



GEORGETOWN UNIVERSITY

# **CRISISFacts: Summarizing Technologies For Emerging Crisis Events**

**Pranav Patil, Dheeraj Orguganty, Will Corbin**

## ***Two Dead in Explosion at Houston Plant***

A blast woke Houston residents from sleep in the early hours of Friday morning, shattering windows and scattering debris. The two fatalities were believed to be employees of the plant, officials said.





KHOU 11 News Houston

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Here's our first daylight look at the aftermath. Several buildings were leveled or destroyed in this morning's explosion in northwest Houston. 1 resident taken to the hospital, 1 worker missing, HFD says. MORE: [khou.com/article/news/l...](https://khou.com/article/news/l...) #HTownRush #KHOU



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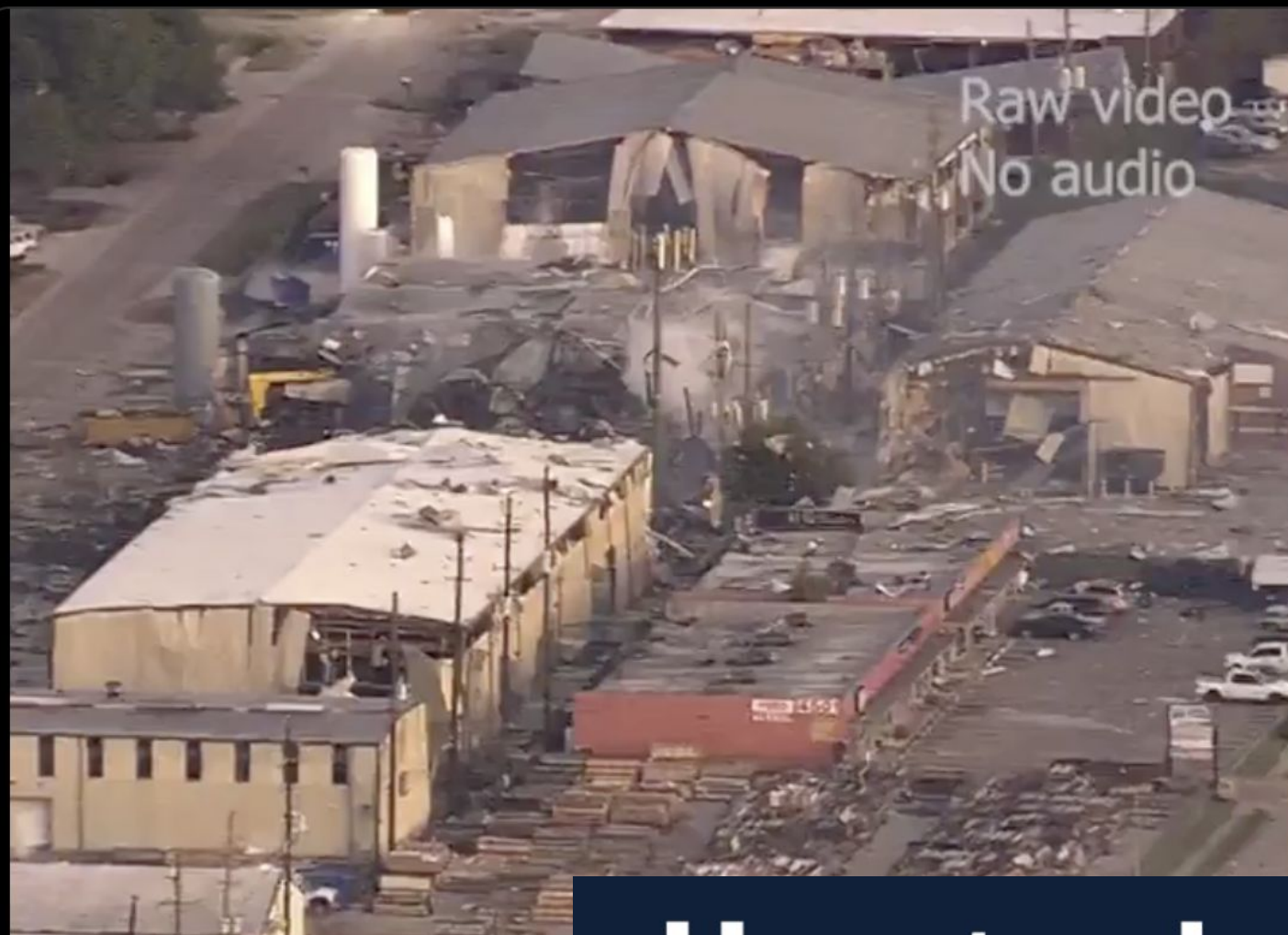




