that connections are the 'missing link' when it comes to gaining better understanding from AI-trained data. Together, AI and graph software are the ideal combination to give us the better, faster predictions and a route to smart decision making we all crave.

Reference	
1	https://neo4j.com/blog/why-graph-databases-are-the-future/