Graph Analytics and Machine Learning in Spark

Data Application Lab

Graph Analytics

- What is graph database
- Applications
- Spark GraphX/GraphFrame
- Demo

Machine Learning

- Machine learning at scale
- Spark ML in action

Relational Database

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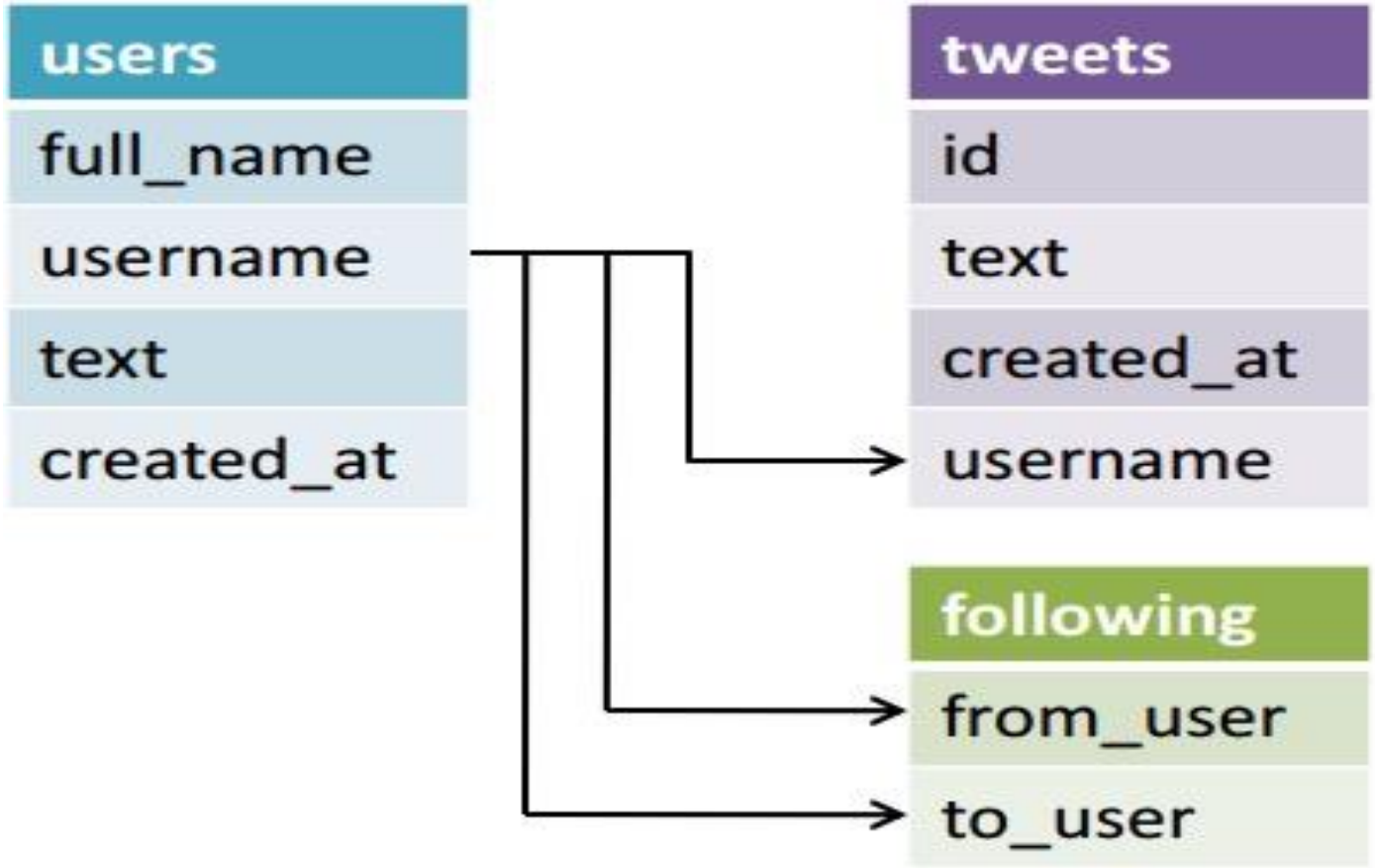

- Schema
- Table
- Key
- Join
- View

No-SQL Database

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- Key-Value
- Column based
- Document based
- Graph database

- Data model
- Data structure
- Scaling
- Development model

Data is more connected

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- Text
- Hypertext
- RSS
- Blogs
- Comments
- Review
- Endorse
- Message
- Locations

What is Graph Database

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1. A database with graph structure
2. Each node knows its adjacent nodes
3. As the number of nodes increases, the cost of a local computation remains the same

Why graph database

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1. Data connected
2. Performance
3. Flexibility
4. Agility