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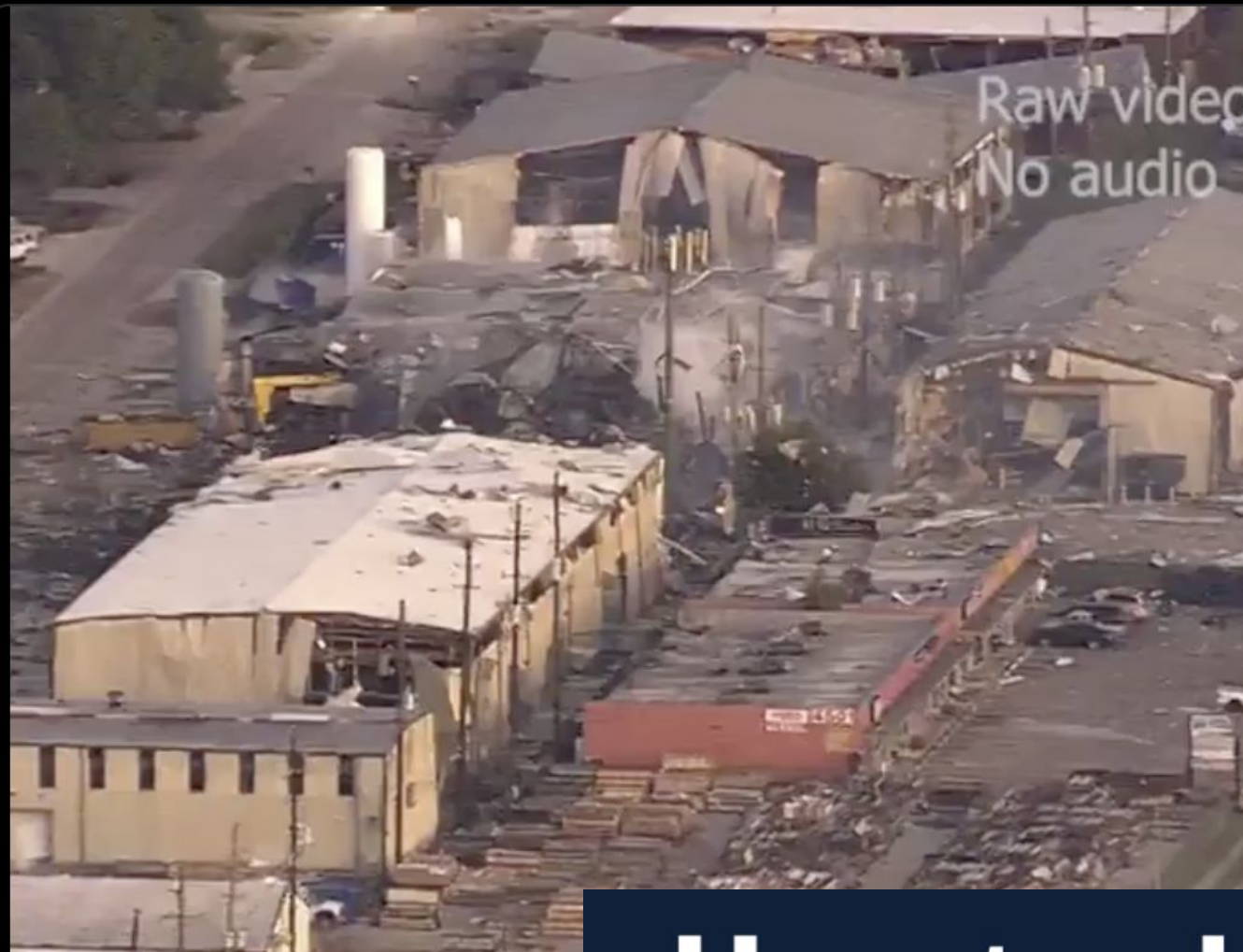




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**fd6270** • 5y ago •

Nothing like the weekly Texas chemical plant explosion on [r/CatastrophicFailure](https://www.reddit.com/r/CatastrophicFailure)

↑ 4 ↓    Reply    Share    ...



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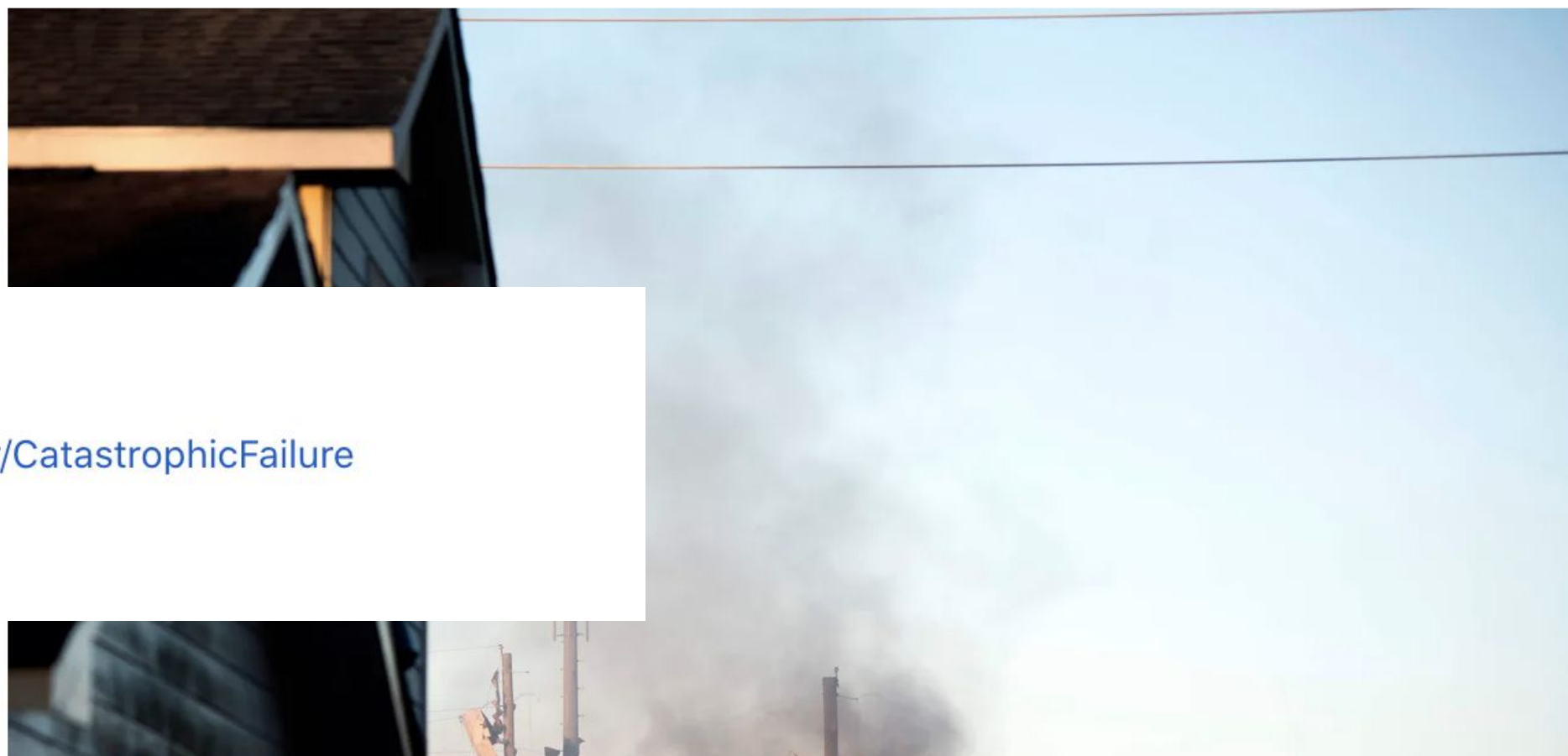




