

Oracle 23ai: **Die Datenbank wird intelligent**

Sichere Integration von LLMs für smarte Anwendungen

Maximillian Jahn
@maxjahn

A black and white portrait of a man with short dark hair, wearing a dark suit jacket over a light-colored button-down shirt. He is looking slightly to the right of the camera with a neutral expression. The background of the slide is a solid blue color with a pattern of stylized, overlapping white clouds.

About

MMag. Maximillian Jahn, LL.B.(WU)

- Head of Cloud Advisory bei **Orbit Cloud Solutions**
- Vormals Principal Cloud Architect bei **Oracle**
- Certified Cloud Architect für OCI, AWS, Azure und Google Cloud
- Focus auf Statistik im Studium
- Co-Autor einiger wissenschaftlicher Papers zu Recommender Systemen

Agenda

Einführung

Alles AI heute?

Grundlagen

Was man wissen sollte

S/LLMs in der Datenbank

Die Oracle DB lernt den Kontext zu verstehen

Der Scotch Badger Shop

Ein hypothetisches Fallbeispiel

Vorteile von In-DB LLMs

Das Beste zweier Welten?

Conclusio

Ausblick

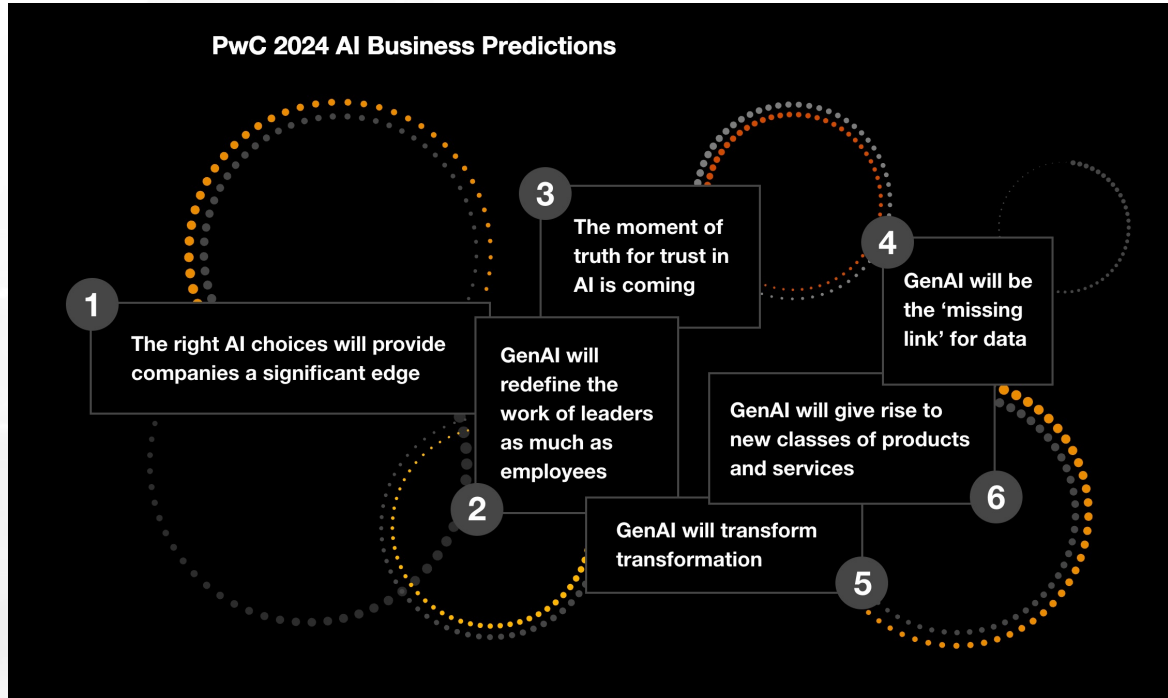


01

Einführung

Alles AI heute?

Hohe Erwartungen



<https://www.pwc.com/us/en/tech-effect/ai-analytics/ai-predictions.html>

74%

of leaders expect GenAI to impact their business significantly.

Hohe Erwartungen

Key benefits organizations hope to achieve with generative AI

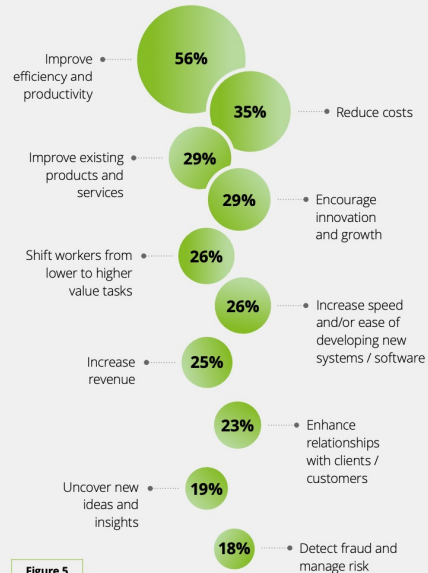


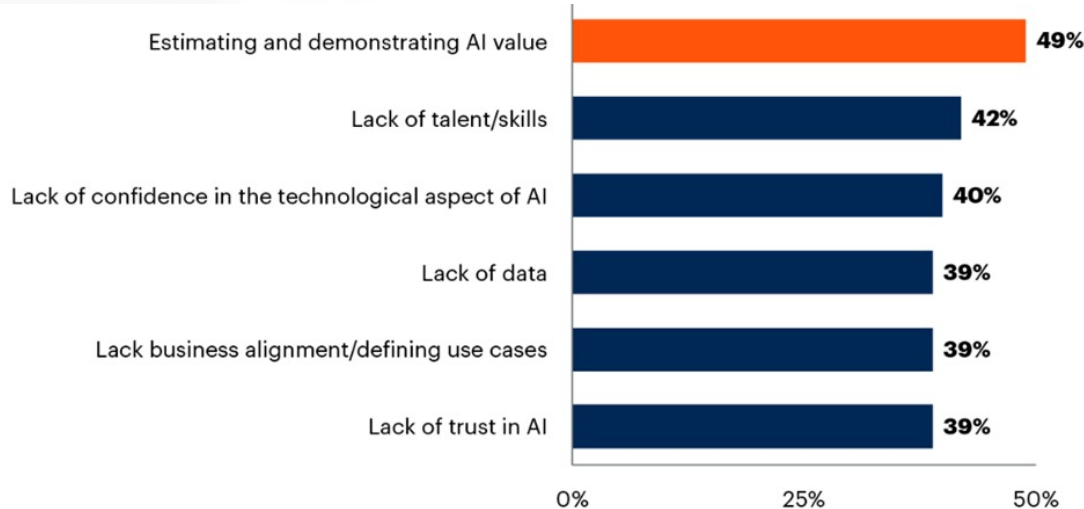
Figure 5

Q: What are the key benefits you hope to achieve through your generative AI efforts?
(Oct./Dec. 2023) N (Total) = 2,835

91% of all organizations expect their productivity to increase due to generative AI.