PageRank Algorithm

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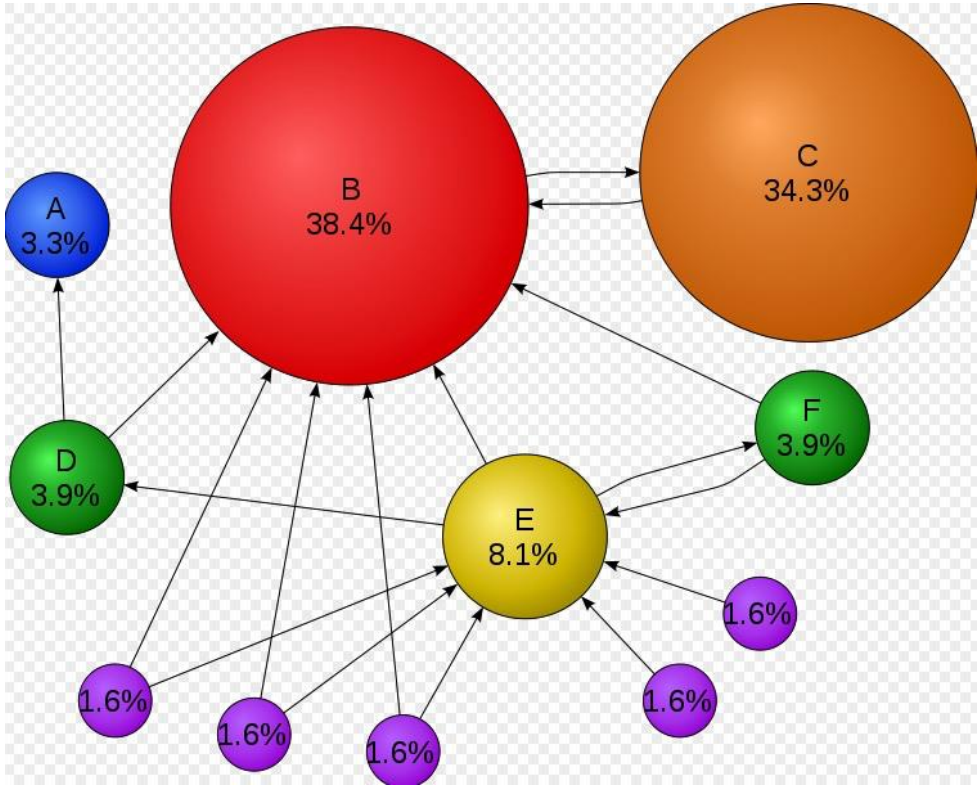
1. Rank page in Google search engine
2. Roughly estimate how important the website is
3. Count the number and quality of links at a page
4. Page C has a higher PageRank than Page E, even though there are fewer links to C; the one link to C comes from an important page and hence is of high value



Use Cases

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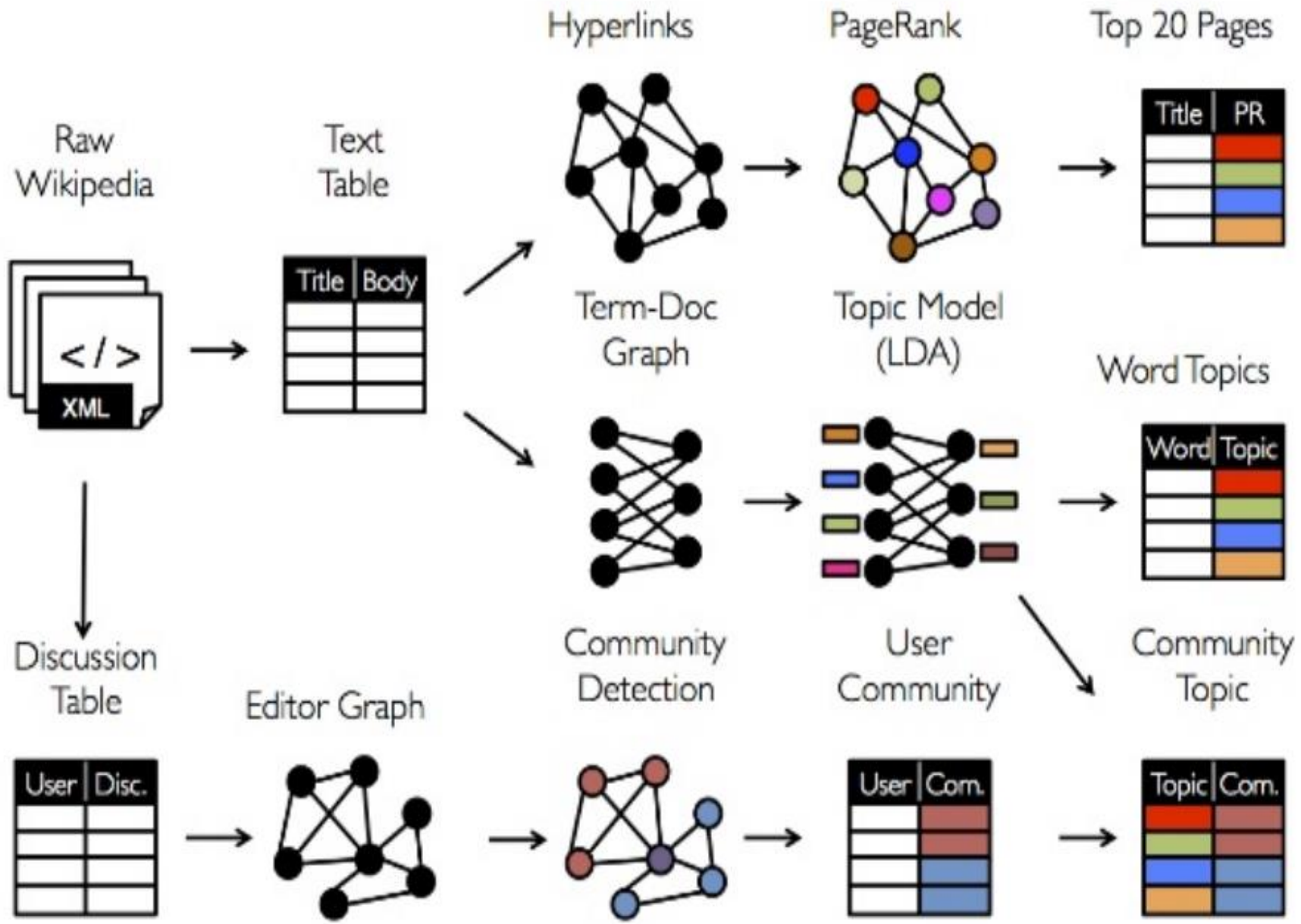
1. Fraud detection
2. Graph-based search
3. Network IT operations
4. Real-time recommendation
5. Social network
6. Identity and access management