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<https://twitter.com/battlenub19/status/1220660538453172225?s=21> video of the explosion

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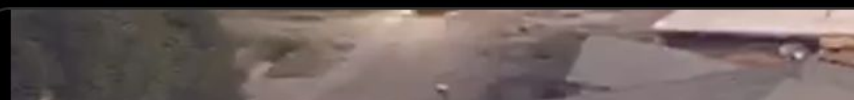




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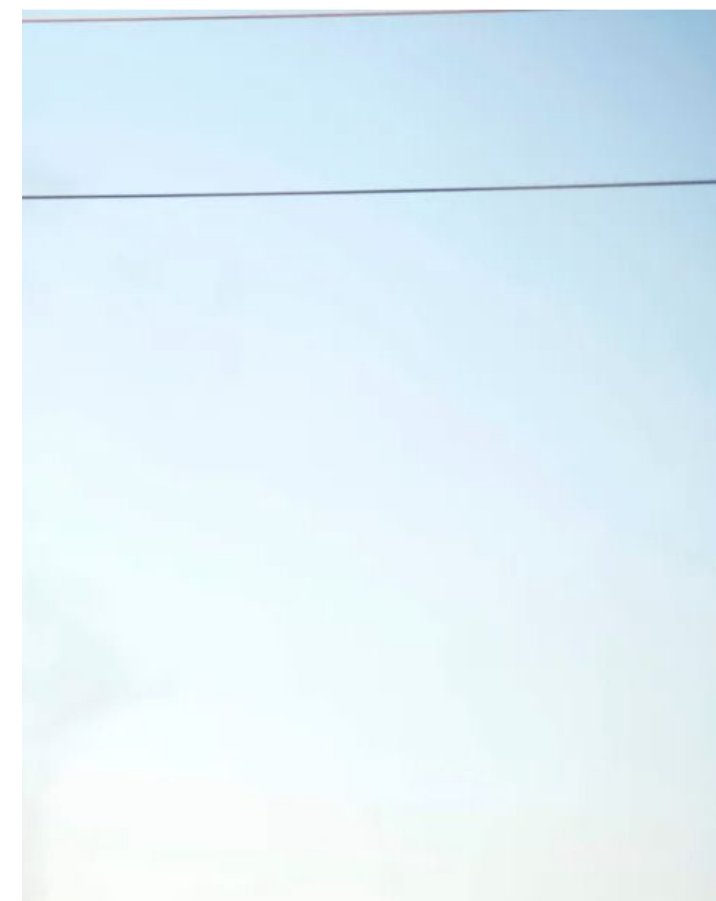
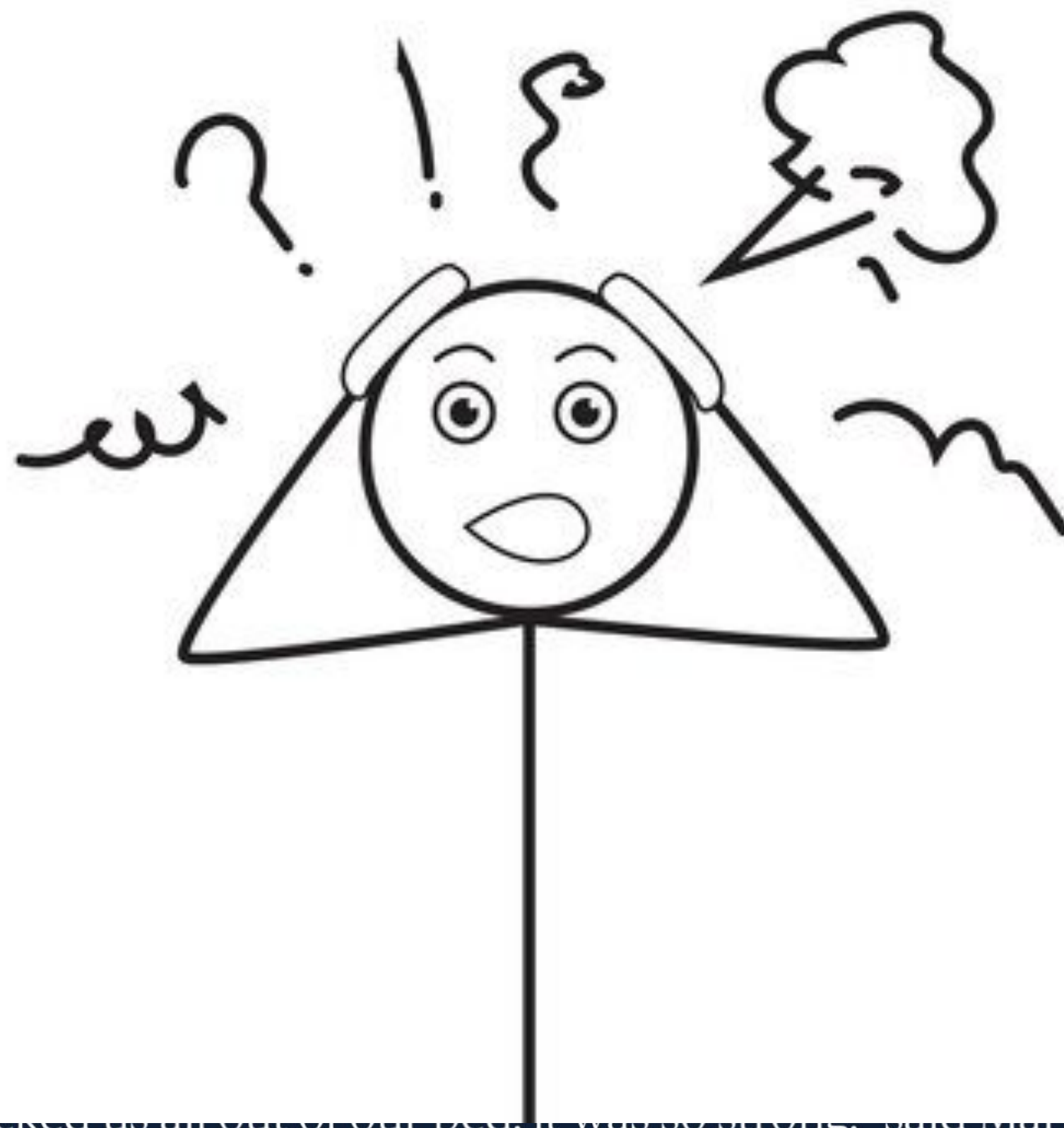
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[53172225?s=21](https://www.youtube.com/watch?v=53172225?s=21) video of the explosion

