




# Professional Video Game Reviews

Milestone #3: Search System (PRI)



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# Project Overview

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04

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Conclusion

# 00 M2 Overview

- Started information Retrieval
- Solr as information retrieval tool
- Indexed documents by converting CSV to JSON
- Created queries for different search scenarios
- Evaluated results obtained



# 01

# Improvements

- Created second, more advanced schema
- Simple query runs ***simple\_schema***, Boosted query runs ***boosted\_schema***
- Implemented **SynonymFilterFactory** filter
- Implemented **Semantic Search** with the use of embeddings
- New techniques such as **Query Rewriting** and **Relevance Feedback**
- Developed User Interface



# 02

## New Implementations (1/3)

- **SynonymFilterFactory**

- Applied in **boosted** and **semantic** schema
- Improves results relevance
- Increases chances of finding related terms
- Enhances vocabulary coverage
- Helps retrieve documents that might otherwise be missed
- No need to use all the synonyms in the queries

```
{  
  "class": "solr.SynonymGraphFilterFactory",  
  "synonyms": "/var/solr/data/ign_boosted/conf/synonyms.txt",  
  "expand": true,  
  "ignoreCase": true  
}
```



# 02

## New Implementations (2/3)

- Semantic Search

- Created *semantic\_schema*, based on *boosted\_schema*
- Vector Generation
- KNN Search Query
- “Content” divided by paragraphs
  - Pick specific parts of reviews
  - Only returns relevant part

```
{
  "id": "353bb75c952c53bf1869b31adeb3b34b_0",
  "parent_id": "353bb75c952c53bf1869b31adeb3b34b",
  "Title": "Red Dead Redemption 2 Review",
  "Subtitle": "A meticulously polished open-world ode to the outlaw era.",
  "Score": 10,
  "Content": "Red Dead Redemption 2 is a sprawling Western tale of loyalty,
  \"paragraph_num\": 0,
  \"vector\": [
    0.029099343344569206,
    -0.010929684154689312,
    -0.07770080119371414,
    -0.02460503950715065,
    0.041780974715948105,
    0.026142146438360214,
    0.0014596047112718225,
    0.004528351593762636,
    -0.07236523926258087,
    0.06118331416130066,
    -0.0066785248927772045,
    0.05153529718518257,
    0.02202492207288742,
    -0.0035389706026762724,
    0.019644025713205338,
    0.017968012019991875,
    0.05869825556874275,
    -0.017851969227194786,
    -0.0007534947944805026,
    -0.0523638017475605,
    -0.01954362541437149,
    0.02184935286641121,
    0.031146755442023277,
    ...
  ]
}
```

```
{
  "name": "vector",
  "class": "solr.DenseVectorField",
  "vectorDimension": 384,
  "similarityFunction": "cosine",
  "knnAlgorithm": "hnsw"
}
```

# 02

## New Implementations (3/3)

- **Query Rewriting**

- Modifies original query to improve search relevance
- **Expanded\_query** = query\_text + "gameplay mechanics control response"

- **Relevance Feedback**

- Uses user-provided judgments on retrieved documents
- Learns from user feedback



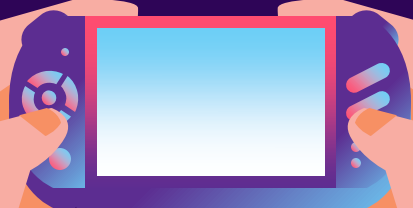
Original query: games with impressive graphics visual quality performance  
Expanded query: games with impressive graphics visual quality performance gameplay mechanics control system input response