Now decides next: Insights from the leading edge of generative AI adoption. Deloitte's State of Generative AI in the Enterprise. January 2024

Große Bedenken



n = 632, leaders highly involved in AI; excludes "unsure"

Q. What are or will be the top 3 barriers to the implementation of AI techniques within your organization?

Source: 2023 Gartner AI in the Enterprise Survey

810529_C

Gartner

<https://www.gartner.com/en/newsroom/press-releases/2024-05-07-gartner-survey-finds-generative-ai-is-now-the-most-frequently-deployed-ai-solution-in-organizations>

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Maximillian Jahn

Große Bedenken

Specific generative AI risks and concerns include inaccurate results and information (i.e., “hallucinations”); legal risks such as plagiarism, copyright infringement, and liability for errors; privacy and data ownership challenges; lack of transparency, explainability and accountability; and systemic bias. The latter exemplifies another category of risk in which AI amplifies and exacerbates a problem that already exists, such as propagating and systematizing existing social biases, facilitating and accelerating the spread of misinformation, helping criminals commit crimes, or fanning the flames of political divisiveness.

According to the business and technology leaders we surveyed during fourth quarter 2023, the biggest concerns related to governance were: lack of confidence in results (36%), intellectual property issues (35%), misuse of client or customer data (34%), ability to comply with regulations (33%), and lack of explainability / transparency (31%).

Now decides next: Insights from the leading edge of generative AI adoption. Deloitte's State of Generative AI in the Enterprise. January 2024

Erwartungen

- Produktivitätssteigerung
- Neudefinition der Arbeit von Führungskräften ebenso wie von Mitarbeitern
- Generative KI wird die Transformation transformieren
- Verbesserung bestehender Produkte und Dienstleistungen
- Innovation und Wachstum fördern
- Neue Ideen und Erkenntnisse aufdecken

Oracle 23ai: Die Datenbank wird intelligent.
Sichere Integration von LLMs für smarte Anwendungen.

Bedenken

- Wie den Wert von KI einschätzen und nachweisen?
- Mangel an Know-How in der Organisation
- Mangelndes Vertrauen in die Ergebnisse
- Probleme mit geistigem Eigentum
- Missbrauch von Kunden- oder Mandantendaten
- Einhaltung von Vorschriften
- Erklärbarkeit / Transparenz der Ergebnisse



02

Grundlagen

Was man wissen sollte



***„Jede hinreichend
fortgeschrittene
Technologie ist von Magie
nicht zu unterscheiden“***

Arthur C. Clarke's 3rd Law

MJ Was ist die Fluggeschwindigkeit einer unbeladenen Schwalbe?



MJ



Reply to Claude...

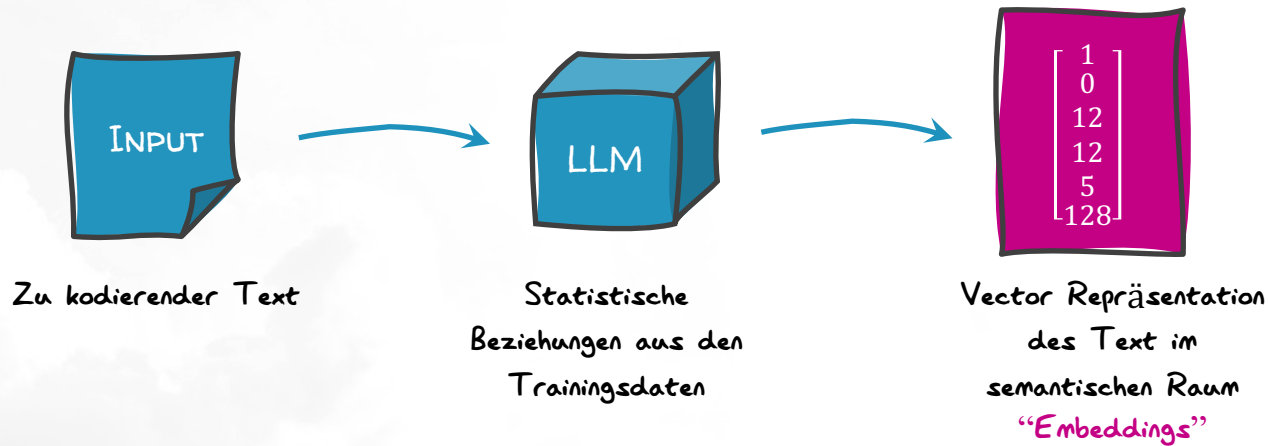


Claude 3.5 Sonnet

Large Language Models

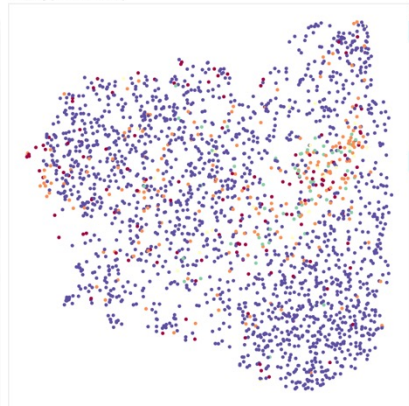
- Ein (Large Language Model, LLM) ist ein Computermodell, das sich durch seine Fähigkeit auszeichnet, allgemeine Sprachgenerierung und andere Aufgaben der natürlichen Sprachverarbeitung wie Klassifizierung durchzuführen.
- Basierend auf Sprachmodellen erwerben LLMs diese Fähigkeiten, indem sie während eines rechenintensiven Trainingsprozesses statistische Zusammenhänge aus riesigen Textmengen lernen.
- Ausgehend von der Transformer-Architektur gibt es zwei große Gruppen von LLMs:
 - Autoencoding-Modelle
 - Autoregressive-Modelle

Autoencoding Modelle

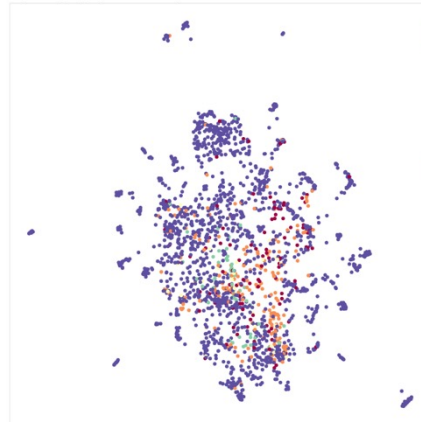


Visualisierung mit UMAP (Uniform Manifold Approximation and Projection for Dimension Reduction)

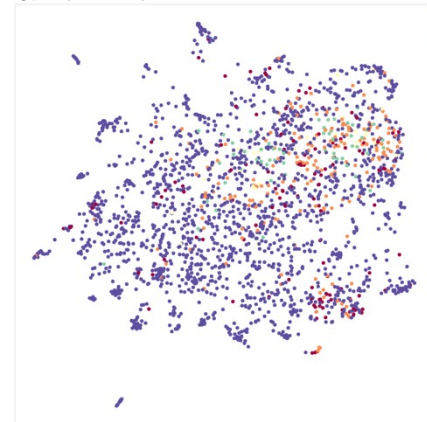
bert_tiny (128 dimensions)



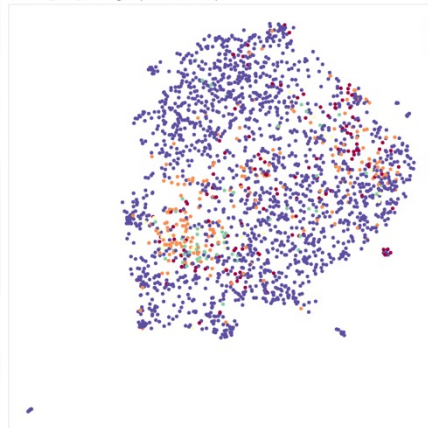
all_MiniLM_L12_v2 (384 dimensions)



