Documento 5.1: AI Innovations

Página 1: Portada

ORACLE
University
Oracle Cloud Infrastructure
Introduction to AI
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Página 2: Definición de IA

What is Artificial Intelligence?

- Ability of machines to mimic the cognitive abilities and problem-solving capabilities of human intelligence

Página 3: Inteligencia Humana vs IA

Human Intelligence

Learns

- **Learn** new skills through observation
- **Think** abstractly and reasons
- **Communicates using a language and non-verbal cues**
- **Handles complex situations in real time**
- **Plans short and long term**
- **Creates art, music, and inventions**

If we can replicate any of these capabilities in machines, that is
Artificial General Intelligence (AGI).
When we apply AGI to solve problems with specific, narrow objectives, we call it
Artificial Intelligence (AI).

Página 4: Ejemplos de IA

AI Examples

Classifying images

- Writing computer language code

- AI is all around us!
- Spam mail classification
- Predicting old car prices

Página 5: Terminología de IA

AI Terminology

Machine Learning (ML)
Deep Learning (DL)
Data Science (DS)

Página 6: Por qué necesitamos IA

Why do we need AI?

Automation and Decision Making

- Approve a credit card or loan.
- Process insurance claims.
- Recommend products to customers.
- Detect fraudulent transactions.
- Classify documents and images.

Creative Support

- Create content.
- Write stories and poems.
- Provide designs.
- Share code.
- Generate ideas.
- Crack jokes.

Página 7: Dominios y Ejemplos de IA

AI Domains and Examples

Language

- Languages
- Vision

- Speech
- Product Recommendations
- Anomaly Detection
- Learn by Reward
- Forecasting
- Generate Content

Language Translation

- Language Classification
- Text to Speech
- Detect
- Fraudulent Transactions
- Self-Driven Cars
- Weather Forecasting
- Generate Image from Text

Páginas 8-12: [Vacías]

Documento 5.2: Select AI

Página 1: Portada
ORACLE
University
Natural Language Queries
Just Ask Your Database
Use natural language to analyze your data using Select AI and GenAI.

Página 2: Capas de IA Empresarial
Oracle can bring AI to the enterprise at every layer of our stack.
SaaS Apps
AI Services
Data
Infrastructure
Partners

Página 3: Agenda

Agenda

Select AI in Oracle Autonomous Database
Easily query your data using natural language
SQL query generation process flow

Página 4: Visión General

Autonomous Database Select AI

Simplest way to get answers about your business

- Use **your language** to query data.
- There is no need to understand where and how your data is stored to gain insights.

Página 5: [SCREENSHOT - Interfaz de Select AI]

Select AI

Simplest way to get answers about your business

Just ask a question.

Autonomous Database manages the entire query process to produce your answer.

What are our total streams for each Tom Hanks movie this month?

- **AOB Chat**
    - Change: Obesity: About No
    - Actual: Obesity: A Best View
    - Exchange of C: A One Week
Name	Total Streams
Tom Hanks	44000
Shapiro vs. Earths	4000
Sodhi	8000
Apple & Chrome	24000
Smartphone Apps	20000
Web Global Pro Device Call	6000
Photoshop	9000
Dig	9600
Card Away	22000
The Quiz Book Network	5000
      Explore

Explore
What are our total streams for each Tom Hanks movie this month?

- **Ao Business**

Página 6: [SCREENSHOT - Demostración de Consultas]

Demonstration

Speak "Human" to Autonomous Database to get your business questions answered.

- **ADR Chat**
- Google Change System for
- Smart Distance + Built mass
- Keeping HPC+ Open mode

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1. A number of types include:

- Channeling Channel Service as a producer for HPC (PDR)
- A number of non-national Auditor
- API for Autonomous Control (SDR)
- Please see how the messaging of the search Google Chrome has seen. Which does necessitate numerous possibilities and threats for this environment including:
- What are not both content of remote live use, Google Chrome model
- **TITLE**
- **FINAL_VIEWS**
- Server
- US$100
- File-based Server
- SAS$10
- Country
- SAS$20
- Camera Driver
- SAS$30
- Camera Trades
- SAS$60

- Further
- Explain

---

2. An Overview

Página 7: [SCREENSHOT - Ejemplo de Consulta y Resultados]

Ask Oracle

Top 10 Streamed Movies

- "Mean Emotion: A Brief Menu..."
- Exploring NYC: A One-West...
- Summary of the movie "Big"
- Hurricane Fowl's Needle Alert...

