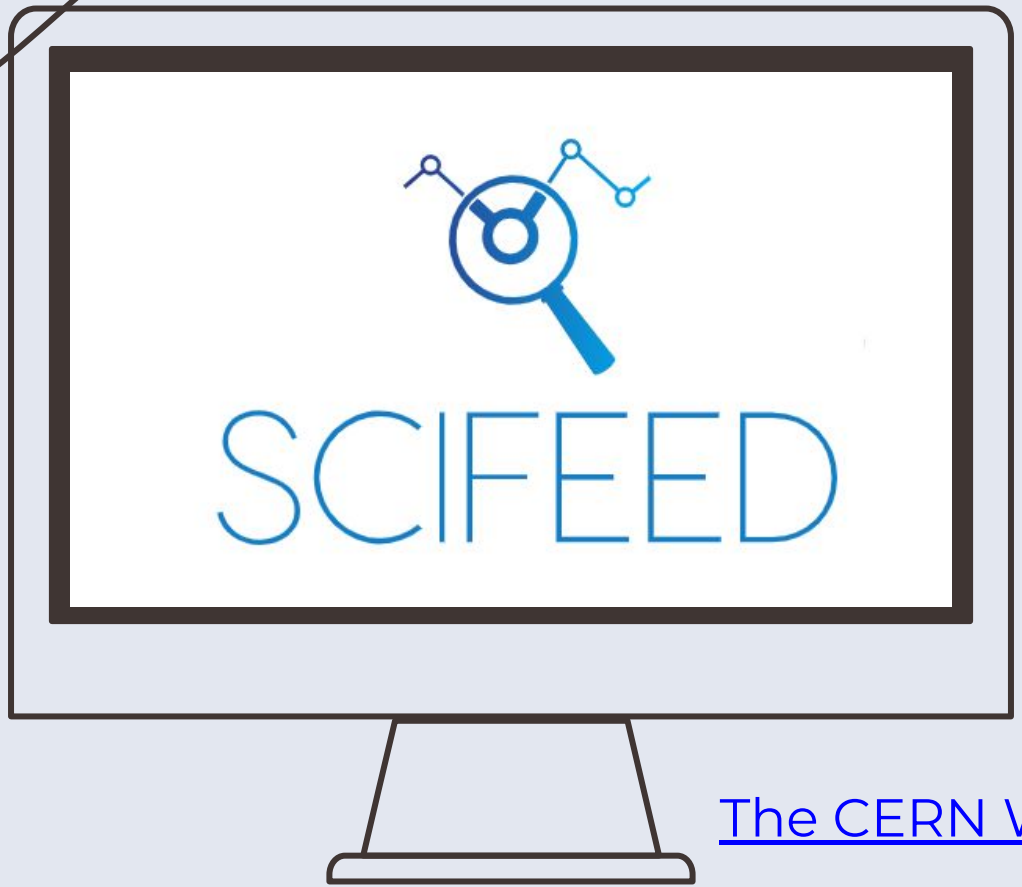


Daniel Kosc

Kristupa Seskauskaite

Marta Adamina Krawczyk

Peter Blum

Shrishti Kulkarni

Viona Cufo

The CERN Webfest 2023

Structure of presentation

- Problem and Motivation
- Our Solution
- Our design and functionality
- Website prototype presentation
- Future features
- Conclusion
- Q&A

Motivation

- Personal experience and conversation with different students we have noticed one major issue:

  Where do I START?

- Overwhelming amount of information available
- Verbosity of research papers

Current approach

- Refining soft skills and seeking guidance from experienced individuals, such as professors
- Effective for some, but not be suitable for everyone, especially those who lack the confidence or developed soft skills to ask for help.

Our Goal

- Remove friction from the research process
- Help users explore science and find topics that interest them
- Give direction to students looking for research topics
- Inspire future scientists

Our Solution:

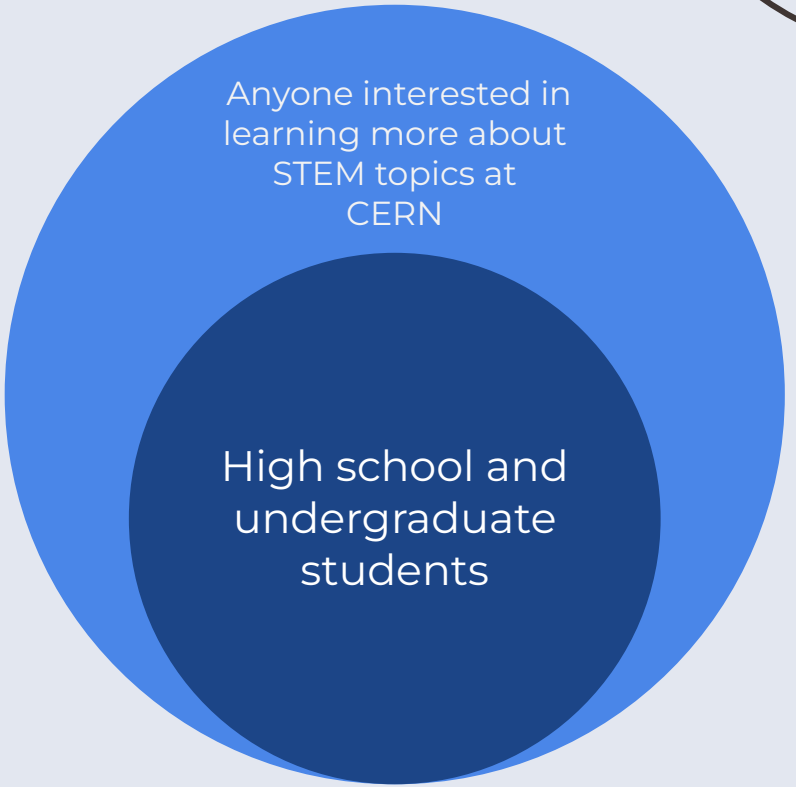
Sci-Feed

Sci-Feed

- User-friendly webpage
- Designed to facilitate the research process
  - At the moment particularly for topics related to CERN
- Interactive interfaces to promote exploration
- Relevant resources filtered based on search prompts

Target group

- Students and aspiring scientists who may not have extensive scientific backgrounds or research experience.
- Serves as a search hub, redirecting users to relevant science papers, articles, and videos from the CERN database based on their search topics.