03

# Results and Comparisons

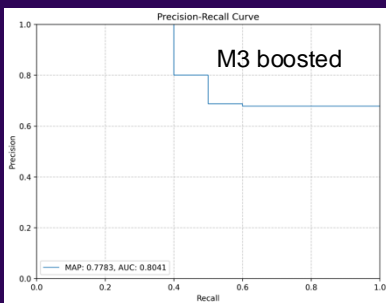
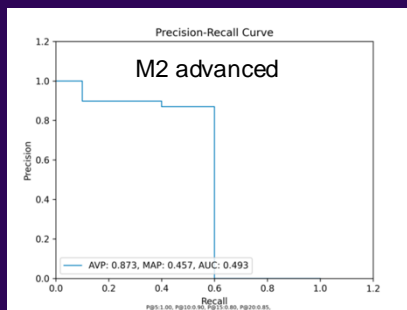
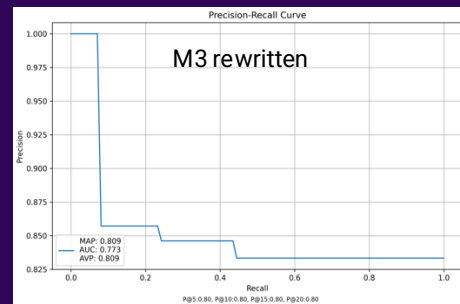
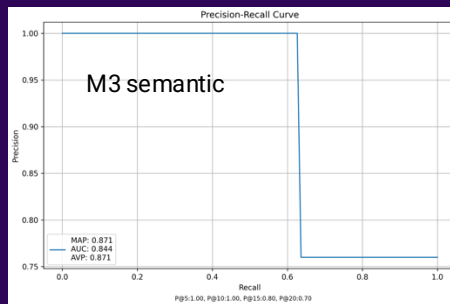
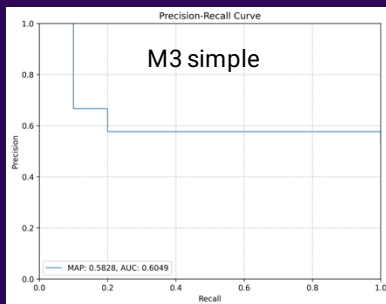
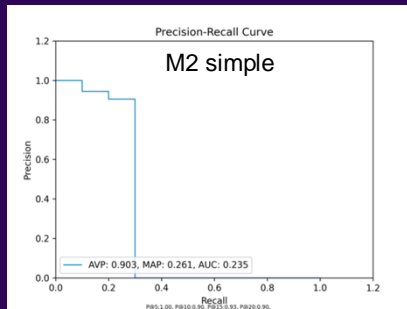






# 03

## Controls



```
"params": {  
  "defType": "edismax",  
  "q": "Content:(controls responsive tight precise fluid gameplay handling)*4 OR Content:(gameplay movement physics)*2 OR Title:(controls gameplay)*3",  
  "qf": "Content*3 Title*2 Subtitle",  
  "pf": "Content*10",  
  "mm": "2<70%",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content"  
}
```

```
"params": {  
  "q": "Content:(controls good tight precise responsive fluid excellent smooth)",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content",  
  "sort": "score desc"  
}
```

Very good results in any configuration

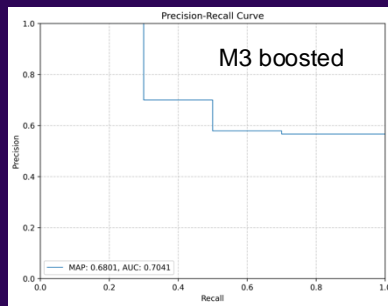
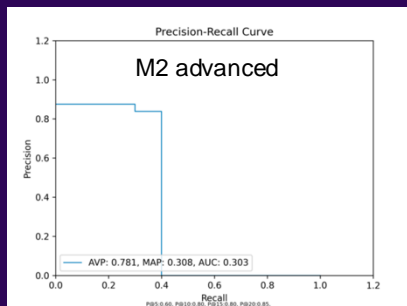
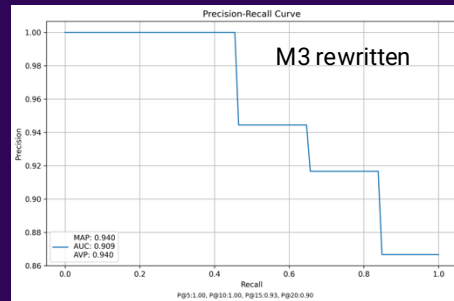
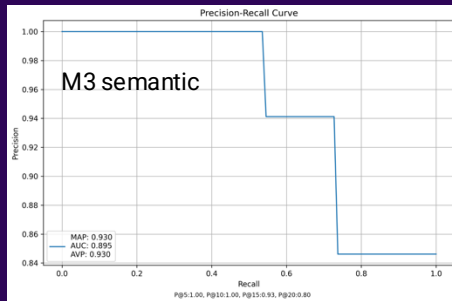
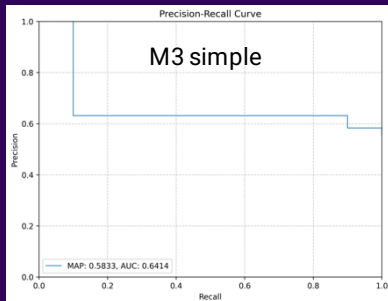
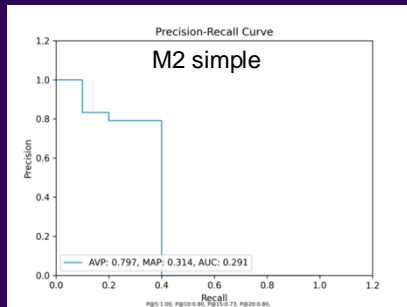
Semantic Search Query	
q	{!knn f=vector topK=50}controls responsive precise
Description	Uses dense vectors generated by all-MiniLM-L6-v2 model to find semantically similar content. The query text is converted to a 384-dimensional vector before being sent to Solr.
fl	id,parent_id,Title,Content,Score,paragraph_num,score
rows	30
wt	json
sort	score desc