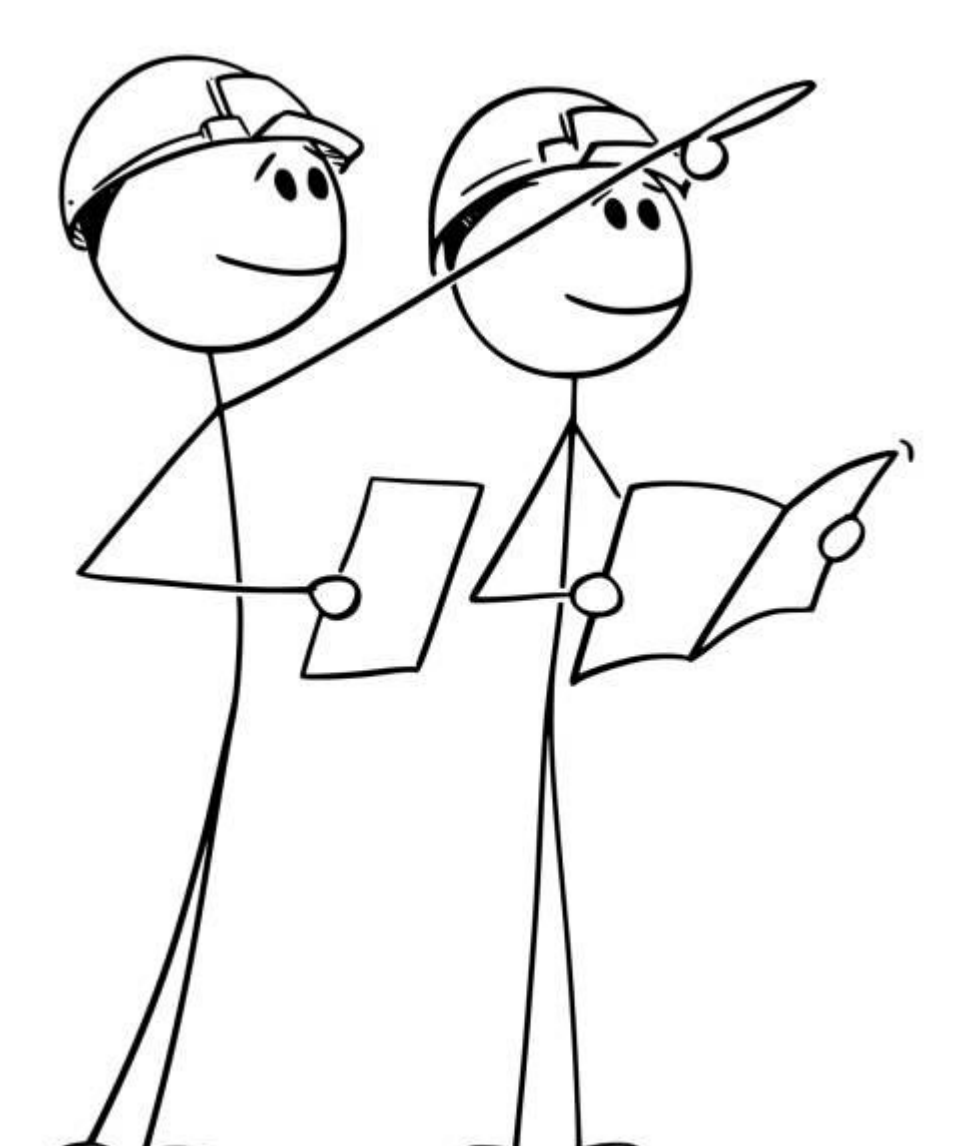
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### 2020 Houston explosion

Date	January 24, 2020
Location	<a href="#">Houston, Texas, U.S.</a>
Coordinates	<a href="#">29.8369°N 95.5456°W</a>
Deaths	3
Non-fatal injuries	18
Property damage	200 nearby buildings damaged

On January 24, 2020, a building at Watson Grinding and Manufacturing in northwest [Houston, Texas, United States](#), exploded at 4:24 a.m.<sup>[1][2]</sup> Debris was scattered as far as one-half mile (0.8 km),<sup>[3]</sup> and approximately 200 nearby houses and businesses were damaged.<sup>[4]</sup> Officials asked local residents to search for debris and body parts to assist with an investigation into the explosion's cause.<sup>[5]</sup> An absence of [zoning ordinances](#) separating industrial areas from residences is known to prevail in the vicinity of the explosion.<sup>[1]</sup>

Two deaths were reported on the morning of the incident.<sup>[6]</sup> Both men were employees of Watson Grinding and Manufacturing.<sup>[5]</sup> A third man, whose home was impacted by debris from the explosion, died from his injuries on February 5.<sup>[7]</sup>

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# What's On Tap

## Introduction

Why CRISISFacts?



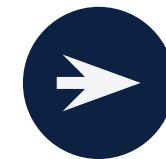
## Backend Design

The behind the scenes code!



## Interface

Making code user-friendly!



## Demo

See it in action!