What are our top 10 streamed movies?

MOVIE_TITLE	NOM_STREAMS
Aerogers: Endgame	81,074.00
Captain Marvel	33,587.00
The Loon King	33,044.00
Star Wars Episode No: The Rise of Skywalker	31,330.00
Aladdin	297779.00
Spider-Man: Far from Home	29,021.00
Adamson	20,337.00
Aerogers: Infinity War	18,818.00
Tip Story 4	17,424.00
Butenman Biography	16,349.00

Explore SQL

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who started in Aerogers: Endgame?
Ask Oracle

Página 8: [SCREENSHOT - Más Resultados de Consulta]

Ask Chicks

Top 30 Standard Movies

- "Mean Emotion: A Brief Menu."

- Exploring NYC: A One-West...
- Summary of the movie "Big"
- Harrison Ford's Modale Arts...
Adviser	747719.0
Spider-Mac Pat from Home	29203.0
Aquarium	20,500.0
Aerospace Infantry War	98,883.0
Tay Story 4	17,643.0
[Extension Blugbody]	16,550.0

Options: 1/3.

who started in Aerospace Endgame?

ACTOR

- Star List
- Air Button
- James Lita
- Joe Button
- Mrs. Rong
- Lee Mance
- Lee Babe
- Mike Lutz
- Paul Redel
- Sean Gunn
  Now you available
  Explore - SQL

[Ask Questions]

Página 9: [SCREENSHOT - Ejemplo de Código SQL]

SQL

```
SELECT R-TITLE(,CONST(A-BM_ID) AS TOTAL_FINANCE
FROM NOTICE:TITLE.RETABLES = OR =NOTICE_ID = =NOTICE_ID
USER NOTICE:TITLE.RETABLES = OR =NOTICE_ID = =NOTICE_ID
ORDER A=CHORD IN ("Find Book", "Size bar")
GROUP BY R-TITLE
```

Página 10: Proceso de Traducción

Select AI Translates Your Language into Oracle SQL Language

Processes question using an AI large language model (LLM)

Question	Inference
what are our Total streams	→ Total number of movie views → Breakout views by movie → Tom Hanks is an actor. → Understanding of time → SELECT m.title AS movie_title, COUNT(s.views) AS total_streams FROM movie m JOIN activity s ON m.movie_id = s.movie_id JOIN actors a ON m.movie_id = a.movie_id WHERE a.actor = 'Tom Hanks' AND EXTRACT(MONTH FROM s.day_id) = EXTRACT(MONTH FROM SYSDATE) GROUP BY m.title

Página 11: Desarrollo de Aplicaciones

Developing Apps with Select AI

Simple

Designed so that you can easily build generative AI capabilities into new or existing applications.

Future-enabled

Choose from an array of large language models. Pick the model that is best suited to your business.

Secure

Rely on the same Oracle Database security that protects your data. Plus, when using OCI Generative AI, your data will not be sent to the LLM provider or seen by other customers.

Página 12: [SCREENSHOT - Ejemplo de Consulta Natural]

Easy to Extend and Build New Natural Language Apps

1

select at
what are our top 10 streamed movies
that were released after 2010;

Query Result *:

- **SQL**
  All Items fetched 10 to 7.29% seconds
VALUE_TIME	STEAMAL_COMPT
Avengers: Endgame	81974
Captain Marvel	33587
Star Wars Episode IX: The Rise of Skywalker	31331
Spider-Man: Far from Home	29621
Aladdin	24058
The Lion King	22627
Aquomena	28557
Avengers: Infinity War	18813
Toy Story 4	17426
Bohemian Rhapsody	16936

Use a standard SELECT statement followed by AI and your question.
Process the result as you would any other SQL result set.