# 03

# Multiplayer Games

Semantic Search Query	
q	{!knn f=vector topK=50}multiplayer online cooperative
Description	Uses dense vectors generated by all-MiniLM-L6-v2 model to find semantically similar content. The query text is converted to a 384-dimensional vector before being sent to Solr.
fl	id,parent_id,title,Content,Score,paragraph_num,score
rows	30
wt	json
sort	score desc



```
"params": {  
  "q": "Content:(multiplayer online coop cooperative competitive pvp gameplay fun engaging players teams)",  
  "rows": 30,  
  "fl": "id,title,score,subtitle,content",  
  "sort": "score desc"  
}
```

```
"params": {  
  "defType": "edismax",  
  "q": "Content:(multiplayer online cooperative competitive gameplay)<4 OR Content:(pvp players teams matchmaking)<2 OR Title:(multiplayer online coop)<3",  
  "qf": "Content<3 Title<2 Subtitle",  
  "pf": "Content<10",  
  "mm": "Tcf=0",  
  "rows": 30,  
  "fl": "id,title,score,subtitle,content"  
}
```

Semantic Search dramatically improves results

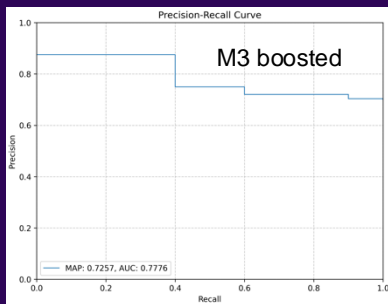
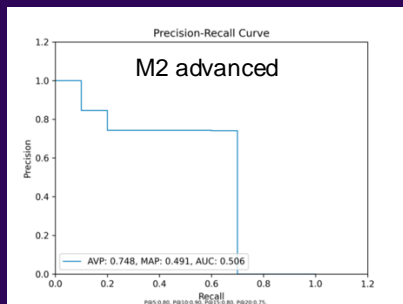
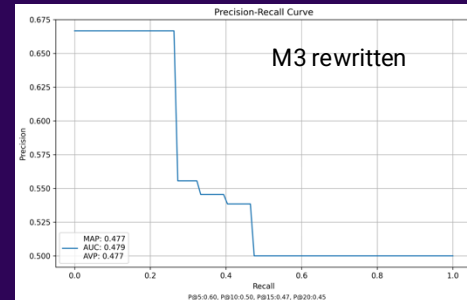
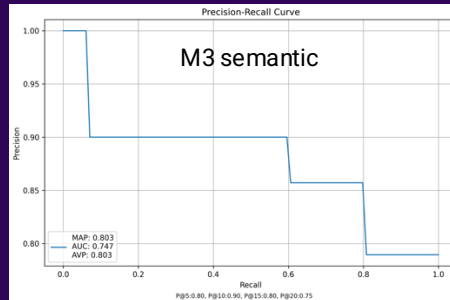
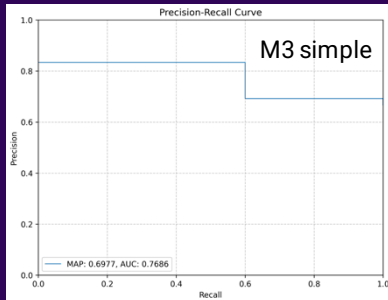
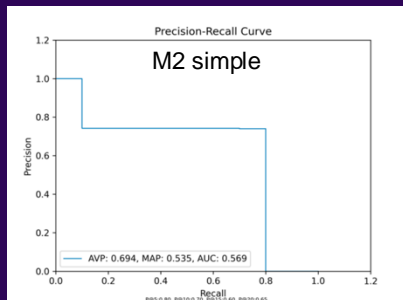




