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DI RIPRESA E RESILIENZA



Future  
Artificial  
Intelligence  
Research

**Casi di studio di LLM  
nell'ambito dei progetti di  
Ricerca Respira ed  
EnrichMyData.**

Vincenzo Masucci  
Expert.ai SPA

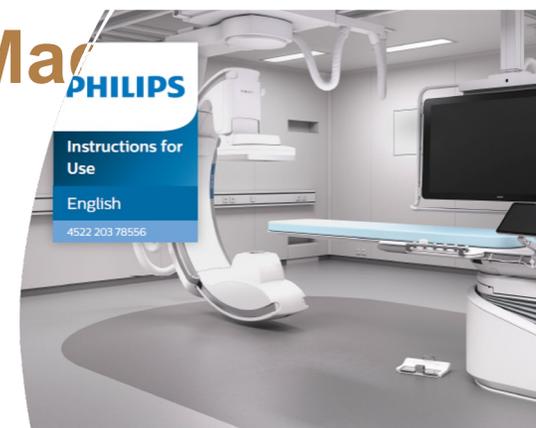
24 Settembre 2024 Napoli



## Caso di Studio: Tecnico di Risonanza Magnetica

PH investe notevoli capitali nella progettazione e produzione di sistemi di imaging medicale (ad esempio, risonanza magnetica, tomografia computerizzata) che vengono utilizzati per la diagnosi e la terapia guidata dalle immagini negli ospedali.

*«Nel corso degli anni le funzionalità di queste apparecchiature sono cresciute notevolmente, rendendo più difficile la manutenzione del sistema, della progettazione e dei metodi di verifica ad ogni rilascio del sistema. Per risolvere questo problema, è necessario conoscere l'uso effettivo dei sistemi negli ospedali. »*



Philips Azurion  
use 21



Achieva



Ingenia, Ingenia S, Ingenia Evolution

**Available source data**

7 pdfs

with between 114 and 992 pages



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# Ricerca Standard



minimum level of helium < > ... x

Adobe Acrobat

**i** Adobe Acrobat ha completato la ricerca all'interno del documento. Non è stata trovata alcuna corrispondenza.

OK

level of helium < > ... x

Adobe Acrobat

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OK

RISULTATI ESATTI <b>i</b>	
helium	84

Ricerca in 892 di 892



# Sistema Esperto di Risonanze Magnetiche

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Magnetic Resonance Imaging Achieva AchievalFUR10US 821-892.pdf

what minimum level of helium must be guaranteed?

**Generated Answer**

The minimum acceptable helium level for the magnet is 30%.

**AchievalFUR10US 821-892.pdf (p. 55)**

Topping up liquid helium  
Topping up liquid helium Magnet coils must be immersed in liquid to ensure that they remain superconductive. The minimum acceptable helium level for the magnet is 30%. If the helium level is 30% or lower, contact your helium supply organization.

**AchievalFUR10US 001-102.pdf (pp. 80,81)**

The following warning messages will be displayed.  
The following warning messages will be displayed. Message on first day of low helium level: Fig. 8: Helium level is too LOW! Solve now, Scanning will be prohibited within 3 days. Message on second day of low helium level: Fig. 9: Helium level is too LOW! Solve now, Scanning will be prohibited...

**AchievalFUR10US 001-102.pdf (p. 80)**

Helium refill message  
...once the actual helium level is below the helium refill level. You are asked to confirm that your helium supply organization is notified. Fig. 7: Magnet helium refill required. Confirm you contacted your helium supply organization. You can do the following: • Keep the message on screen until...

**AchievalFUR10US 821-892.pdf (p. 54)**

NOTICE  
Weekly magnet check NOTICE Does not apply to BlueSeal systems. This magnet check must also be performed during holiday periods. Measure the helium level in the magnet cryostat and note the measured values in the logbook. • Check if the sound of the compressor is still normal. CAUTION The...

**AchievalFUR10US 821-892.pdf (p. 54)**

NOTICE  
NOTICE The helium level is displayed with a delay of 20 seconds. Do not use the Enter key during that time.