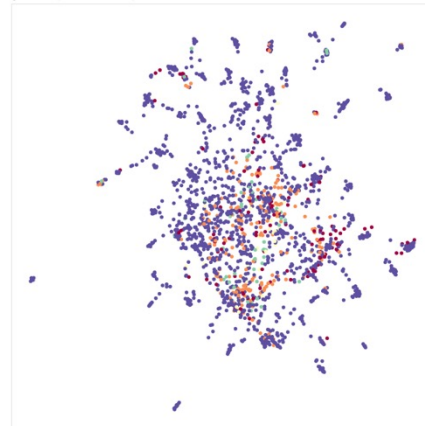
bge_micro (384 dimensions)



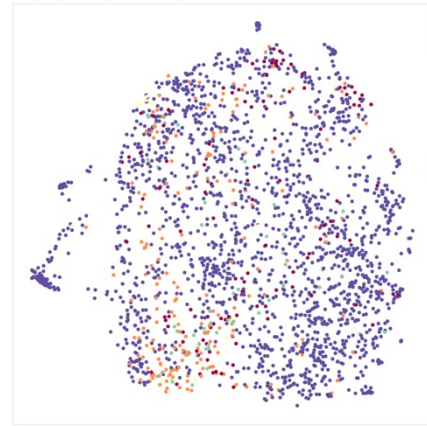
distiluse_base_multilingual (512 dimensions)



gte_base (768 dimensions)



all_mpnet_base_v2 (768 dimensions)

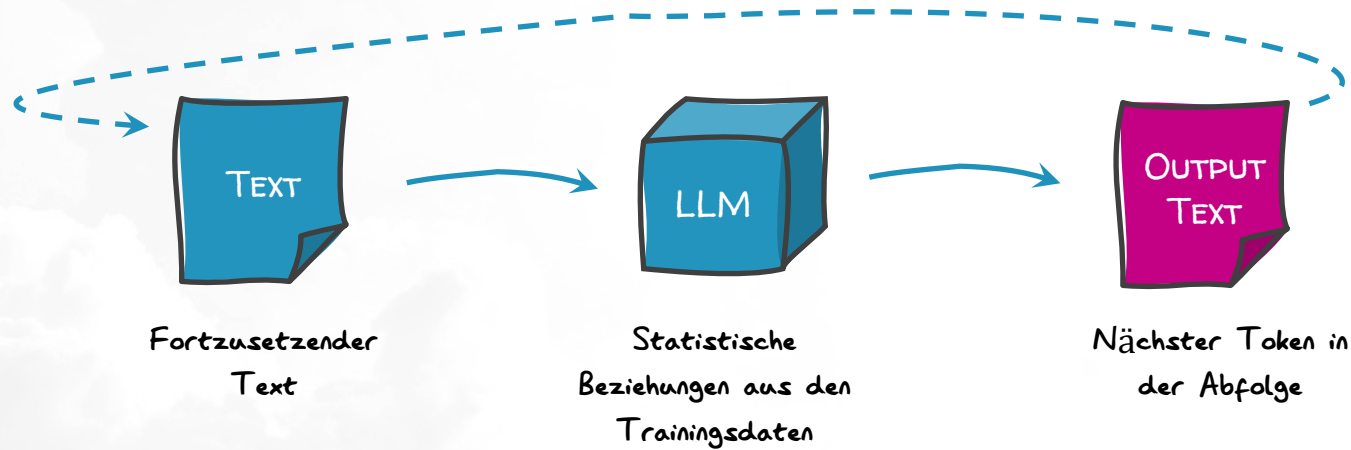


Text verstehen

- Extrahiert aus dem Input/Text
 - Semantische Bedeutung
 - Semantische Ähnlichkeit
 - Zusammenfassungen
 - Kategorisierung
- "Was ist das fehlende Stück, das hier die Lücke füllt?"
- Encoder-Teil des Transformers



Autoregressive-Modelle



Text erzeugen

- Tokens generieren
- Text generieren
- Dialog führen
- "... Erzähl mir mehr"
- Decoder-Teil des Transformers



03



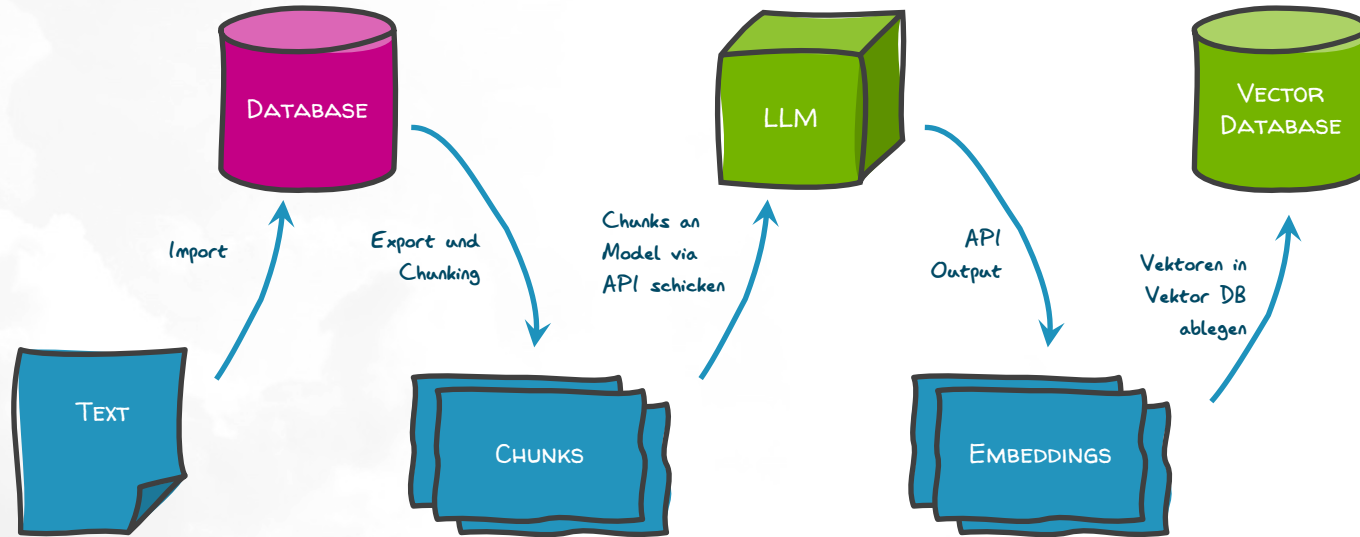
S/LLMs in der Datenbank

Die Oracle DB lernt den Kontext zu verstehen

Was davon ist relevant für uns?