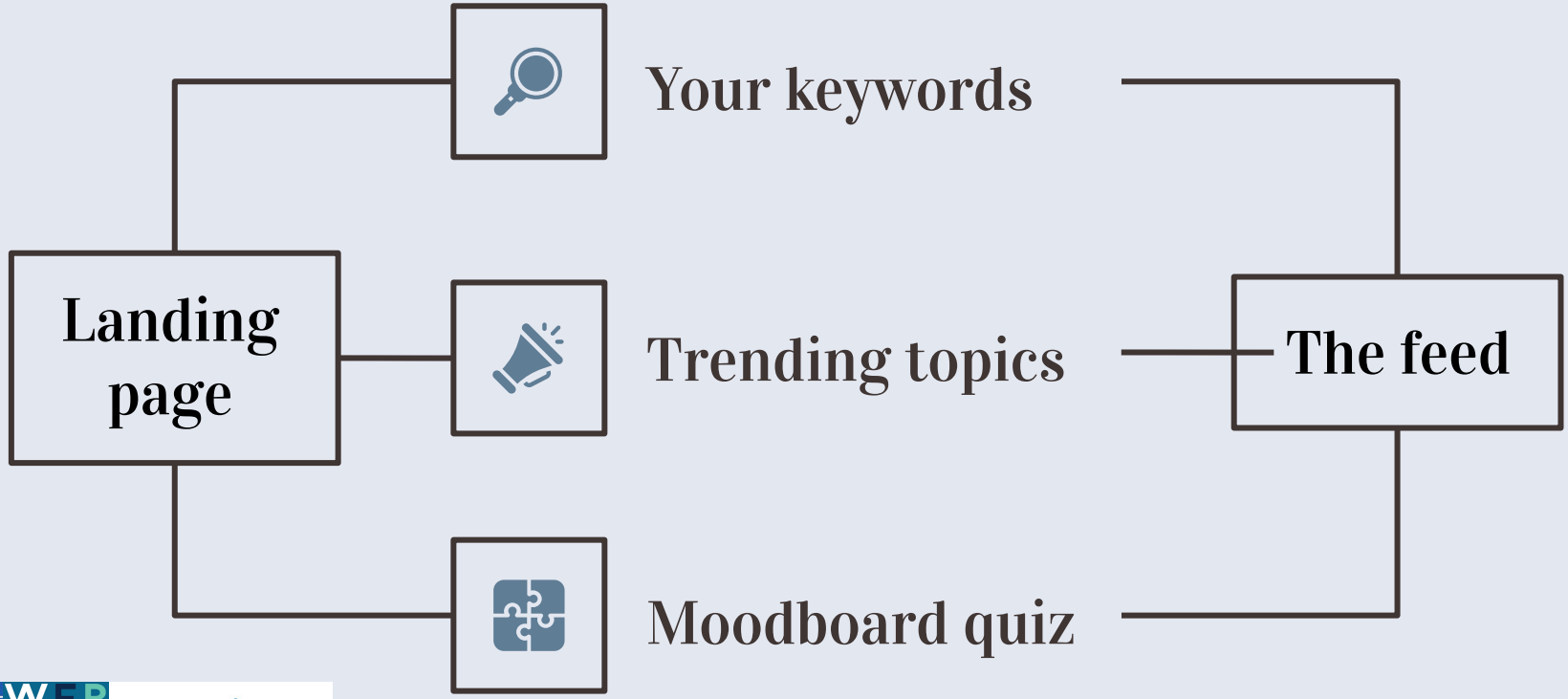


Making the research process user-friendly and interactive

- Streamlines the search process, presenting only the most relevant information using an interactive quiz-like interface.
- Integration of pretrained Large Language Models that allow features like:
  - Summaries of the selected resources, ensuring they match the user's level of understanding
  - Chat-bot interface that allows the users to ask questions about specific papers or topics, enhancing their learning experience.

User flow

Figma



How the mood board works

Pictures
A predetermined array to choose from

Selection
Pictures for the mood board

Resizing
Resize the image based on importance

Recommendations
Our code suggests image categories & subcategories of interest

Further research
Leads back to the querying page

Future features

- Listening to the Summary of the Paper (podcast style)
- Top researchers
- More databases included
  - Scale research so it is not just CERN-centric
- Use filters to get more appropriate content (date, type, author, ...)
- Decrease latency

SciFeed envisions a future where scientific knowledge is readily accessible to all, igniting a passion for discovery and fostering a global community of inquisitive minds, driving transformative advancements and training the new generation of scientist.

Find our project

Front-end: https://www.figma.com/community/file/1264603999168198188

Back-end: https://github.com/danyk20/SciFeed/tree/main

Sources used

- https://looka.com/editor/138331027
- https://www.figma.com/file/dUVby0DgZbhAtj9MIJWaen/Spotify-UI-Design-(Search%2FArtist-Profile)-(Community)?type=design&node-id=42-28&mode=design&t=pfNqZtcwrBhnuRm1-0
- http://cds.cern.ch/
- https://knowledgetransfer.web.cern.ch/applications-cern-technologies-society
- https://openai.com/blog/chatgpt
- https://huggingface.co/com3dian/Bart-large-paper2slides-expander
- https://pypi.org/project/transformers/2.1.0/
- https://pypi.org/project/PyPDF2/
- https://pypi.org/project/requests/

Q&A

Backup

What will your research topic be ?

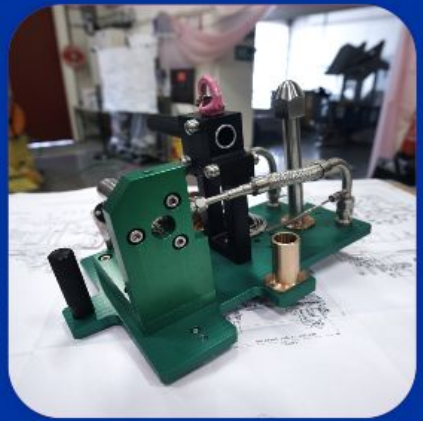
Research Field...

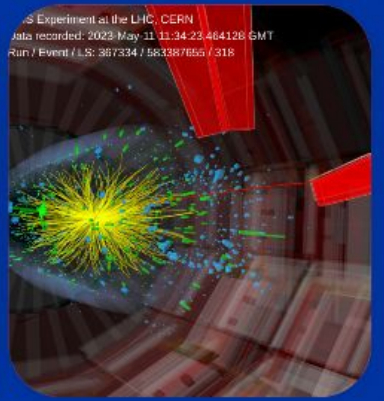
Trending now

LHC | Cryogenic islands | Readout systems | Front-end electronics | Radon detectors