**AchievalFUR10US 001-102.pdf (pp. 78,79)**

Liquid helium  
Safety with Helium Liquid helium WARNING Under no circumstances should a liquid helium container be brought into the magnet area unless it is known to be made of non-magnetic material or the magnet is not energized. It is extremely dangerous for patients, personnel and equipment to bring any...

**AchievalFUR10US 001-102.pdf (p. 43)**

Release of helium gas in the examination room  
...persons from the examination room. • Do not switch off air circulation and ventilation in the examination room. • Do not reenter the examination room until it is confirmed that the air oxygen content is at a safe level. For more information about helium gas, see chapter "Helium gas" on page 79.

**AchievalFUR10US 001-102.pdf (p. 82)**

Magnet helium pressure alarm  
Magnet helium pressure alarm Fig. 17: Magnet helium high pressure alarm. This message is displayed when the average magnet pressure exceeds the defined level during the last three hours.

Routine user checks program
Maintenance and Quality assurance

### Topping up liquid helium

Magnet coils must be immersed in liquid to ensure that they remain superconductive. The minimum acceptable helium level for the magnet is 30%.

If the helium level is 30% or lower, contact your helium supply organization.

### Anti-virus updates

The MR system is equipped with anti-virus software which is designed to detect viruses on your system and to deny access to infected files, before they can do any damage.

Anti-virus definitions should be updated on a regular basis, usually every day. The Anti-virus definitions update mechanism automatically looks for updated virus definition files at a pre-configured time (as set by service engineer or hospital administrator) and installs them, if available.

### NOTICE

It is the responsibility of the system operator to daily check if the anti-virus definitions are up to date.

### Check the anti-virus definitions date

- Right-click on the virus scan icon in the tray of the windows task bar and select 'About...'
- In the displayed window check the "DAT Created ON" date.

An update is necessary if the date of the definitions is older than 7 days (compare with current date).

### Update the anti-virus definitions

- Right-click on the virus scan icon in the tray of the windows task bar and select 'Update Now ...'
- The anti-virus definitions are automatically updated.
- After the update has finished recheck the date of the definitions.

### Periodic Image Quality Test (PIQT)

### NOTICE

It is advised to use the PIQT over any other quality assurance program.

PIQT offers an automated and consistent test procedure.

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Magnetic Resonance Imaging Achieva



AchievalFUR10US 821-892.pdf

what minimum level of helium must be guaranteed?



Generated Answer

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AchievalFUR10US 821-892.pdf (p. 55)

Topping up liquid helium

Topping up liquid helium Magnet coils must be immersed in liquid to ensure that they remain superconductive. The minimum acceptable helium level for the magnet is 30%. If the helium level is 30% or lower, contact your helium supply organization.

user checks program

Maintenance and Quality assurance

Topping up liquid helium

Magnet coils must be immersed in liquid to ensure that they remain superconductive. The minimum acceptable helium level for the magnet is 30%.

If the helium level is 30% or lower, contact your helium supply organization.

Anti-virus updates

The MR system is equipped with anti-virus software which is designed to detect viruses on your system and to deny access to infected files, before they can do any damage.

helium level is down to 48%



Generated Answer

The helium level is at 48%, which is above the minimum acceptable level of 30%. Therefore, there is no need to contact the helium supply organization at this time. However, it is recommended to keep an eye on the helium level and refill it when it drops below the minimum acceptable level.