- In einer Datenbank möchten wir unser Verständnis der Daten erweitern, daher wollen wir **Autoencoding-Funktionen** nutzen.
 - Semantische Ähnlichkeit
 - Semantische Suche
 - Zusammenfassung
 - Kategorisierung
- Um eine semantische Repräsentation unserer Daten zu erhalten, verwenden wir **Embedding-Modelle**

Embeddings erzeugen



Modelle für Embeddings

- Proprietäre Modelle

- OpenAI
- Cohere
- Google AI / VertexAI
- Anthropic
- Mistral

- Open Source Modelle

- BERT (Bidirectional Encoder Representations from Transformers)
- RoBERTa (Robustly Optimized BERT Pretraining Approach)
- DistilBERT
- ELMo (Embeddings from Language Models)
- Viel mehr im HuggingFace Hub!



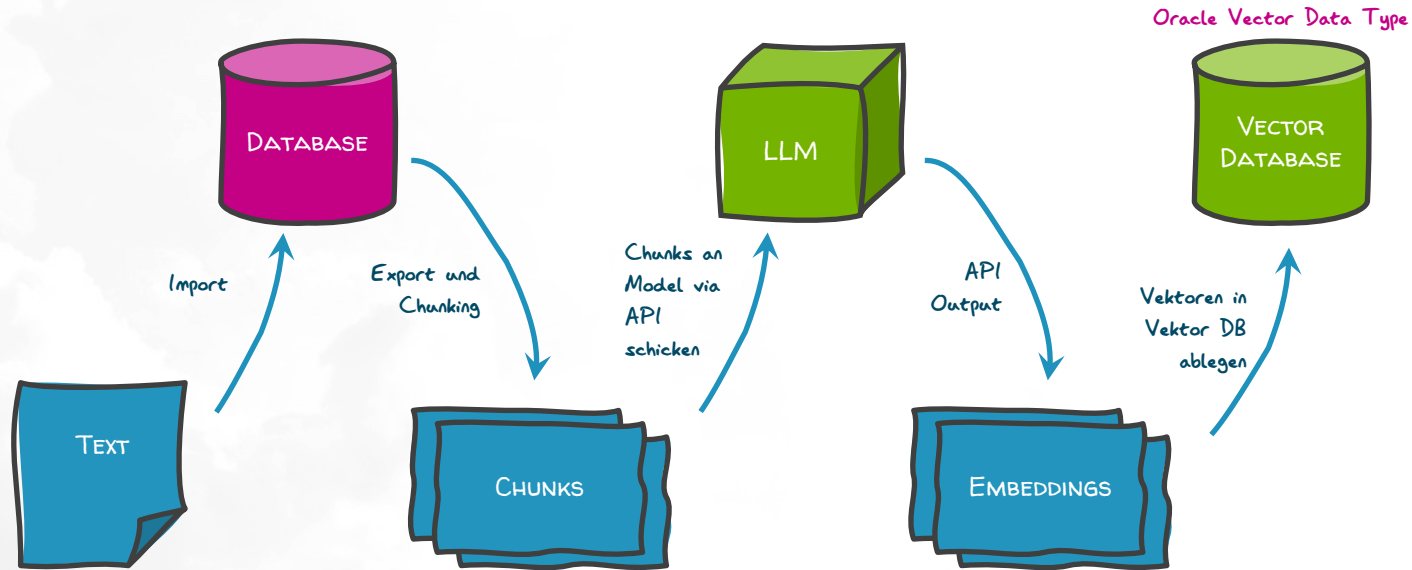
Proprietäre ("Closed Source") Modelle erfordern in der Regel Endpoints, die vom Anbieter oder Partnern bereitgestellt werden (z.B. Azure und OpenAI, Oracle und Cohere)

Open-Source-Modelle können auf eigener Infrastruktur gehostet werden

Embedding Modelle

- (Open Source) Modelle können direkt in der Oracle-Datenbank ausgeführt werden!
 - Oracle Machine Learning (OML) unterstützt bereits seit einiger Zeit In-DB-Modelle im ONNX Format
- Datenbank-Maschinen haben normalerweise keine (bzw. unterstützt die DB keine) GPUs, daher muss das Modell klein und schlank sein.
 - Außerdem wollen wir grundsätzlich immer die Anzahl der CPUs minimieren, auf denen Oracle DBs laufen...

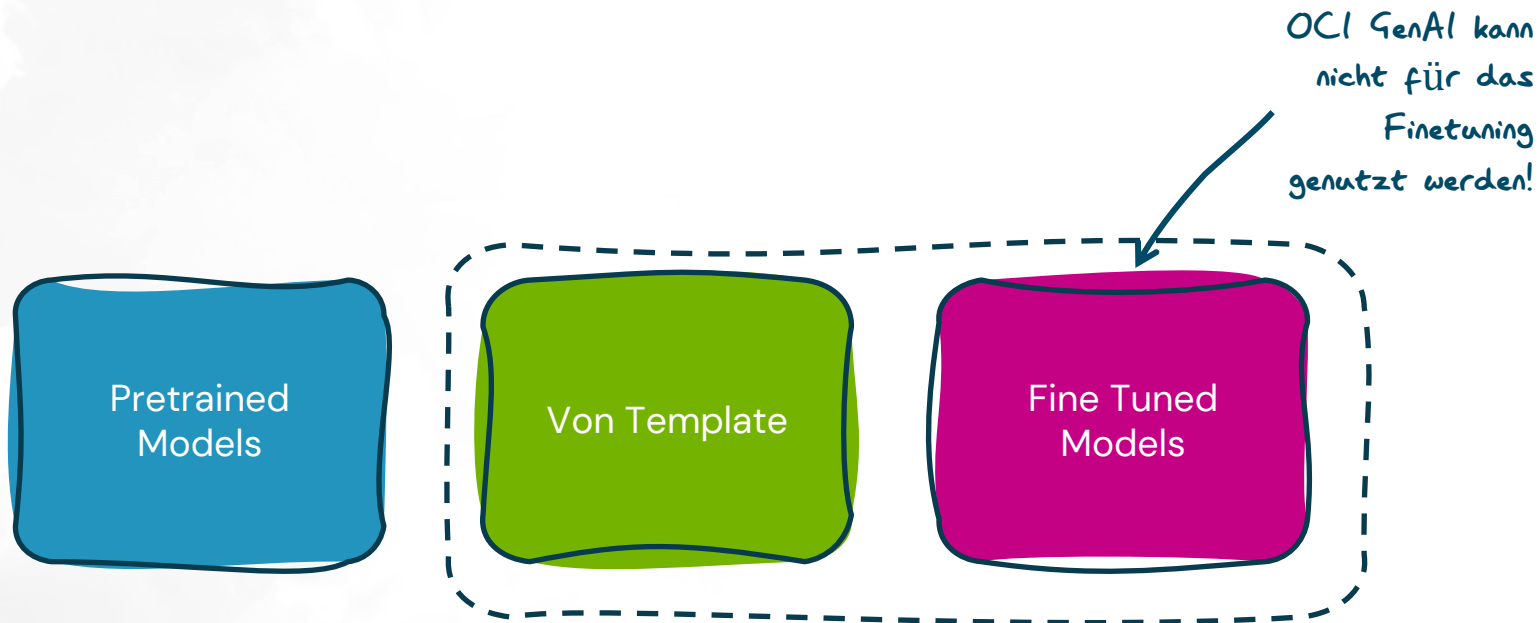
Embeddings erzeugen



HuggingFace Pretrained Models

- sentence-transformers/all-mpnet-base-v2
- sentence-transformers/all-MiniLM-L6-v2
- sentence-transformers/multi-qa-MiniLM-L6-cos-v1
- ProsusAI/finbert
- medicalai/ClinicalBERT
- sentence-transformers/distiluse-base-multilingual-cased-v2
- sentence-transformers/all-MiniLM-L12-v2
- BAAI/bge-small-en-v1.5
- BAAI/bge-base-en-v1.5
- taylorAI/bge-micro-v2
- intfloat/e5-small-v2
- intfloat/e5-base-v2
- prajjwal1/bert-tiny
- thenlper/gte-base
- thenlper/gte-small
- TaylorAI/gte-tiny
- infgrad/stella-base-en-v2
- sentence-transformers/paraphrase-multilingual-mpnet-base-v2
- intfloat/multilingual-e5-base
- intfloat/multilingual-e5-small
- sentence-transformers/stsb-xlm-r-multilingual
- ...