Liquid nitrogen | Proton beams | Quadrupole magnets | Antimatter

OR Press pictures to start

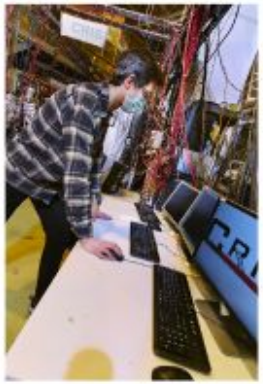
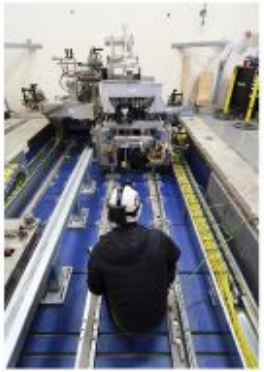






Select all the images you are interested in (3 to 7):






Select all the images you are interested in (3 to 7):










Finish

Home
Search

Create Moodboard
Liked Categories

Accelerators,
Electronic,
Microelectronic,
Supercomputers,
Qunatum Computing,
Deep Learning,
Machine Learning,
Detectors,
Material Science
Cooling,
Radioprotection,
R&D,
Universities,
Research Organizations
Particle Tracking
Metrology,
Mechanics,
Manufacturing,
Magnets,
Information,
Testing Facilities
Beam Component,
Cryogenics
Ventillation,

Particle physics

Particle physics is a branch of physics that studies the fundamental particles of the universe and the forces that govern their interactions.

Papers/Articles

Title: "Unraveling the Higgs Boson's Secrets"
Description: This paper investigates the properties the Higgs boson, shedding light on its role in particle mass generation and its interactions within the Standard Model.

Title: "Neutrino Oscillations in Matter"
Description: Examining the behavior of neutrinos in various mediums, this paper delves into neutrino oscillations, shedding new light on the elusive nature of these subatomic particles.

Title: "Search for Dark Matter Candidates"
Description: Focusing on experimental searches, this paper discusses the quest for detecting potential dark matter particles and their implications for cosmolog and particle physics.

Title: "Advances in Quantum Chromodynamics"
Description: This paper reviews the latest theoretical developments in Quantum Chromodynamics (QCD), providing insights into strong nuclear force phenomena and quark-gluon interactions.

Title: "Supersymmetry: Beyond the Standard Model"

Video

Title: "Precision Tests of Electroweak Theory"
Description: This video focuses on experimental tests of electroweak theory, examining the properties of W and Z bosons and scrutinizing the validity of the theory at high energies.

Title: "Collider Phenomenology of New Gauge Bosons"
Description: Exploring potential new gauge bosons beyor the Standard Model, this video analyzes their impact on collider experiments and their implications for particle physics.

Researchers

Cody Fisher
Radioprotection

Jane Cooper
Silicon detectors

Arlene McCoy
Cooling

Ralph Edwards
Quantum Computing

Albert Flores
Radiotherapy

Wade Warren
Accelerators

Robert Fox
Mechanics

Kathryn Murphy
Electronics

Kristin Watson
Superconductivity

Darrell Steward
Deep Learning

Annette Black
Materials

Search for new phenomena in two-body invariant mass distribution

Searches for new resonances are performed using an unsupervised anomaly-detection technique. Events with at least one electron or muon are selected from 140 fb 1 of collisions at = 13 TeV recorded by ATLAS at the Large Hadron Collider. The approach involves training an autoencoder on data, and subsequently defining anomalous regions based on the reconstruction loss of the decoder. Studies focus on nine invariant mass spectra that contain pairs of objects consisting of one light jet or -jet and either one lepton (,), photon, or second light jet or -jet in the anomalous regions. No significant deviations from the background hypotheses are observed.

Here are the suggested questions:
Q1
Q2

Would you like a simplified summary?

Type in your questions here...

background hypotheses are observed.

Searches for new physics phenomena beyond those described by the Standard Model (SM) require advanced techniques to devise selections that involve a large number of variables characterizing collision events. Furthermore, limited understanding of how new physics would manifest itself has inspired the design of model-independent searches [1]. In traditional methods, event selections are optimized to target specific signatures of signals beyond the SM (BSM signals) and to maximize their separation from SM background processes. Alternatively, event selection criteria can be relaxed to target more general signatures, but this reduces the ability to suppress background.