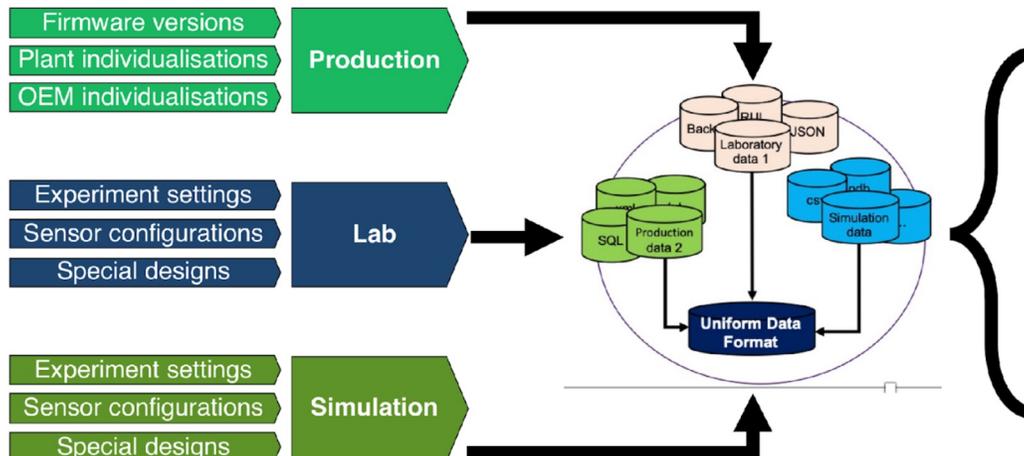
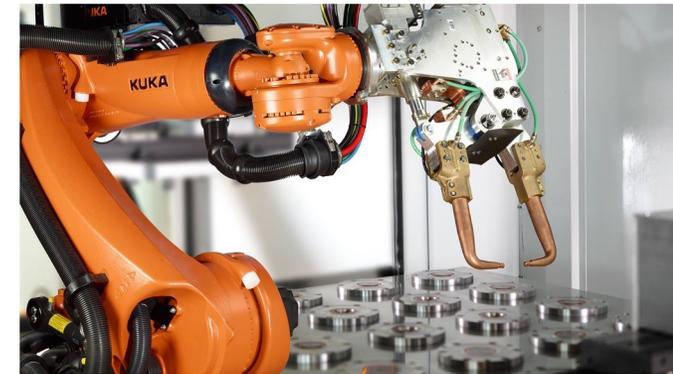




# Caso di Studio: Esperto Saldature Industriali

To ensure the high quality of welding spots:

**GOAL:** A data enrichment pipeline for the automation of data preparation for AI-based analytics related to automatic welding robots



## La sfida per BOSCH : Estrarre conoscenza da dati non strutturati

- Source: pdf or text files
- Relation extraction: NERD, quantity extraction, relation extra

The voltage needed for welding depends on the resistance of the material to be welded, the sheet thickness and desired size of the nugget. When welding a common combination like 1.0 + 1.0 mm sheet steel, the voltage between the electrodes is only about 1.5 V at the start of the weld but can fall as low as 1 V at the end of the weld. This decrease in voltage results from the reduction in resistance caused by the workpiece melting. The open circuit voltage from the transformer is higher than this, typically in the 5 to 22 volt range.<sup>[13]</sup>

- Challenges:
  - Structure of pdf files is difficult to extract
  - The amount of information that can be extracted might be limited
  - There might be not much data as we expected (still collecting from factories)

# Esempi di richieste e risposte attese

What is resistance spot welding? (external – page 1)

**Spot welding** (or **resistance spot welding**<sup>[1]</sup>) is a type of electric resistance welding used to weld various sheet metal products, through a process in which contacting metal surface points are joined by the heat obtained from resistance to electric current.

What is operating voltage when setting up welding timer? (technical – page 26)

Ans: +24 V DC (min 19 V DC, max 30 V DC)

## Welding timer

Degree of protection	IP20 when installed in power unit
Operating voltage	+24 VDC (min. 19VDC, max. 30VDC i.a.w. EN61131-2) optional internal supply or external supply to logic

What does a welding system consist of? (technical – page 22)

The welding system consists of

- Welding hardware (welding gun, robot or multi point ...)
- Timer module PSI 6XXX.350 L1
- MF inverter PSI
- welding transformer
- A programming terminal with BOS-5000 software for data entry, operation and monitoring

How many programs in welding timer system? (technical – page 26)

Ans: 256

- Humidity	No dew point excursion allowed
Number of programs	256, access to each individually from spot selection
Load cell input	Analog input, 0 to 5V (1V equivalent to 1 kN)

Bosch use DC or AC current for welding? (technical – page 24)

What is system voltage of power unit when setting the welding timer? (technical)

Ans: 400 V – 480 V (3 phase)

## Welding current

The Bosch medium-frequency welding system uses DC current for welding. The duration of the welding current is programmed in milliseconds (ms). Because welds turn out to be more uniform than at 50 Hz, a higher output of correct welds is obtained.