Modelle importieren



Embeddings in der DB erzeugen

- Erstbeladung
 - Mit SQL oder PL/SQL
- Automatisierte Updates
 - Database Triggers
 - DB Scheduler Jobs

Alles wird innerhalb der Datenbank ausgeführt:
Keine Daten werden exportiert oder an externe API-Aufrufe weitergegeben!

Daten abfragen

- Vektor-Indizes hinzufügen
 - In-Memory Neighbor Graph-Vektorindex: Hierarchical Navigable Small World (HNSW) wird in RAC (= OCI Autonomous DB) Umgebungen nicht unterstützt
 - Nachbarschaftspartitions-Vektorindex: Inverted File Flat (IVF)
- Oracle SQL Vektor-Funktionen (VECTOR_DISTANCE) zur Abfrage von Daten
 - euclid, cosine, scalar product, manhattan



04

Der Scotch Badger Shop

Ein hypothetisches Fallbeispiel

Fallbeispiel

- Händler für schottischen Whisky
- Normalerweise ~300 Artikelnummern (SKUs) im Verkauf
- Bewertungen für ~2300 Whisky-Sorten
- Bestandsverwaltung in Oracle DB
- Autonomous DB in OCI mit Oracle 23ai
- Apex-Anwendungen für Vertrieb und Backoffice
- Kunden-Website



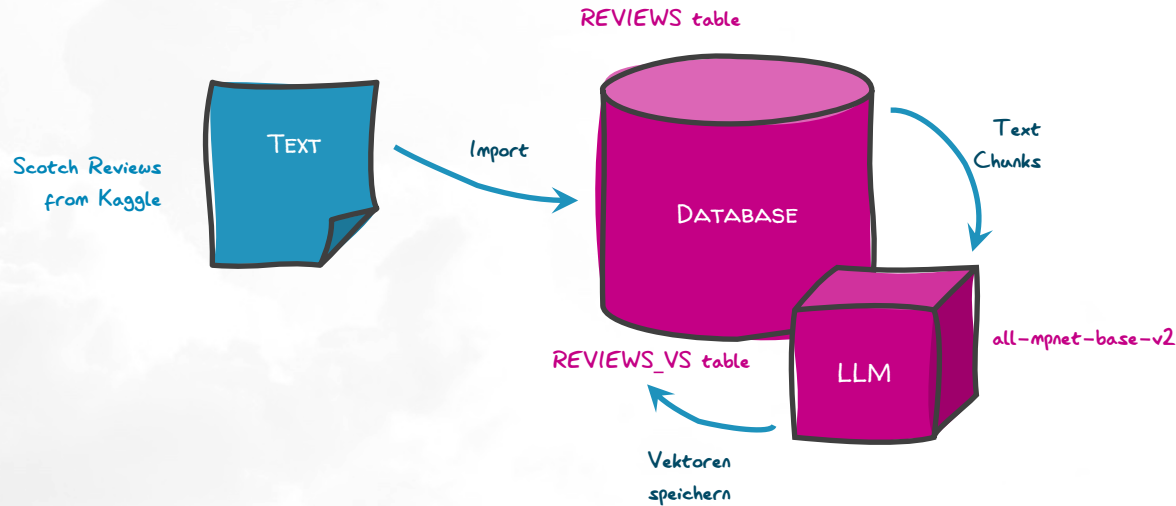
Anforderungen

- Eine semantische Suche zur Backoffice-Anwendung hinzufügen, um Produkte zu finden
- Funktionalität zum Finden ähnlicher Produkte
- Funktionalität zum Finden ähnlicher Produkte, die auf Lager sind
- Einen Chatbot auf der Website einrichten, der über Whisky plaudern und Empfehlungen basierend auf interner Dokumentation und bereits in der Oracle-Datenbank gespeicherten Bewertungen geben kann
- Möglichkeit, die verwendeten Modelle zu trainieren/feinzutunen

Modellauswahl

- Embedding-Modell
- Englische Sprache
- Keine spezifischen Domänenkenntnisse
- Schnell und klein
- Für die Implementierung wurde **sentence-transformers/all-mpnet-base-v2** verwendet
 - Zu ONNX konvertiert und in OCI Object Storage hochgeladen
 - ONNX-Modell mit PL/SQL importiert

Embeddings





Backoffice Application

Products

🔄 Reset

+ Create

🔍 Semantic Search

No Record Selected

☐ In Stock

Aberlour 16 year old, 40%
Single Malt Scotch

Adelphi (distilled at Bowmore) 12 year old 2000, 5...
Single Malt Scotch

Ardbeg Auriverdes, 49.9%
Single Malt Scotch

Ardbeg Grooves, 46%
Single Malt Scotch

Ardbeg Supernova (2010 Release), 60.1%



Products

Search...

☐ In Stock

Aberlour 16 year old, 40%
Single Malt Scotch

Adelphi (distilled at Bowmore) 12 year old 2000, 5...
Single Malt Scotch

Ardbeg Auriverdes, 49.9%
Single Malt Scotch

Ardbeg Grooves, 46%
Single Malt Scotch

Ardbeg Supernova (2010 Release), 60.1%
Single Malt Scotch

Ardbeg Supernova 2015 Release, 54.3%
Single Malt Scotch

Semantic Search



Semantic Search
seaweed and smoke

Search Results

Name	Category	Description
The McGibbons Provenance (distilled at Port Ellen), 19 year old, 1982, 62.5%	Single Malt Scotch	Amber color. Full aroma of peat smoke, with interwoven notes of seaweed, burning leaves, leather, and fudge. Medium in body, with a slight oily texture. Powerful and evolving in flavor, with great depth. It begins somewhat sweet up front with notes of vanilla and toffee, followed by a peat smoke explosion. Lingering notes of seaweed, oak, salt and pepper add complexity. Finally, the whisky becomes slightly sweet again, with lingering smoke.
Ardbeg Supernova 2015 Release, 54.3%	Single Malt Scotch	Apparently this is the final Supernova release and the Ardbeg team has ensured it goes out with all guns blazing. Although it seems calm initially—there's a minty and sweet spicy element to the fore—the smoke begins to push through in the guise of creosote, then sootiness which, in turn, mingles with seaweed aromas. The peat dominates the palate but there is sufficient oiliness to round it out and add layers of smoked fish, and dried grasses. Farewell.
The BenRiach Importanticus, 12 year old, 46%	Single Malt Scotch	Finished in a tawny port cask. Peat smoke and seaweed interwoven with layers of ripe, red fruit (currant, raspberry, cherry), crisp citrus, graham cracker, vanilla, and honey. Nice interplay between sweetness, fruit, and smoke. (Brighter and