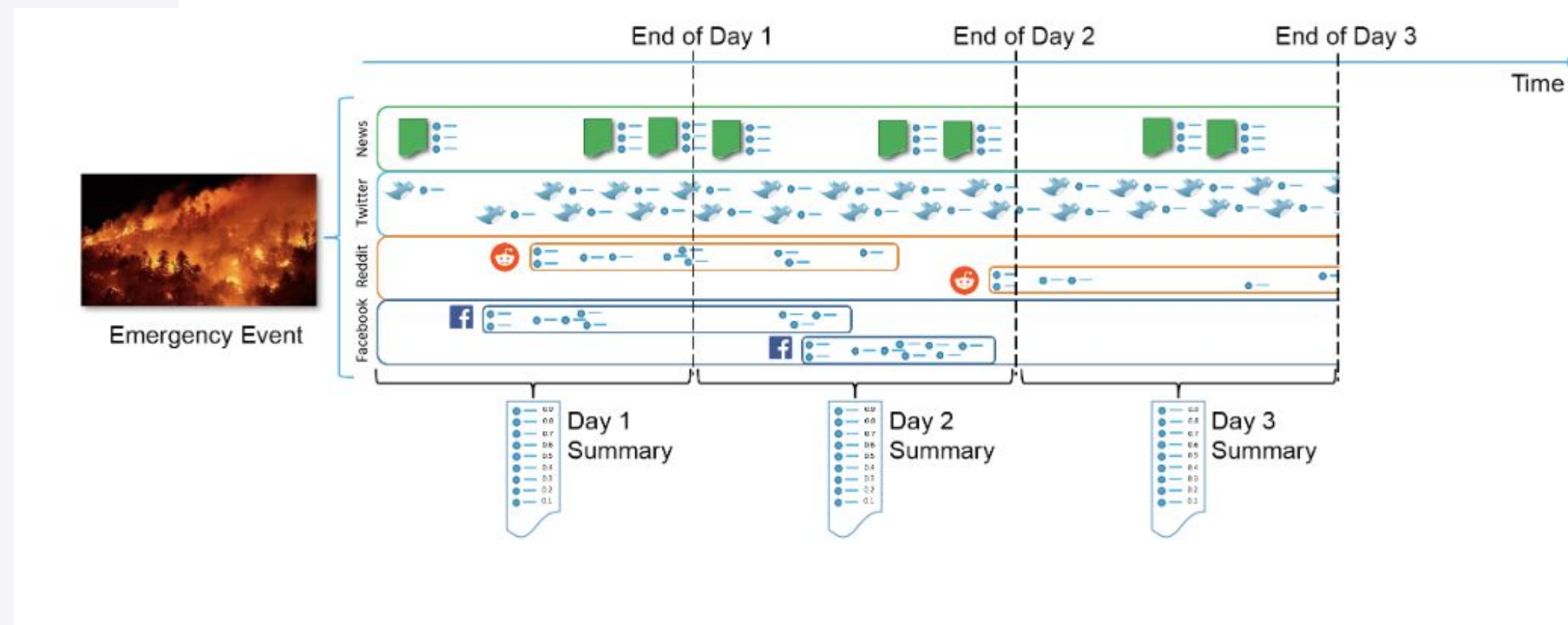


# Introduction

## Developing Summarization Technologies For Emerging Crisis Events

We aim to address the challenges of extracting, organizing, and ranking relevant information from the CRISISFacts data streams.

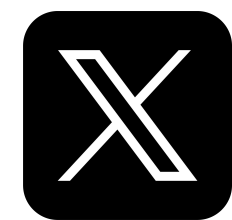
Our goal is to provide concise, actionable summaries of events that are tailored to crisis responders.





# Data Subsetting

Utilizing subsets of the CRISISFacts dataset that focus on specific crisis events, including:



Twitter Data



Reddit Data



News Article Data

eventID	Title	Type	Tweets	Reddit	News	Facebook
CrisisFACTS-010	Houston Explosion, 2020	Accident	58,370	5,704	2,175	6,281



# Literature Review

Several recent studies have informed our approach, including:

1. **McCreadie et al. (2023)**: Introduction of the CRISISFacts framework, highlighting the importance of multi-platform event summarization during crises

(Link - [https://idl.iscram.org/files/mccreadie/2023/2529\\_McCreadie+Buntain2023.pdf](https://idl.iscram.org/files/mccreadie/2023/2529_McCreadie+Buntain2023.pdf))

2. **Khattab and Zaharia (2020)**: ColBERT's late interaction mechanisms for efficient and effective text retrieval.

(Link - [https://people.eecs.berkeley.edu/~matei/papers/2020/sigir\\_colbert.pdf](https://people.eecs.berkeley.edu/~matei/papers/2020/sigir_colbert.pdf))

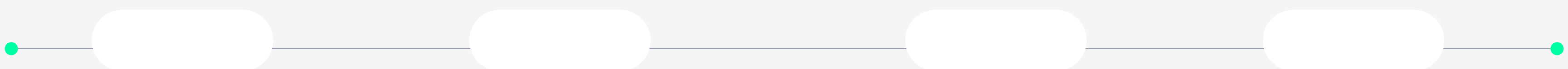
3. **Rudra et al. (2016)**: This work explores extractive summarization techniques for situational tweets, providing insights into processing high-volume social media data during crises.

(Link - [https://mimran.me/papers/Summarizing\\_situational\\_tweets\\_HT2016.pdf](https://mimran.me/papers/Summarizing_situational_tweets_HT2016.pdf))



# Methodology

## Data Ingestion and Preprocessing



Using Spark and Python to clean and preprocess the data

## Feature Engineering

Employing dimensionality reduction and clustering techniques to identify key information clusters.

## Summarization Framework

Developing a hybrid system that combines extractive methods (for quick relevant snippet retrieval) and neural based models (for context-aware ranking and abstract summarization).

## Interface Development

Creating an interactive, user-friendly search interface.