Página 13: Conversaciones con Datos
Have a Conversation to Get Your Questions Answered
sql-scripts > [conversations.sql >]...
35 -- Have a Conversation with your data
36 -- Ask an initial question and then build on that -- just like a normal conversation
37 -- Begin with a high level questions
38 select ai SENEP action bar total streams;
49 -- Give me more details
42 select ai Break that out by genre;
43 -- Which customer segments are watching the genres?
44 select ai Add customer segment;
45
PROBLEMS OUTPUT DERAO CONGOLE TERMINAL POSTS QUERY RESULT SCARP FOLTRY! 50
Your first question is not your last!
Keep refining your questions until you get the answer you need.

Página 14: Configuración de Perfiles AI
Future-Enabled: Easy to Configure Your Data for Natural Language Queries
Use one or more Select AI Profiles that is best for your business.
Choose an LLM to generate a database query from natural language.
1
OCI Generative AI
OpenAI
Cohere
Azure OpenAI
Specify schemas, tables and/or views to participate in processing.

2
Finance
Streaming
ACTUALS
CUSTOMERS
MOVIES
PLAN
VIEWS
SEGMENTS
Access data across databases, data lakes, and clouds

Página 15: [SCREENSHOT - Código de Configuración]

Easy to Configure Your Data for Natural Language Queries

Use one or more AI profiles that is best for your business.

1. Choose an LLM to generate a database query from natural language.
2. Specify schemas, tables and/or views to participate in processing.
   Simple PL/SQL API creates AI profile:
   dms_cloud_ai.create_profile(
   profile_name => 'movie_nL_processing',
   attributes =>
   '{"mysql=": "gend",
   "credential_name": "GENAL_CRE0",
   "object_list": [{"owner": "myschend",
   "name": "movie"},
   {"owner": "myschend",
   "name": "sales_sample"},
   {"owner": "myschend",
   "name": "customer"}]
   },
   };

Página 16: Flujo de Generación de SQL
SQL Query Generation Process Flow
Find the top three customer segments for George Clooney movies.
1 2 3 4
All Profile Database metadata LLM to use Produce Prompt Profile + Question Generate SQL using LLM Return query results or SQL to app
REST
Pluggable LLM

Página 17: Conclusiones
Simplest way to get answers about your business

Key Takeaways
Easily build AI into your apps
Secure at every layer
Future-enabled

Páginas 18-20: [Vacías]

Documento 5.3: Vector Search

Página 1: Portada
ORACLE
University
AI Vector Search
Oracle Database 23ai

Página 2: Agenda

Agenda

AI Vector Search in Oracle Database 23ai
AI Vector Search powers Gen AI pipelines

Página 3: Oracle AI Vector Search

Oracle AI Vector Search

Oracle Database 23ai

- SQL support for vector generation
- Vector Data Type
- Similarity search with SQL syntax and functions
- Approximate search indexes

USON
[1,4,8,2]

Página 4: [DIAGRAMA - Proceso de Vector Search]
Database-Native Vector Embedding Generation
Generate vector from query image
VECTOR_EMBEDDING(resnet_50 USING query_image)
Image dataset already embedded into vectors and stored in Oracle Database 23ai
VECTOR_EMBEDDING(resnet_50 USING data_image)
Top 2 results
Query Image Embedding Generation as BLOB

Vector embedding
Vector Search for similar matches

Página 5: Tipo de Dato Vector

Vector Datatype

New VECTOR datatype

CREATE TABLE my_images (
id NUMBER,
data_image BLOB,
image_vec VECTOR(768, FLOAT32));
Optional dimension count
Optional dimension format
Dimension format can be:
INT8, FLOAT32, and FLOAT64

Simpler VECTOR specification

CREATE TABLE my_images (
id NUMBER,
data_image BLOB,
image_vec VECTOR);

Why is this useful?

You can embed your data with newer ML embedding models as AI technology evolves, but your schema can stay the same, and applications don't need to be rewritten.