Products

talisker

In Stock

Double Barrel
Talisker/Craigellachie, 46%
Blended Malt Scotch Whisky

Douglas Laing Premier
Barrel (distilled at Taliske...
Single Malt Scotch

Douglas Laing Provenance
(distilled at Talisker) 6...
Single Malt Scotch

Douglas Laing Provenance
Young & Feisty (distilled...
Single Malt Scotch

Talisker 10 year old, 45.8%
Single Malt Scotch

Talisker 10 year old, 45.8%
Single Malt Scotch

Reviews

Edit Similar Similar In Stock

Name	Talisker 10 year old, 45.8%
Category	Single Malt Scotch
Rating	90
Description	Fresh, vibrant. Appetizingly briny, with notes of seaweed, fishnets, lemongrass, smoke, and damp peat. A bed of light toffee provides contrast and balance. It finishes with a knockout punch: powerfully peppery and salty. This whisky remains a beautifully dynamic and bold whisky.

Stock

No stock available



Products

talisker

In Stock

Double Barrel
Talisker/Craigellachie, 46%
Blended Malt Scotch Whisky

Douglas Laing Premier
Barrel (distilled at Taliske...
Single Malt Scotch

Douglas Laing Provenance
(distilled at Talisker) 6...
Single Malt Scotch

Douglas Laing Provenance
Young & Feisty (distilled...
Single Malt Scotch

Talisker 10 year old, 45.8%
Single Malt Scotch

Talisker 10 year old, 45.8%
Single Malt Scotch

Similar



Name	Category	Rating	Description
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Cadenhead	Single Malt Scotch	89	Antique gold color. Aromas of peat smoke, damp earth, exotic pepper, vanilla, and fruit. Medium body. A great balance of flavors, with a lovely Islay character. The whisky begins sweet up front, ultimately turning pleasingly dry towards the finish. In between you'll enjoy flavors of peat smoke, vanilla, spicy pepper, and delicately honeyed malt, with just a hint of the sea. What I like most about this whisky is its impeccable balance-between youth and maturity, sweetness and dryness-with just the right amount of peat smoke to declare its Islay roots without smothering its other flavors.
Ardbeg, 10 year old, 46%	Single Malt Scotch	93	Straw-gold color. On the nose, sweet toffee, citrus notes, seaweed, and spice complement a powerful peat smoke infusion. In body, it is thick and oily. On the palate, a somewhat sweet maltiness up front is run over by a powerful peat smoke locomotive. Again, the whisky is enriched with citrus and pear notes, spice, and seaweed. The finish is powerful, long, and warming. The smoke lingers for minutes, if not hours. If you like your Ardbeg to go to a phenolic extreme, you will cherish this one. This big, powerful whisky makes no apologies for its Islay roots. And the fact that this whisky is bottled at 46% ABV just makes this big whisky even bigger.
			Light to medium in body (and quite pale in color), but quite

Create

Semantic Search



Edit

Similar

Similar In Stock

lemongrass, smoke, and damp peat. A bed of
ut punch: powerfully peppery and salty. This

Products

Reset

Create

Semantic Search

talisker

☐ In Stock

Double Barrel
Talisker/Craigellachie, 46%
Blended Malt Scotch Whisky

Douglas Laing Premier
Barrel (distilled at Taliske...
Single Malt Scotch

Douglas Laing Provenance
(distilled at Talisker) 6...
Single Malt Scotch

Douglas Laing Provenance
Young & Feisty (distilled...
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Talisker 10 year old, 45.8%
Single Malt Scotch

Talisker 10 year old, 45.8%
Single Malt Scotch

Reviews

Edit

Similar

Similar In Stock

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Stock

No stock available



Products

talisker

☐ In Stock

**Double Barrel
Talisker/Craigellachie, 46%**
Blended Malt Scotch Whisky

**Douglas Laing Premier
Barrel (distilled at Taliske...**
Single Malt Scotch

**Douglas Laing Provenance
(distilled at Talisker) 6...**
Single Malt Scotch

**Douglas Laing Provenance
Young & Feisty (distilled...**
Single Malt Scotch

Talisker 10 year old, 45.8%
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Talisker 10 year old, 45.8%
Single Malt Scotch

Similar in Stock

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Signatory (distilled at Caol Ila), 14 year old, 1990 vintage, 56.2%	Single Malt Scotch	85	Light to medium in body (and quite pale in color), but quite invigorating. A flirtatious vanilla sweetness at the front of the palate quickly evolves into spicy, peppery, grassy notes. The whisky evolves further, expressing notes of smoke, tar, chewy seaweed, brine, feint green tea and olives. A persistent, if delicate, honey sweetness hangs on throughout to offer some gentility. Lingering, smoky finish. A raw whisky, but somehow compelling. An excellent value too! (Bottled exclusively for Binny's Beverage Depot.)
Lagavulin, 12 year, 57.8%	Single Malt Scotch	84	Style: Islay single malt scotch Color: Pale straw Aroma: Peat smoke-lots of it. Damp earth. Hint of olives and seaweed. Palate: Surprisingly gentle in texture and on the light side of medium in body. A malty sweetness balances the dry-ish peat smoke. Again the damp earth mid palate. An appetizing saltiness emerges towards the finish, but is fleeting. Smoky finish.
			Very dry, fragrant and spicy. Medium bodied, but firm. Initial,

+ Create

Semantic Search



Edit

Similar

Similar In Stock

lemongrass, smoke, and damp peat. A bed of
but punch: powerfully peppery and salty. This



Erweiterte Similarity Search

- Mit der Multimodell-Suche in Oracle können wir sowohl Vektor- als auch relationale Daten abfragen, um Fragen zu beantworten wie:
 - Welche ähnlichen Produkte sind auf Lager oder werden nächste Woche nachbestellt?
 - Welche unserer Produkte unterscheiden sich stark von unseren 3 meistverkauften Produkten?
 - Welche Kunden haben in den letzten 6 Monaten Produkte bestellt, die gut zu BBQ passen? (Um ein Werbeangebot zu versenden)
 - Haben unsere Kunden in Österreich andere Präferenzen als Kunden in Norddeutschland?
- Diese Art von Abfragen funktioniert nicht gut mit separaten Vektor-Datenbanken oder separaten semantischen Suchmaschinen
- Alternativ Nutzung von Tools und/oder Agents

Product Browser

Semantic Search

Search

A. D. Rattray (distilled at Bowmore), 18 year old ...
Single Malt Scotch

A.D. Rattray (distilled at Highland Park) 19 year ...
Single Malt Scotch

A.D. Rattray (distilled at Littlemill) 22 year old...
Single Malt Scotch

Aberfeldy 14 year old Single Cask, 58.1%
Single Malt Scotch

Aberfeldy 16 year old, 40%
Single Malt Scotch

Aberfeldy 18 year old, 40%
Single Malt Scotch

Aberfeldy Single Cask (Cask No. 5) 16 year old, 57...
Single Malt Scotch

Products

Find Similar

Find Similar in Stock

Scotch Assistant

Name	A. D. Rattray (distilled at Bowmore), 18 year old (Cask #2075), 53.5%
Category	Single Malt Scotch

Show All Reviews Stock

Reviews

+

	Rating	Description
	90	The fruit (orange marmalade, tangerine, fresh pineapple) is nearly as dominant as the leafy smoke. Sweet notes of nutty caramel, honeyed barley, toffee, and nougat round out the palate. Ginger, cinnamon, telicherry pepper, tobacco, and ash play a supporting role. Lingering fruity, smoky finish. For those who like sherried Islay whiskies.

