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What's new in Hibernate 6.4?

by Christian Beikov



Who am I?

Christian Beikov

Long time Hibernate community contributor

Full time Hibernate developer at Red Hat since 2020

Founder of Blazebit and creator of Blaze-Persistence

Living in Vienna/AT and Bonn/DE

Like to play tennis and go running





Noteworthy in 6.2

`@Embeddable` as `@Struct` or JSON/XML

Java Record support

Unified value generation `@ValueGenerationType`

Table partitioning

SQL generation learned the `MERGE` statement

<https://in.relation.to/2023/03/30/orm-62-final/>



Noteworthy in 6.3

DAO/Repository support in annotation processor

Simple querying with `CriteriaDefinition`

`CriteriaQuery` from HQL

Upsert (a.k.a. insert-or-update) with `StatelessSession`

Revamped documentation

<https://in.relation.to/2023/08/31/orm-630/>



Noteworthy in 6.4

Soft delete

Array functions

Count query derivation

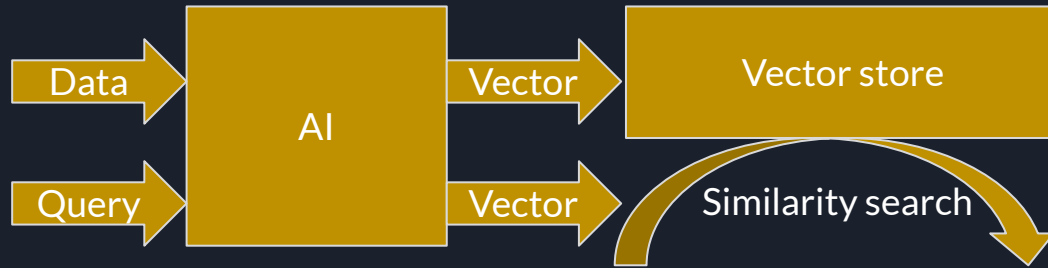
JFR events

Vector similarity search

<https://in.relation.to/2023/11/23/orm-640-final/>



What is vector similarity search?



AI creates embedding (vector) out of unstructured data

Related data have vectors “near” each other

Nearest neighbour search allows to find similar/related data



What is vector similarity search?

Vector is a numeric array e.g. `[1.0, 5.6, -0.38, 2.59, ...]`

Precision can be e.g. `float64, float32, float16` etc.

Speed up nearest neighbour search with index

- Flat (deterministic) e.g. IVFFlat (Inverted File Flat)
- Graph (approximate) e.g. HNSW (Hierarchical Navigable Small World)



Vector similarity search use cases?

Content filtering

Recommendation system

Fraud detection

Semantic search

Image search

etc.



Vector search supported databases

PostgreSQL pgvector extension

Oracle to provide implementation for Oracle DB

Ideas for supporting other databases or extensions?

Could support any database with array support, but slow without indexes



Vector search Pros and Cons

- + Improve search relevance “magically”
- + Efficiency
- + Easy to implement

- AI and embedding vectors are black boxes
- Trial and error for data preparation
- Additional infrastructure/cost



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Demo source

<https://github.com/beikov/quarkus-insights>



ORM 6.5 outlook

Insert `on conflict` clause a.k.a. Upsert

Joins in DML (update, delete)

`@FractionalSeconds` for temporal columns

Generated values retrieval through returning clause

Configure query cache layout



What's next?

ORM 6.6

- Nested array support
- Ensure orm.xml can fully replace hbm.xml

ORM 7.0

- Boot abstraction for type discovery and reflection
- Jakarta Persistence 3.2
- Java 17 requirement
- Remove deprecated APIs
- Remove hbm.xml?



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Q & A