Página 6: Función de Distancia Vectorial

Vector Distance Function

The key operation is vector distance computation to gauge similarity
VECTOR_DISTANCE(VECTOR1, VECTOR2, <optional distance metric>)
Different embedding models can use different metrics, but the basic concept remains the same:
The Distance between two vectors is smaller for entities that are more similar
Distance functions supported in Oracle Database 23ai are:
COSINE (default), EUCLIDEAN, EUCLIDEAN_SQUARED, HAMMING, MANHATTAN, DOT

Página 7: [SCREENSHOT - Ejemplo de Vector Search SQL]

Vector Search SQL

Vector Search is used to find Top K closest matches to a given query item
Find the top 10 positions matching a candidate's resume that are offered in a city among the candidate's preferred cities

```
SELECT _
FROM Job_Postings
WHERE city IN (SELECT preferred_cities FROM Applicants _)
ORDER BY vector_distance(job_desc_vectors, .resume_vector)
FETCH FIRST 10 ROWS ONLY;
```

Jane Doe
jane@doe.com
Applications as a developer in AJ/AL
BSc in Comp Sc. ABC college
MS in Data Science, Univ of DGF
Worked 5 years at XYZ.com
Languages: Python, Java, C++
Maintained GT repositories
References: John Smith, XYZ.com

Página 8: Sintaxis de Índices Vectoriales

Vector Index Syntax

Basic index creation

```
CREATE VECTOR INDEX photo_idx ON customer(photo_vec)
ORGANIZATION [INMEMORY NEIGHBOR GRAPH | NEIGHBOR PARTITIONS]
DISTANCE COSINE | EUCLIDEAN | MANHATTAN | ... WITH TARGET ACCURACY 90
```

ORGANIZATION for an index is based if it will fit in-memory:

- If the index data will fit in-memory, use **INMEMORY NEIGHBOR GRAPH**
- Else use **NEIGHBOR PARTITIONS**
  TARGET ACCURACY clause is added to indicate the default accuracy the index should provide for similarity search queries

Página 9: Búsquedas Aproximadas

Vector Search

Specifying approximate searches

A new APPROXIMATE keyword in the Row Limiting (FETCH) clause indicates that the user wants to perform a similarity search using a Vector Index.
Find the top 5 customers by similarity with a search photo vector:

```
SELECT id, name, photo
FROM Customers
ORDER BY VECTOR_DISTANCE(photo_vec, :QUERY_VEC)
FETCH APPROXIMATE FIRST 5 ROWS ONLY;
```

Exact search may be performed if there is no index or based on the SQL Optimizer costs

Página 10: [DIAGRAMA - Búsqueda con Joins]

Similarity Search Over Joins

- Join with normalized enterprise data
    - 3 Tables: Authors, Books, and Pages
- Pages table has each page individually embedded into vector column pageVec
- Return the top 5 books containing text similar to this query text
- Genre is 'Fiction'
- Author comes from 'India'

Top-K

- **Join**
- **Join**
- **Pages (similar to queryVec)**

Authors (country = 'India')

- **Books (genre = 'Fiction')**

```
SELECT pageID FROM Authors, Books, Pages
WHERE Authors.authorID = Books.authorID
AND Books.bookID = Pages.bookID
AND Books.genre = 'Fiction'
AND Author.country = 'India'
ORDER BY vector_distance(pageVec, :queryVec)
FETCH APPROX FIRST 5 ROWS ONLY;
```

Página 11: [DIAGRAMA - Pipeline Gen AI]

AI Vector Search powers Gen AI pipelines

AI Vector Search in Oracle Database 23ai

- Data Sources
- Document Loaders
- Document Transformation (e.g., Text Splitting, Summarization)
- Embedding Models
- Vector Database (Oracle Database 23ai)
- Similarity Search

Tight integration with 3rd party frameworks such as Langchain and LlamaIndex

LLMs User

Página 12: Conclusiones
Simplest way to get answers about your business
Key Takeaways

- AI Vector Search is seamlessly integrated with Oracle Database 23ai
- Simple to combine relational and AI vector Search in single query
- Efficient orchestration of Gen-AI pipelines