# 03

## Story Narrative Games

Semantic Search Query	
q	{!knn f=vector topK=50}story narrative
Description	Uses dense vectors generated by all-MiniLM-L6-v2 model to find semantically similar content. The query text is converted to a 384-dimensional vector before being sent to Solr.
fl	id,parent_id,Title,Content,Score,paragraph_num,score
rows	30
wt	json
sort	score desc



```
"params": {  
  "q": "Content:(story narrative writing plot characters storytelling dialogue compelling emotional engaging)",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content",  
  "sort": "score desc"  
}
```

```
"params": {  
  "defType": "edismax",  
  "q": "Content:(story narrative writing characters plot)*4 OR Content:(storytelling dialogue emotional writing)*2 OR Title:(story narrative rpg adventure)*3",  
  "pf": "Content^10",  
  "mm": "2<20%",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content"  
}
```

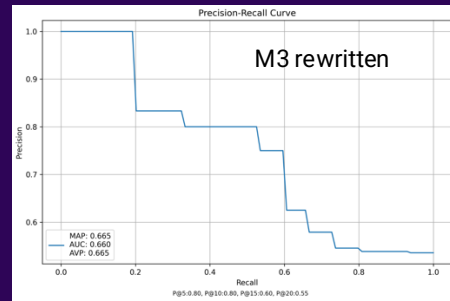
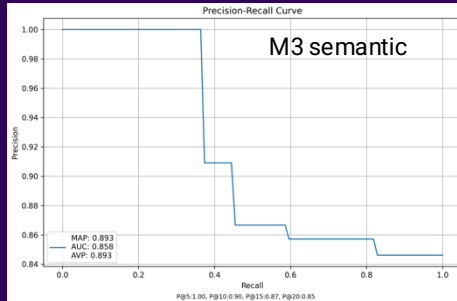
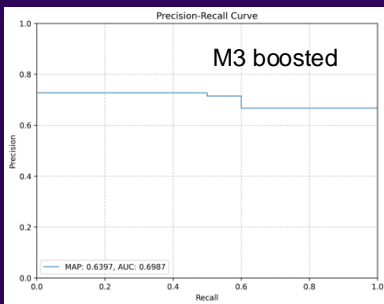
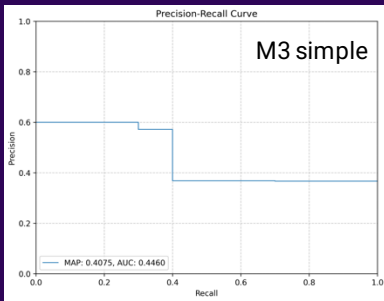
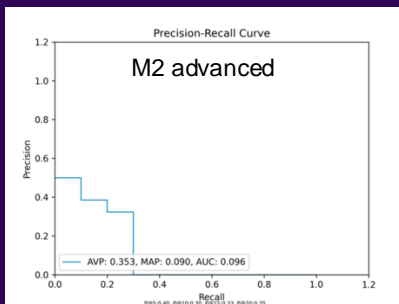
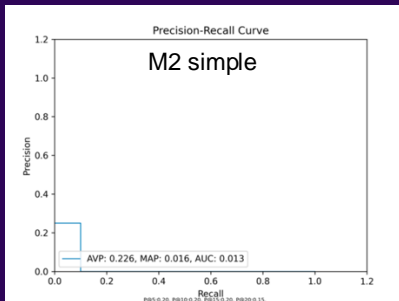
Possibility adding irrelevant terms has made query rewritten perform worse