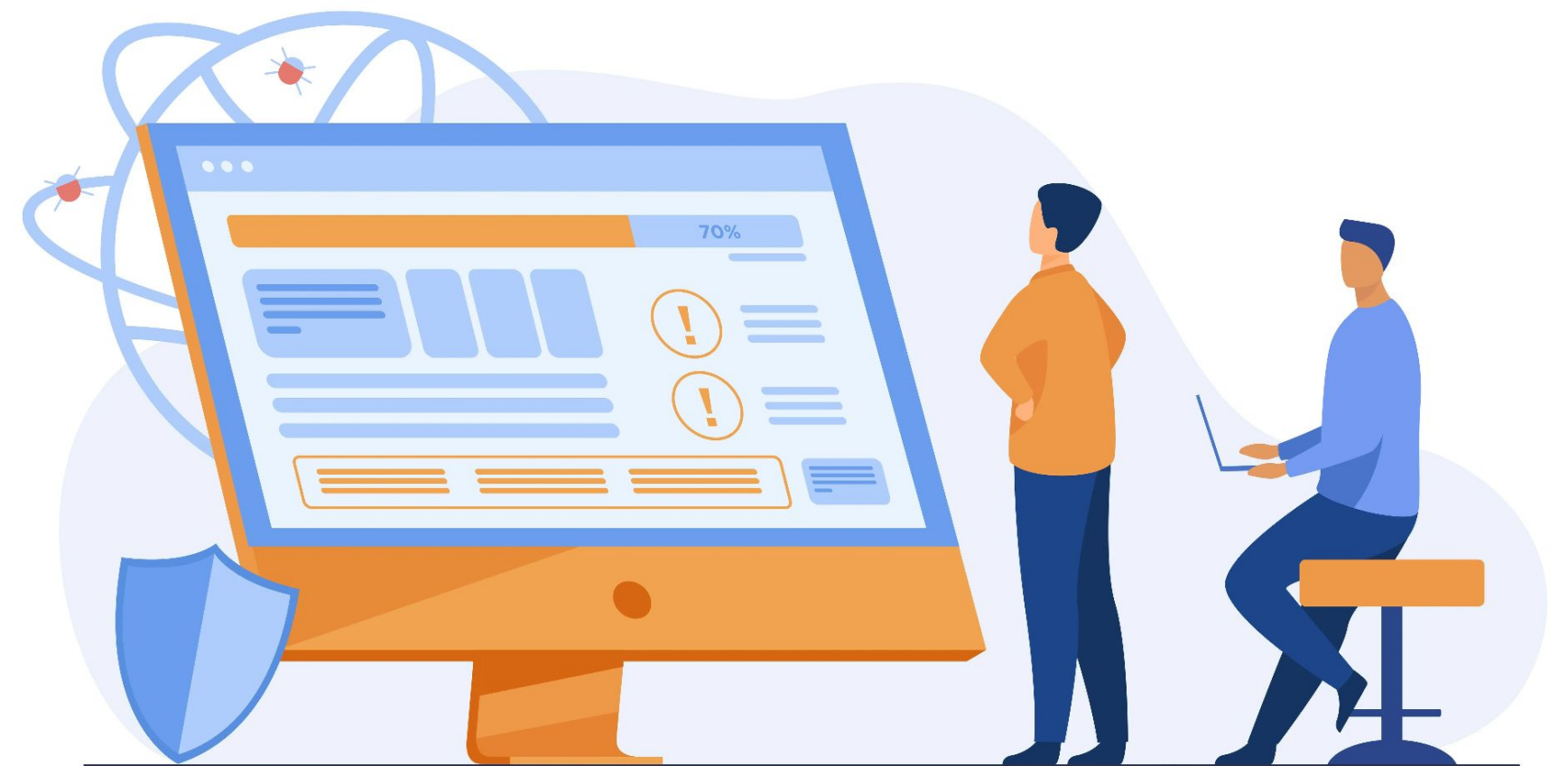


# Evaluation Strategy

## Scoring With Automated and Manual Metrics:

<https://huggingface.co/spaces/mteb/leaderboard>