The medium-frequency welding current is clocked at 1000 Hz. The constant-current regulation system is faster and more precise compared to 50 Hz welding.

Upon delivery, the PSI 6XXX.350L1 is set to primary current monitoring.

## 2.2 Power unit

Overview of technical data of power unit

	PSI 6XXX.350 L1
System voltage	400 V -20 % to 480 V +10 % 3-phase



# Sistema esperto di Saldature Industriali



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Demo2 table improvement  PS6000\_AllSystems.pdf

What is maximum primary current of PSI 6200 inverters? 

**Generated Answer**

The maximum primary current of PSI 6200 inverters is 1,200 A.

**PS6000\_AllSystems.pdf (p. 4)**

**Benefits**

Property PSI 6200/w1 PSI 6300/a1 PSI 6300/a2 PSI 6300/w1 PSI 6300/w2 PSI 6400/w1 PSI 6500/w1 Weight approx. 56 kg approx. 20 kg approx. 21kg approx. 25 k g approx. 25 kg approx. 56 kg approx. 70 kg Supply voltage range 400...480 V 400...480 V 500...690 V 400...480 V 500...690 V 400...480 V 400...480 V Rated...

**PS6000\_AllSystems.pdf (p. 7)**

**PST 600E – compact power packs for stationary machines and manual welding units**

Characteristic PST 610EL PST 610EW PST 625EL PST 625EW PST 650EW Cooling Air Water Air Water Water Power supply connection grounded TN or TT system 400 V (-20 %) to 600 V (+10 %) 50/60 Hz Maximum output current for

its economic efficiency in many applications compared to other processes:

- ▶ Higher weld quality by more dynamic current control than can be achieved with AC technology
- ▶ Weld-ability of many materials increased by more powerful energy insertion

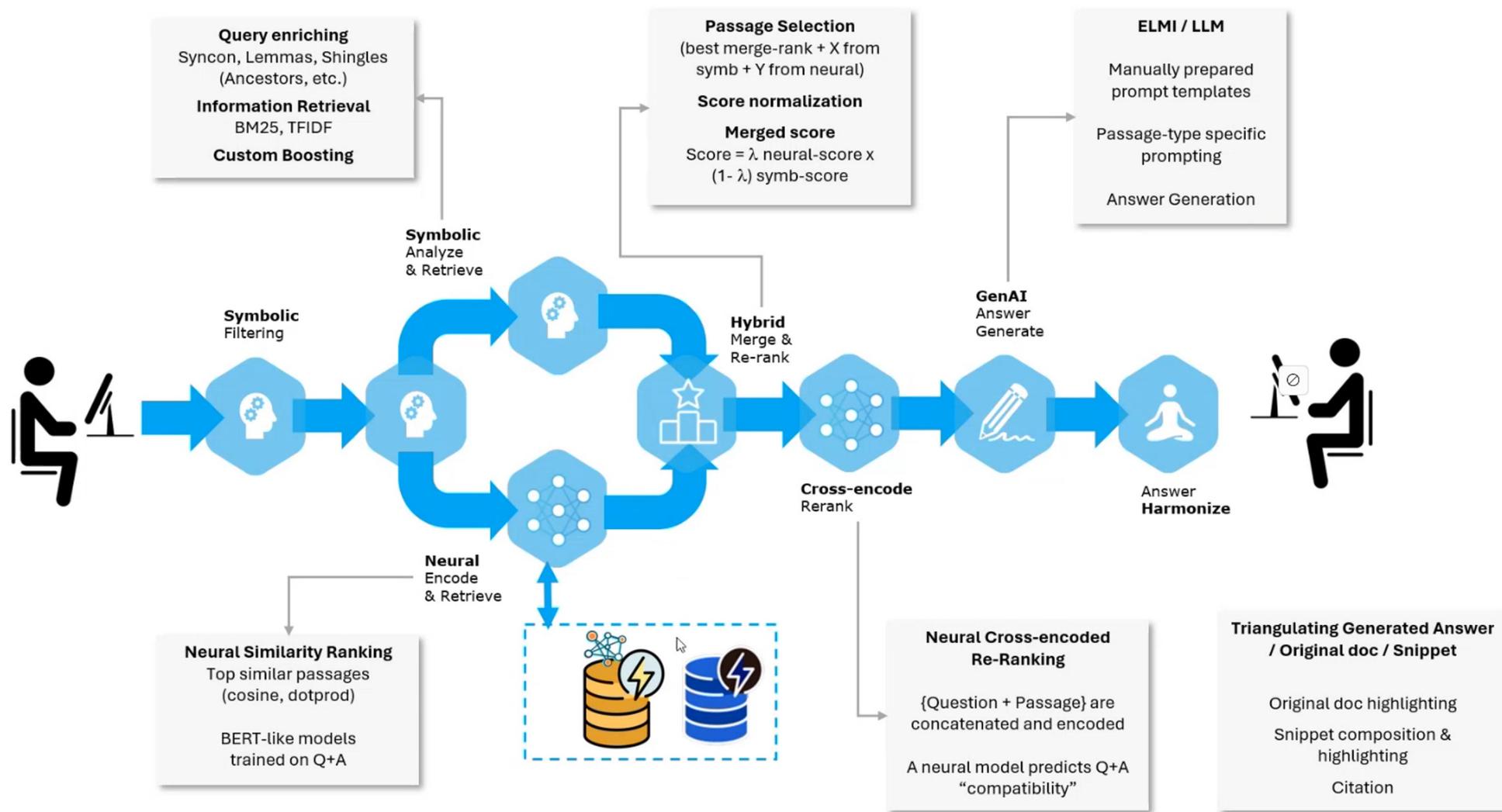
▶ Electrode life lengthened thanks to lower the mechanical load on the electrode tips