1 - 1

Edit

Save

		Category		Stock	Restock Date
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No data found

Product Browser

 Semantic Search

Search

A. D. Rattray (distilled at Bowmore), 18 year old ...
Single Malt Scotch

A.D. Rattray (distilled at Highland Park) 19 year ...
Single Malt Scotch

A.D. Rattray (distilled at Littlemill) 22 year old...
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Aberfeldy 14 year old Single Cask, 58.1%
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Aberfeldy Single Cask (Cask No. 5) 16 year old, 57...
Single Malt Scotch

Products

Name

Category

Show All

Reviews

Stock

Reviews

	Rating	Description
	90	The fruit (orange, nougat round, sherried Islay

Edit

Save



Assistant



Current item will be used as context.



Nepomuk at your service. How can I support you today?

Provide a short sales pitch for this Whisky. Add the key qualities as bullet points.

VE



Discover the rich and complex flavors of the A. D. Rattray, an 18-year-old single cask whisky distilled at Bowmore. This exclusive dram, matured in cask #2075, perfectly encapsulates the essence of Islay with its balanced smoky and fruity character.

Key Qualities:

- **Age:** 18 Years Old
- **ABV:** 53.5%, offering a robust and full-flavored experience
- **Flavor Profile:** A harmonious blend of orange marmalade, tangerine, and fresh pineapple with a smoky leafy essence

Type your message here



Find Similar

Find Similar in Stock



Scotch Assistant

k #2075), 53.5%



smoke. Sweet notes of nutty caramel, honeyed barley, toffee, and supporting role. Lingering fruity, smoky finish. For those who like

1 - 1

Stock

Restock Date


No data found



Chatbot

Retrieval Augmented Generation

- Kombiniert semantische Suche mit Chat
- Bewertungsdaten und Details für >2200 Whiskys stammen aus der DB, Oracle Autonomous Database wird als Vektor-Speicher verwendet.
- Die Ergebnisse werden dann in einen Prompt für ein autoregressives (Chat) Modell eingebunden
 - Open AI GPT-4, GPT-3.5, GPT-3.5-turbo (externer Endpunkt → Prompt & History werden immer nach außen mitgeschickt)
 - Cohere Command (läuft auf Oracle OCI GenAI)
- Chainlit wird für die Chatbot-Benutzeroberfläche verwendet
- Public chatbot, daher zwingend Mechanismen wie LLM Guard oder rebuff erforderlich



The history of
scotch whisky



Cocktail recipes that
are based on whisky



Whisky tasting
introduction tips



Food to go with
whisky



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I'm looking for some new cocktail recipes to try that are based on Scotch Whisky. Can you recommend a few that are easy to make at home?



Used Retriever

Ah, you're after some fine Scotch whisky cocktails, are you? Well, you're in luck my friend. Here are a few favourites that'll have you feeling like you're supping at the heart of Scotland from the comfort of your own home:

1. **Rob Roy**

This one's a classic like a good old tale, and it's as simple as can be. You'll need:

- 60ml Scotch whisky
- 20ml sweet vermouth
- Dash of Angostura bitters Stir these together with ice, strain into a glass, and garnish with a cherry. Like a Manhattan, but with a Scottish twist.

2. **Blood and Sand**

This one's a wee bit more complicated, but it's worth it for the show. You'll need:

- 20ml Scotch whisky
- 20ml orange juice
- 20ml sweet vermouth
- 20ml cherry brandy Shake 'em all up with ice, then strain into a glass. Garnish



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which scotch whisky can you recommend for the rob roy?



Used Retriever

Ah, for a Rob Roy, you're wanting a Scotch whisky that can stand up to the sweet vermouth and bitters. Here are a few that would do the job quite handsomely:

1. **Johnnie Walker Black Label 12 year old, 40%:** This blended Scotch has a rich mix of toffee, caramel, almond, and banana flavours, all wrapped up in a cloak of white smoke. It's well-balanced and has a complexity that'll add depth to your Rob Roy.
2. **Bowmore, 18 year old, 43%:** A single malt from Islay, this whisky brings a sherried sweetness that'll complement the sweet vermouth wonderfully. It's got notes of toffee, ripe fruit, tar, dark chocolate, cocoa powder, and a hint of sea salt.
3. **Smoking Ember, 40%:** This one's for the peat lovers. It's big and smoky, with a rich, malty underbelly. There's also tar, licorice, seaweed, and a hint of ginger in the mix. It'll give your Rob Roy a robust, well-rounded character.
4. **Black Bottle, 10 year old, 43%:** A unique blend of seven different Islay whiskies, this one brings a rounded Islay character to the table. It's got peat smoke, brine, seaweed, and a firm, malty foundation.
5. **Dalmore 1995 The Distillery Manager's Exclusive, 40%:** This single malt from Dalmore is a bit of a treat. It's got a nose of worn leather, candied orange, malt, and



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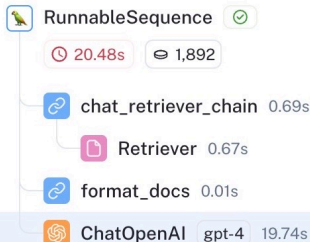




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HUMAN

which scotch whisky can you recommend for the rob roy?

HUMAN

Whisky Name: Johnnie Walker Black Label 12 year old, 40%\nNeed you ask? An unmistakable classic and an exemplar of a blended Scotch whisky, famous around the world. Toffee, swirling caramel, whole almond, and mashed banana amid twisting white smoke. The palate has such poise, balance, and dexterity that it sets the standard for many less accomplished blends to aspire to. Conspicuously iconic, and the closest thing you will find to a complete whisky at this price.

Whisky Name: Bowmore, 18 year old, 43%\nThis replaces the 17 year old in the standard Bowmore portfolio. (The 17 year old will now be Duty Free Only.) The difference is significant. This one is more sherried than the 17 year old, and it wears the sherry well. I know that many of you, like myself, adore the 17 year old. Indeed, I feel that the 17 year old displays the true essence of Bowmore. But this 18 year old integrates the sherry notes with the Bowmore signature to create a richly flavored Islay whisky experience. Thick toffee, ripe fruit, and tar-tinged smoke are accentuated by dark chocolate, cocoa powder, burnt raisin, dates, and sea salt. Long, entertaining finish.