Retrieval time and cost

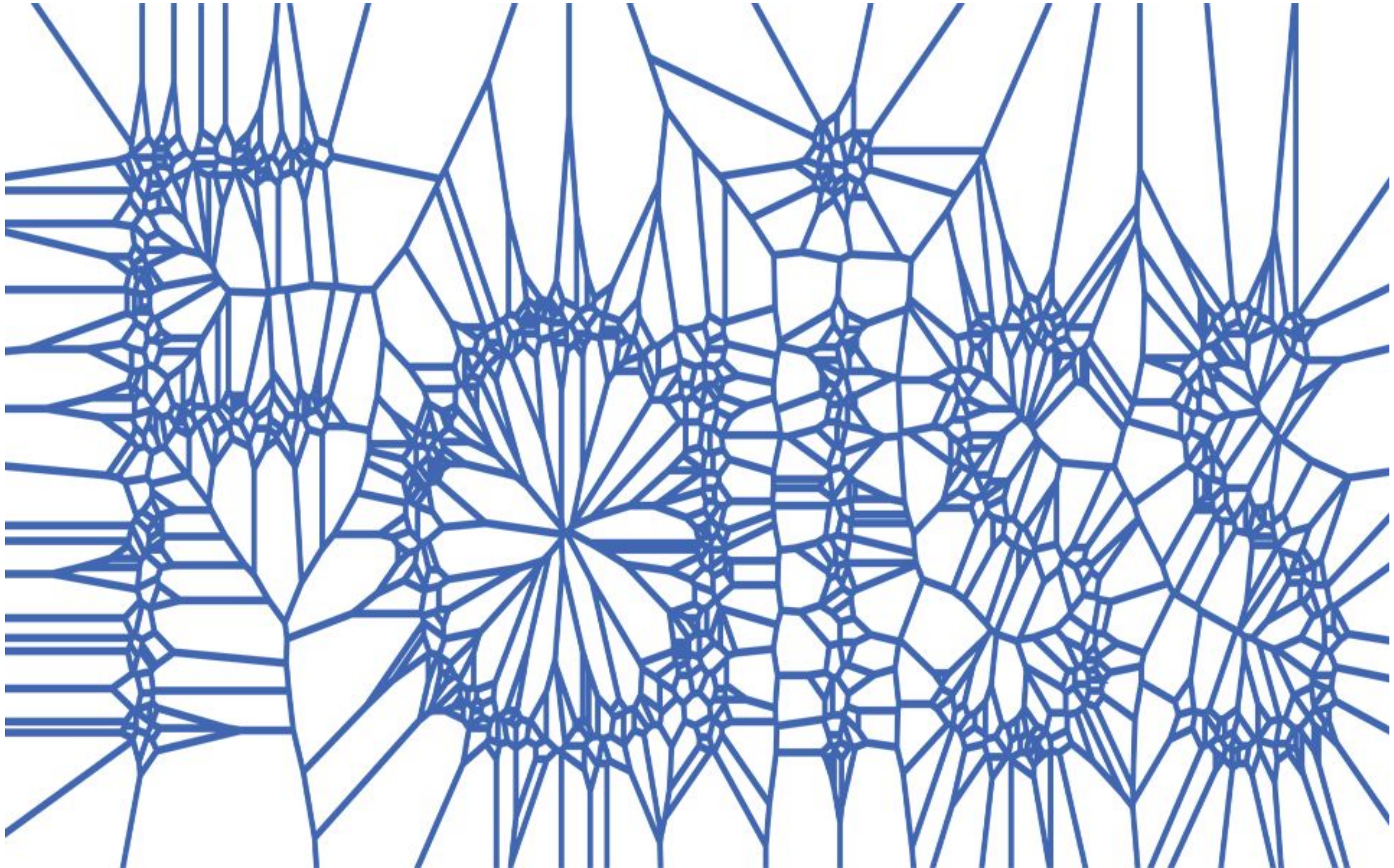






# Backend Design



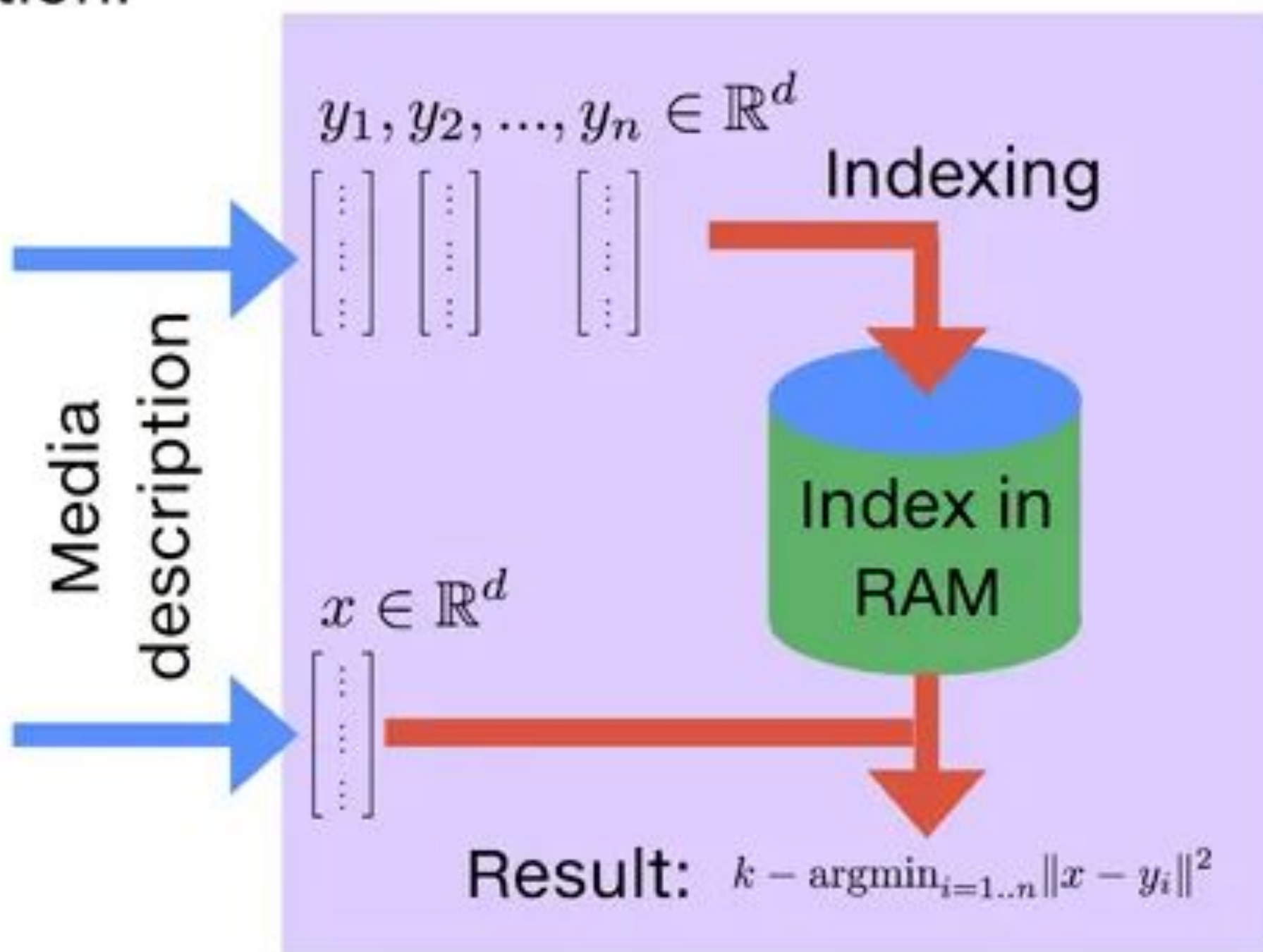




Build index for a collection:



Query:

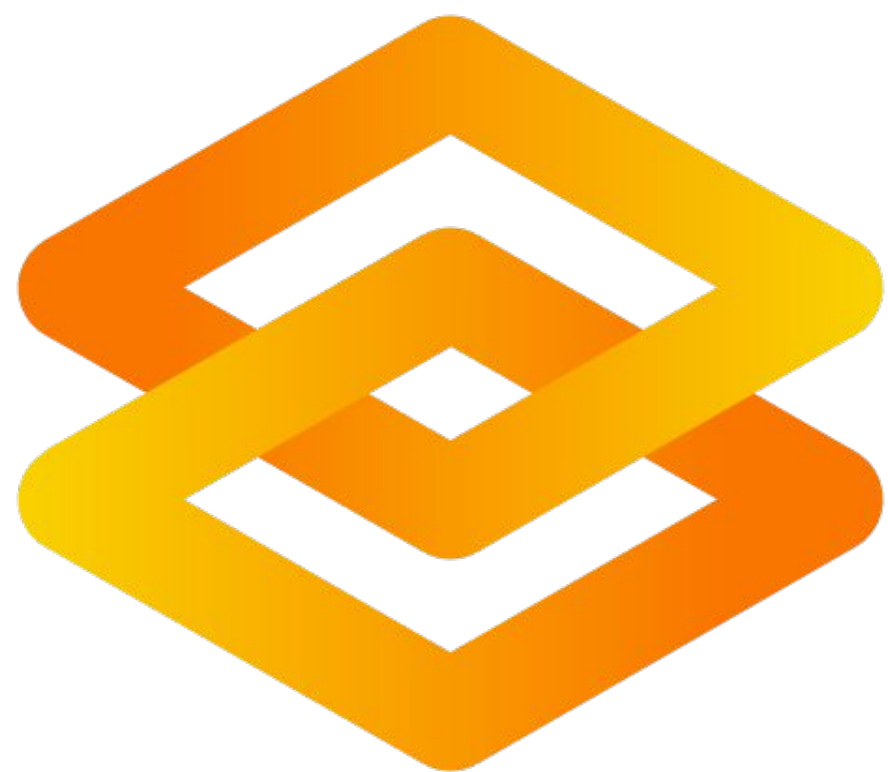






# Interface Design



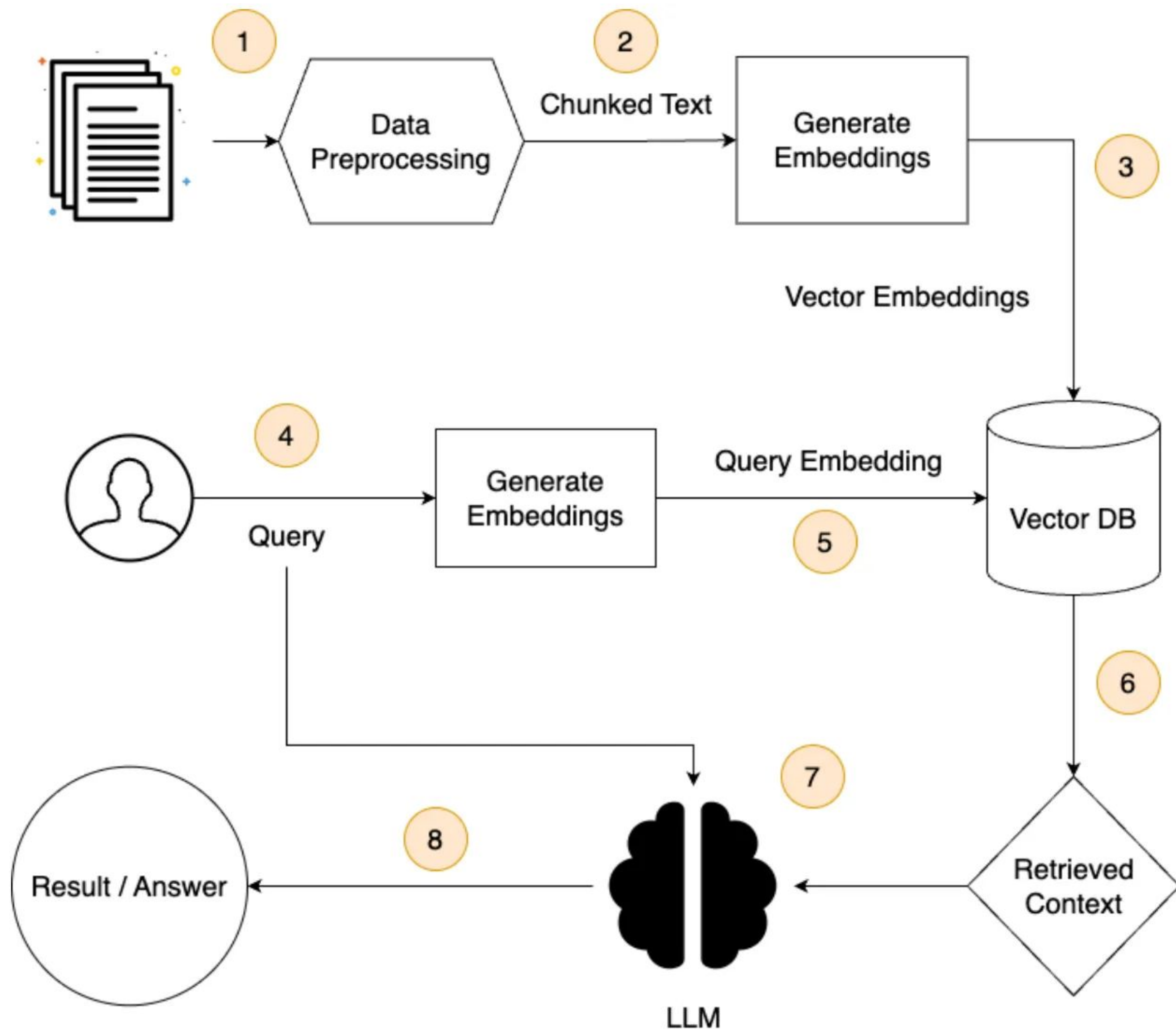


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The background of the slide features a dark blue color with a faint, light blue line pattern that resembles a city street map or a network diagram. The pattern consists of various straight and curved lines intersecting to form a grid-like structure.

# Application Design







# Demo



The background of the slide is a dark blue color. Overlaid on this is a faint, light blue map of the United States. The map shows the outlines of the states, and within each state, there is a detailed grid of lines representing a street network. The lines vary in thickness, with thicker lines likely representing major highways or interstates. The overall effect is a textured, map-like background.

# Conclusion



# Takeaways

**Accurate Information is important for effective response!**

**Scalable summarization as well as a clean interface can tailor to the needs of the user.**

**Application with the user in mind!**

**There are many ways to contribute to research in important fields.**







**Thank You!**