# 03

## Visually Impressive Games

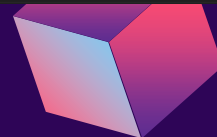


Semantic Search Query			
q	{!knn f=vector topK=50}graphics	visuals	performance technical
Description	Uses dense vectors generated by all-MiniLM-L6-v2 model to find semantically similar content. The query text is converted to a 384-dimensional vector before being sent to Solr.		
fl	id,parent_id,Title,Content,Score,paragraph_num,score		
rows	30		
wt	json		
sort	score desc		

```
"params": {  
  "q": "Content:(graphics visuals performance technical resolution framerate)",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content",  
  "sort": "score desc"  
}
```

```
"params": {  
  "defType": "edismax",  
  "q": "Content:(graphics visuals fidelity ray-tracing performance)*4 OR Content:(optimization framerate resolution rendered)*3 OR Content:(textures lighting effects animations)*2 OR Title:(graphics performance technical)*3",  
  "qf": "Content*3 Title*2 Subtitle",  
  "pf": "Content*18",  
  "max": 1200000,  
  "bf": "Score*2",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content"  
}
```

Possibility adding irrelevant terms has made query rewritten perform worse



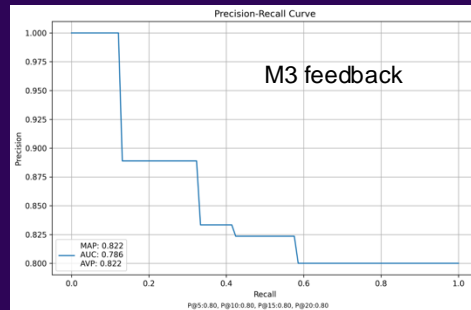
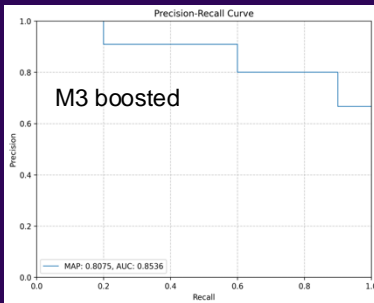
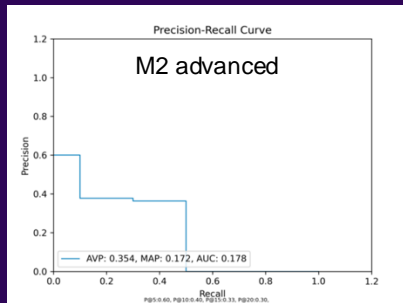
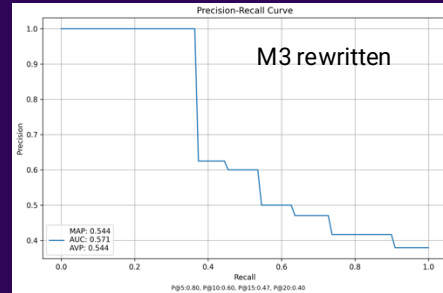
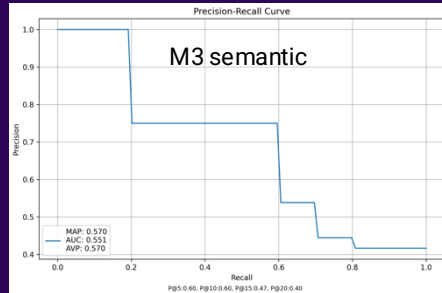
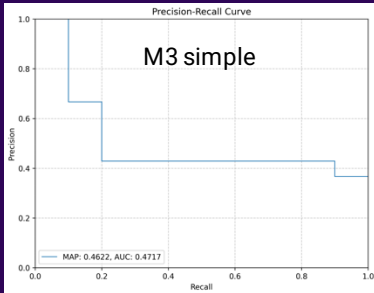
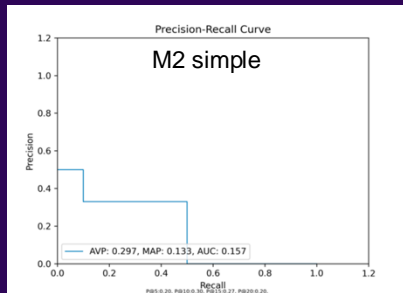


# 03

```
"params": {  
  "q": "Content:(relaxing peaceful casual calm soothing meditative cozy atmosphere peaceful)",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content",  
  "sort": "score desc"  
}
```

## Relaxing Games

Semantic Search Query	
q	{!knn f=vector topK=50}relaxing peaceful calm exploration
Description	Uses dense vectors generated by all-MiniLM-L6-v2 model to find semantically similar content. The query text is converted to a 384-dimensional vector before being sent to Solr.
fl	id,parent_id,Title,Content,Score,paragraph_num,score
rows	30
wt	json
sort	score desc