▶ Smaller and lighter transformers for integrat weld gun

Property	PSI 6200/w1	PSI 6300/a1	PSI 6300/a2	PSI 6300/w1	PSI 6300/w2	PSI 6400/w1	PSI
Weight	approx. 56 kg	approx. 20 kg	approx. 21kg	approx. 25 kg	approx. 25 kg	approx. 56 kg	app
Supply voltage range	400...480 V	400...480 V	500...690 V	400...480 V	500...690 V	400...480 V	400
Rated mains current (max. thermal continuous current)	220 A	110 A	110 A	110 A	110 A	220 A	330
Max. primary current	1,200 A	800 A	800 A	800 A	800 A	1,600 A	2,4
Max. secondary current*	54 kA	36 kA	36 kA	36 kA	36 kA	60 kA	120
Required connection cross-section	95 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	95 mm <sup>2</sup>	2 – cab



# Componenti RAG





# Valore aggiunto per ogni componente

ID	Question	Expected Answer	SYMBOLIC		NEURAL		HYBRID 025		HYBRID 050		HYBRID 075		HYBRID 025 CE		HYBRID 050 CE		HYBRID 075 CE		HYBRID 025 CE GENRERANK		HYBRID 050 CE GENRERANK		HYBRID 075 CE GENRERANK			
			Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics
0	What is resistance spot welding?	Spot welding (or resistance spot welding) is a type of	1		1		1		1		1		1		1		1		1		1		1		1	
1	What does a welding system consist of?	The welding system consists of welding hardware	2		3		2		2		2		1		1		1		1		1		1		1	
2	Bosch use DC or AC current for welding?	The Bosch medium-frequency welding system uses	2		5		4		2		2		1		1		1		1		1		2		0,5	
3	What is operating voltage when setting up welding?	24 V	7		5		14		6		4		7		6		6		4		0,25		2		0,5	
4	How many programs in welding timer system?	256	7		30		20		30		29		17		17		17		4		0,25		5		0,25	
5	What is system voltage of power unit when setting up?	The system voltage of power unit when setting up	1		2		1		2		2		1		1		1		1		1		1		1	
6	Which components does a welding timer include?	comprises the following functional units: - CPU w	inf		inf		inf		inf		inf		inf		inf		inf		inf		0		inf		0	
7	What cautions must be observed when setting up?	The maximum cable length between the KSR sens	1		1		1		1		1		1		1		1		1		1		1		1	
8	What happens when the internal power supply is in	When the welding network is switched off, the 24	1		2		1		1		1		1		1		1		1		1		1		1	
9	What is continuous current when setting up the ext	approx. 1.5 A, plus the current of the inputs and	1		1		1		1		1		1		1		1		1		1		1		1	
10	When the time to pressure is starting to be counted	The time to pressure is starting to be counted wh	4		1		1		1		1		1		1		1		1		1		1		1	
11	What are parameters for a welding test with weldin	1. Check whether the power unit type used has b	2		6		3		4		5		3		3		3		1		1		1		1	