Whisky Name: Smoking Ember, 40%\nBig and smoky, but with a rich, balancing, malty underbelly. Tarry rope, leafy bonfire, rooty peat, burnt licorice, smoked seaweed, coal ash, and vanilla-tinged malt, all with emerging brine, subtle Spanish olive, and a hint of ginger. A robust, yet well-rounded, Islay-style whisky with a pleasing oily texture, though I do

HUMAN

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tell me more about the first recommendation



Used Retriever

Regarding the **Johnnie Walker Black Label 12 year old**:

This is a rich, complex blend of whisky from the four corners of Scotland. It's a true icon, renowned for its balanced flavour and distinctive smoky character. This blend is created using only whiskies aged for a minimum of 12 years from the four corners of Scotland, Johnnie Walker Black Label has an unmistakably smooth, deep character.

It's made with about 40 different whiskies, each aged at least 12 years. The flavour is quite full and complex, with notes of vanilla, peat smoke and a sweet, creamy caramel. You might also detect a faint fruitiness, which comes from the grain whiskies in the blend.

This is a whisky that's perfect for sipping on its own, but its rich flavours also shine through in cocktails like the Rob Roy. The smoky, peaty elements of the Johnnie Walker Black Label provide a nice balance to the sweetness of the vermouth, creating a cocktail with depth and character.

So, if you're looking for a whisky to create a Rob Roy with a punch, the Johnnie Walker Black Label 12 Year Old might just be the dram you're after, lad! And if you're looking to purchase a bottle, you might want to check out Scotch Badger's online store at <https://www.scotchbadger.maxian.io/> for a fine selection of whisky.



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05

Vorteile von In-DB LLMs

Das Beste zweier Welten?

Vorteile

- **Sicherheit und Compliance**

- Die Implementierung in der Datenbank verbessert die Sicherheit und vereinfacht die Compliance. Durch die Verarbeitung von Datenabfragen innerhalb der sicheren Datenbankumgebung werden sensible Informationen nicht außerhalb des Datenbankperimeters exponiert.
- Diese Implementierungsmethode entspricht den regulatorischen Anforderungen, besonders im Umgang mit personenbezogenen Daten (PII) oder branchenspezifischen Datenschutzstandards.

- **Granulare Zugriffskontrollen**

- Datenbanken bieten typischerweise robuste Zugriffskontrollmechanismen, die auf das LLM ausgeweitet werden können. Dies ermöglicht eine feingranulare Kontrolle darüber, wer mit dem LLM interagieren kann und auf welche Daten Zugriff möglich ist.
- Diese Kontrollebene stellt sicher, dass Daten sicher und compliant bleiben, während sie gleichzeitig Zusammenarbeit und kontrollierten Datenaustausch ermöglicht.

Vorteile

- **Datentransfer und Leistung**

- Wenn das LLM direkt in die Datenbank integriert ist, entfällt die Notwendigkeit, Daten zu extrahieren und zwischen Systemen zu verschieben. Dies führt zu deutlich verbesserter Leistung und reduzierter Latenzzeit.
- Durch die gemeinsame Platzierung des LLM mit den Daten werden Abfragen und Analysen schneller ausgeführt, was schnellere Ergebnisse liefert und eine schnellere Entscheidungsfindung ermöglicht.
- Daten sowohl aus Vektoren als auch aus relationalen Tabellen können nahtlos zusammen für Abfragen und Verarbeitung genutzt werden.

- **Skalierbarkeit und Effizienz**

- Die Verarbeitung in der Datenbank reduziert den gesamten Bedarf an Rechenressourcen, was zu Kosteneinsparungen und verbesserter Energieeffizienz führen kann.

Vorteile

- **Echtzeit-Analysen**

- Die Implementierung in der Datenbank ermöglicht Echtzeit-Analysen und Entscheidungsfindung. Sobald Daten aufgenommen oder aktualisiert werden, kann das LLM diese sofort verarbeiten und Erkenntnisse liefern.
- Diese Fähigkeit ist besonders wertvoll für zeitkritische Entscheidungen, Betrugserkennung oder reaktionsschnelle Kundenservice-Szenarien.

- **Vereinfachtes Datenmanagement**

- Mit dem LLM innerhalb der Datenbank wird das Datenmanagement unkomplizierter. Es sind keine komplexen Datenpipelines oder separate Datenvorbereitungsschritte erforderlich, da das LLM direkten Zugriff auf die Quelldaten hat.
- Dies vereinfacht die Wartung und Aktualisierung der Daten und stellt sicher, dass das LLM immer mit den aktuellsten und genauesten Informationen arbeitet.



06

Conclusio

Erwartungen

- Produktivitätssteigerung
- Neudefinition der Arbeit von Führungskräften ebenso wie von Mitarbeitern
- Generative KI wird die Transformation transformieren
- Verbesserung bestehender Produkte und Dienstleistungen
- Innovation und Wachstum fördern
- Neue Ideen und Erkenntnisse aufdecken

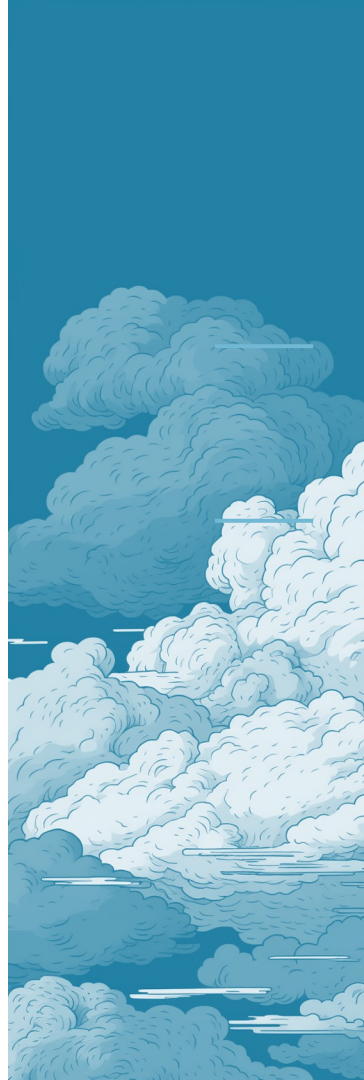
Oracle 23ai: Die Datenbank wird intelligent.
Sichere Integration von LLMs für smarte Anwendungen.

Bedenken

- Wert von KI einschätzen und nachweisen
- Mangel an Know-How in der Organisation
- Mangelndes Vertrauen in die Ergebnisse
- Probleme mit geistigem Eigentum
- Missbrauch von Kunden- oder Mandantendaten
- Einhaltung von Vorschriften
- Erklärbarkeit / Transparenz der Ergebnisse

Bedenken mit In-DB LLMs adressieren

- Daten verlassen die Datenbank nicht, um Embeddings zu erzeugen
 - Kunden- und Unternehmensdaten bleiben innerhalb der Unternehmensgrenzen
- Oracle 23ai unterstützt schnelles Prototyping von LLM-gestützten Funktionen mit bestehender Infrastruktur und Skills (DB Development, APEX)
- Das LLM läuft auf bestehender Infrastruktur und führt (zumindest bei umsichtiger Nutzung) nicht zu höheren Betriebskosten (Dinge wie Backup und Hochverfügbarkeit sind bereits vorhanden)
- Open-Source-Modelle lösen viele Probleme
 - Transparenz von Modellquelle und Trainingsdaten
 - Keine Kunden- oder internen Daten werden für das Training von proprietären öffentlichen Modellen verwendet
 - Finetuning für spezifische Anwendungsfälle gut möglich



Danke für die Aufmerksamkeit!

Get the Slides



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