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GraphX - Demo

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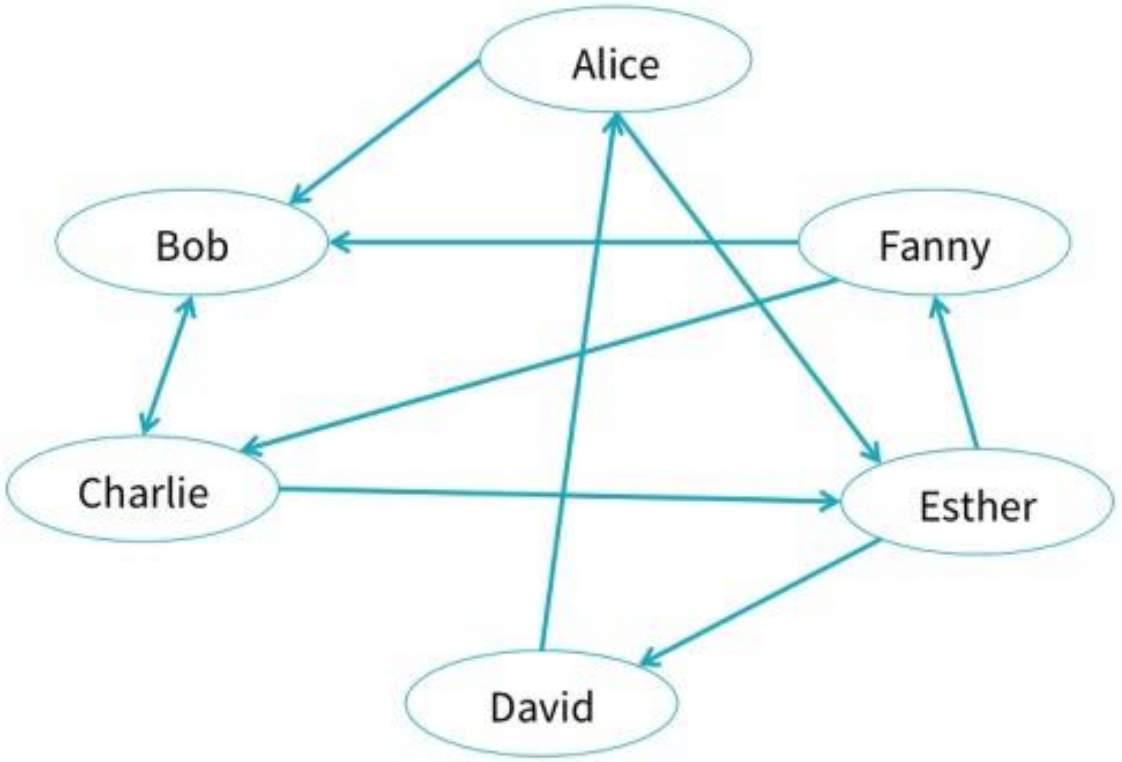

id	name	age
a	Alice	34
b	Bob	36
c	Charlie	30
d	David	29
e	Esther	32
f	Fanny	36

src	dst	relationship
a	e	friend
f	b	follow
c	e	friend
a	b	friend
b	c	follow
c	b	follow
f	c	follow
e	f	follow
e	d	friend
d	a	friend