Relevance Feedback dramatically improves results

```
"params": {  
  "defType": "edismax",  
  "q": "(Content:(relaxing peaceful casual cozy atmosphere meditation)*4 OR Content:(exploration story adventure farming puzzle)*2 OR Title:(relaxing peaceful casual adventure)*3) OR Content:(charming pleasant gentle calm)",  
  "qf": "Content^4 Title^2 Subtitle",  
  "pf": "Content^8",  
  "mm": "1-SNN",  
  "rows": 30,  
  "fl": "id,Title,Score,Subtitle,Content"  
}
```



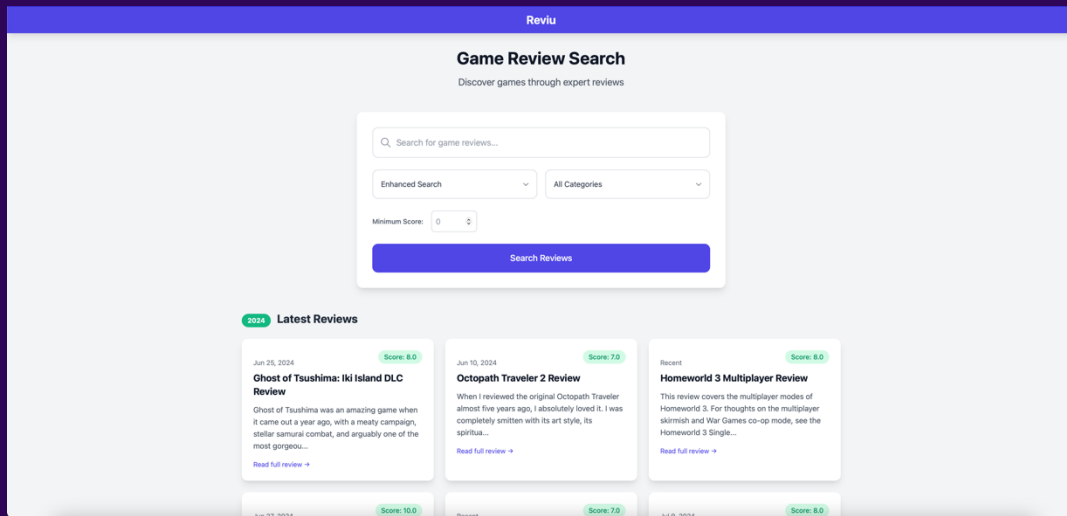
04

# User Interface

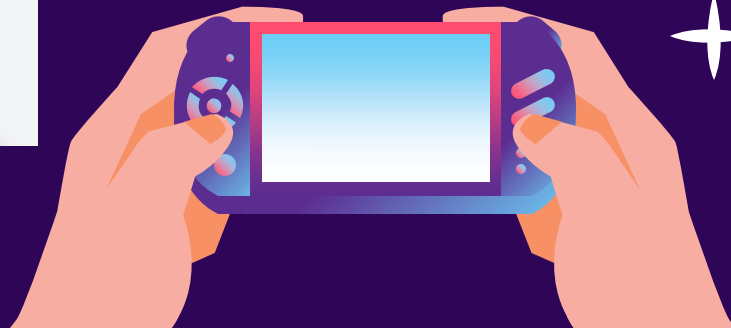


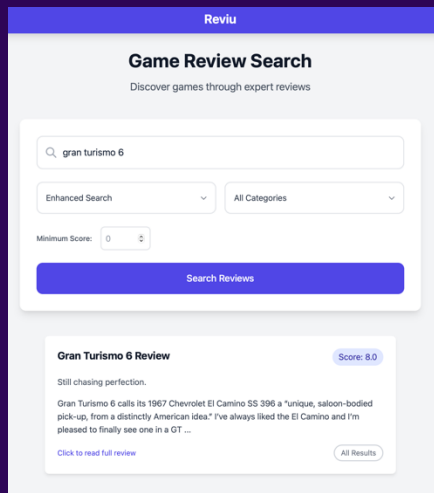
4

# Main Page

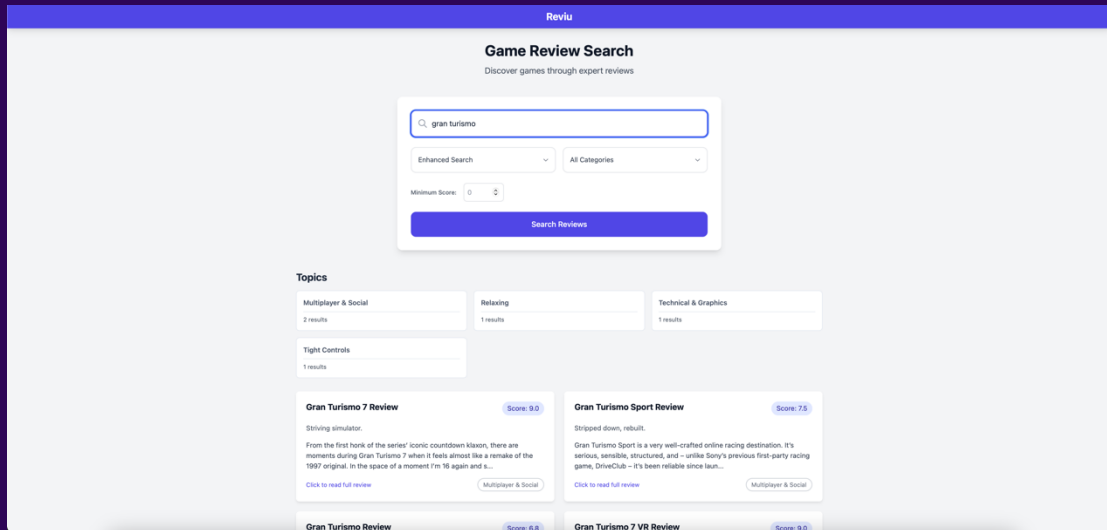


- Search Bar
- Filters (Filter by Categories or Score)
- Dynamic Latest Reviews





# Search Function (1/2)

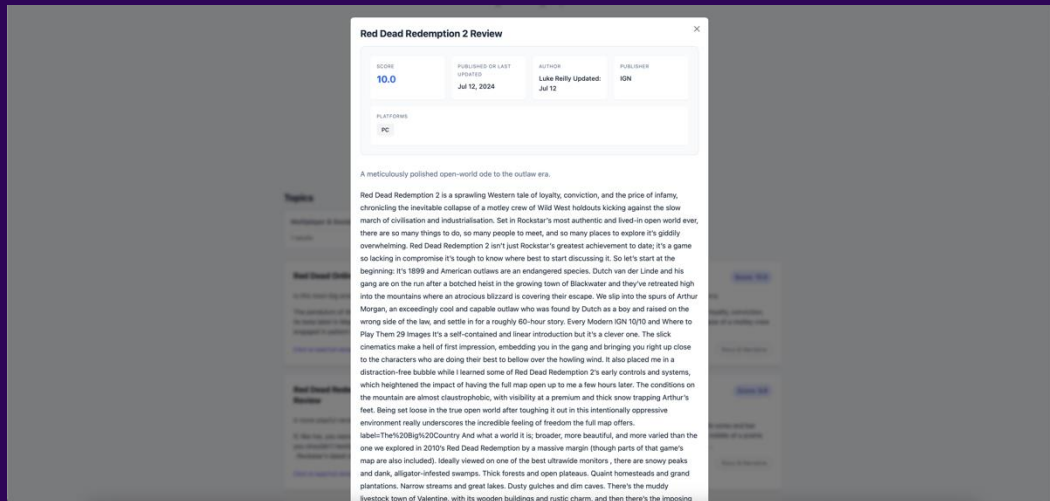


- Retrieves all game related reviews
- No Filters were applied
- Review Snippets that can be expanded
- Clusters
- Show Review Title, Score, SubHeader and Content



## 4

# Search Function (2/2)



- Important informations available
- Review Snippets expanded
- Score, Published or Updated Date, Author, Publisher and Platform



4

## More Like This

race options here. But, you do win money that goes straight into your bank account, which is nice.

### Similar Games

#### Gran Turismo 7 Review

9.0

From the first honk of the series' iconic countdown klaxon, there are moments during Gran Turismo 7 ...

#### Forza Motorsport 7 Review

9.2

The core Forza Motorsport 7 experience is one that hasn't deviated much from the time-tested loop es...

#### Forza Motorsport Review

8.0

Sitting on the grid in my 2017 Holden V8 Supercar, surrounded by Lamborghinis, Ferraris, and Audi R8...

#### Gran Turismo 6 Review

8.0

Gran Turismo 6 calls its 1967 Chevrolet El Camino SS 396 a "unique, saloon-bodied pick-up, from a di...