12	What are the welding transformers used for?	The medium-frequency transformer series are ar	2		8		2		3		5		2		2		2		4		0,25		4		0,25	
13	What is the nominal DC voltage of the transformer	The nominal DC voltage of the transformer PSG 6	1		1		1		1		1		3		3		3		2		0,5		4		0,25	
14	What is maximum primary current of PSI 6200 inver	The maximum primary current of PSI 6200 inver	1		4		1		2		3		1		1		1		1		1		2		0,33333333	
HIT@1			HIT@1	0,466667		0,333333		0,533333		0,4		0,4		0,6		0,6		0,6		0,66666667		0,6		0,53333333		0,53333333
HIT@3			HIT@3	0,733333		0,533333		0,733333		0,733333		0,666667		0,8		0,8		0,8		0,73333333		0,73333333		0,73333333		0,73333333
HIT@5			HIT@5	0,8		0,733333		0,8		0,8		0,866667		0,8		0,8		0,8		0,93333333		0,93333333		0,93333333		0,93333333
HIT@10			HIT@10	0,933333		0,866667		0,8		0,866667		0,866667		0,866667		0,866667		0,866667		0,93333333		0,93333333		0,93333333		0,93333333
MRR				0,635714		0,487222		0,646984		0,585556		0,567854		0,691223		0,69281		0,69281		0,75		0,71333333		0,66888889		0,66888889



# Valore aggiunto per ogni componente

## Dettaglio

SYMBOLIC		NEURAL		HYBRID 025		HYBRID 050		HYBRID 075		HYBRID 025 CE		HYBRID 050 CE		HYBRID 075 CE		HYBRID 025 CE GENRERANK		HYBRID 050 CE GENRERANK		HYBRID 075 CE GENRERANK	
Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics	Ranks	Metrics
1		1		1		1		1		1		1		1		1	1	1	1	1	1
2		3		2		2		2		1		1		1		1	1	1	1	1	1
2		5		4		2		2		1		1		1		1	1	1	2	2	0,5
7		5		14		6		4		7		6		6		4	0,25	2	0,5	2	0,5
7		30		20		30		29		17		17		17		4	0,25	5	0,2	4	0,25
1		2		1		2		2		1		1		1		1	1	1	1	1	1
inf		inf		inf		inf		inf		inf		inf		inf		inf	0	inf	0	inf	0
1		1		1		1		1		1		1		1		1	1	1	1	1	1
1		2		1		1		1		1		1		1		1	1	1	1	1	1
1		1		1		1		1		1		1		1		1	1	1	1	1	1
4		1		1		1		1		1		1		1		1	1	1	1	1	1
2		6		3		4		5		3		3		3		1	1	1	1	1	1
2		8		2		3		5		2		2		2		4	0,25	4	0,25	4	0,25
1		1		1		1		1		3		3		3		2	0,5	4	0,25	5	0,2
1		4		1		2		3		1		1		1		1	2	0,5	3	0,33333333	
HIT@1	0,466667	0,333333		0,533333		0,4		0,4		0,6		0,6		0,6		0,66666667		0,6		0,53333333	
HIT@3	0,733333	0,533333		0,733333		0,733333		0,666667		0,8		0,8		0,8		0,73333333		0,73333333		0,73333333	
HIT@5	0,8	0,733333		0,8		0,8		0,866667		0,8		0,8		0,8		0,93333333		0,93333333		0,93333333	
HIT@10	0,933333	0,866667		0,8		0,866667		0,866667		0,866667		0,866667		0,866667		0,93333333		0,93333333		0,93333333	
	0,635714	0,487222		0,646984		0,585556		0,567854		0,691223		0,69281		0,69281		0,75		0,71333333		0,66888889	



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24 Settembre 2024 Napoli