#### Gran Turismo Sport Review

7.5

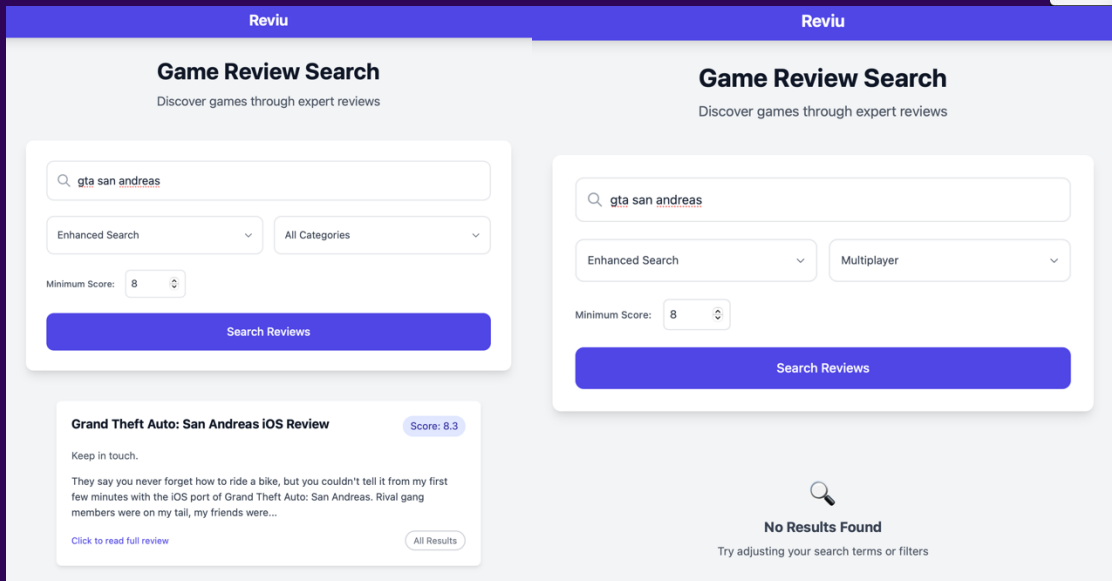
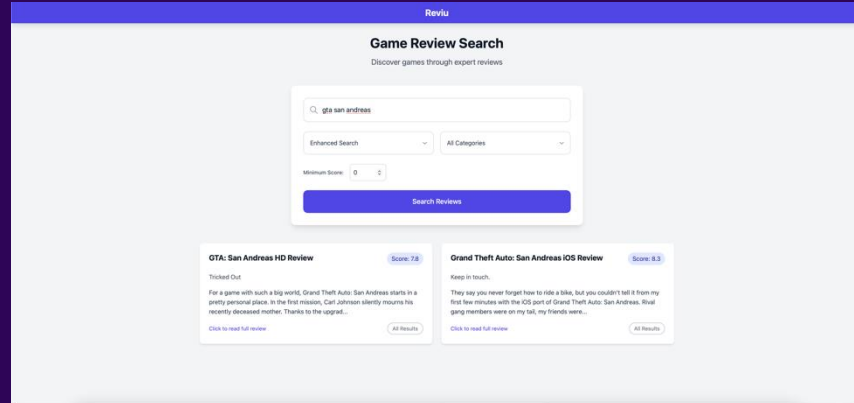
Gran Turismo Sport is a very well-crafted online racing destination. It's serious, sensible, structu...

- Similar game reviews recommended after review content



4

# Filters

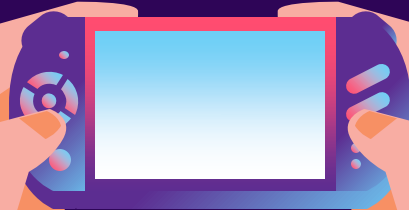


- Multiplayer filter
- No results found because game has no multiplayer mode
- Score filter only shows game reviews equal or above the chosen minimum score



05

# Conclusion



# Conclusion and Future Work



## Objectives accomplished for this milestone:

- Semantic Search Implemented
- Implemented Query Rewriting and Relevance Feedback
- Modern and intuitive User Interface implemented
- Improvements over M2

## Aspects to improve in the future:

- Improve quality of query results
- Improve overall M3 based on feedback
- Improve search system



# Thanks!

Do you have any questions?