Machine learning (ML) anomaly-detection methods [2–12] provide a new way to study collision events. One such approach uses an autoencoder (AE) [13–16], a neural network architecture that is commonly used in unsupervised learning. The AE is trained using mostly SM background events and is applied to identify collision events that display kinematic properties different from those of SM events. ATLAS previously used a weakly supervised learning technique for massive dijet final states [17] and an unsupervised machine-learning method to identify anomalous jets in a search for BSM resonances decaying into a Higgs boson and a generic new boson [18].

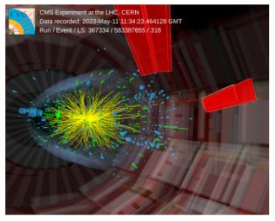
This Letter presents a generic search for resonances in various two-body final states that applies an anomaly detection method to the event topology, for the first time in ATLAS. Events are triggered by the presence of

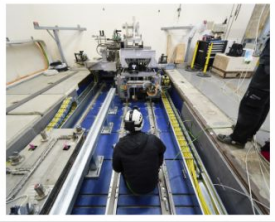
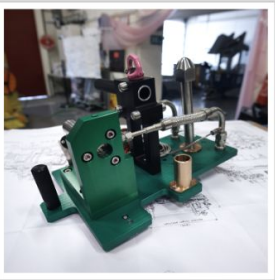
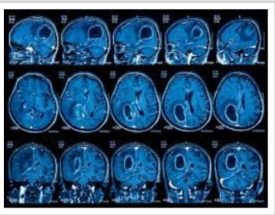
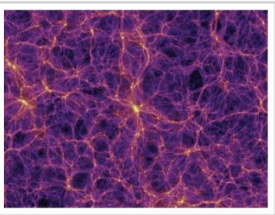
Back up slides design

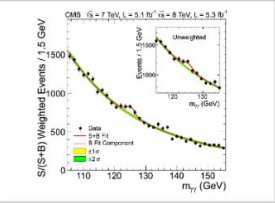
- Landing page - three ways to interact -
  - search up keywords you are interested in
  - select a trending topic or
  - click on pictures to take a moodboard quiz.
- Picture quiz - simplified picture quiz to find your research topic - click and drag the pictures to adjust their importance to you Shrishti will explain more
- The feed -
  - includes short AI description of the topic
  - Papers and videos with AI generated tagline
  - Most active researchers in the field (obtained from the documents)
- Interactive chatbot - ask questions about the paper and experience research in a less intimidating manner

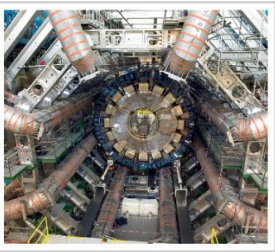
Don't know what you want to research? Create your own mood board and we'll suggest some topics to you!

Select an image by clicking on it. Click and drag the corner to resize the image.



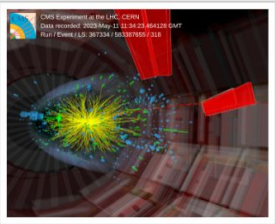



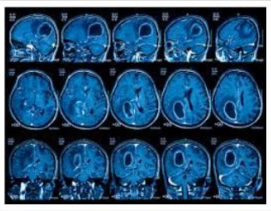
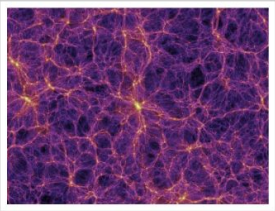
Show me recommendations!

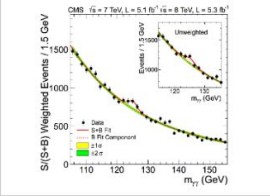
Want to explore one of these topics some more?
Go to our querying interface to get some easy-to-digest information about the frontiers of research!

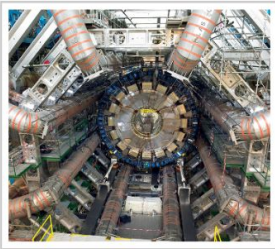
Explore further!





Show me recommendations!

Area of interest 1: Mechanics

Futher topics to explore in this area are: Compact Universal Orbital Cutter, Mounting mechanisms, Precision positioning

Area of interest 2: Detectors

Futher topics to explore in this area are: CMS, LHCb, ALICE, ATLAS, TOTEM, MoEDAL, LHCf, SND, FASER, Subdetectors, Scintillators, Calorimeters, Trackers, Photomultipliers, Cherenkov detectors, Timepix detector

Area of interest 3: Beam systems

Futher topics to explore in this area are: Beam line, Jets, Collimators, Proton beams, DAQ, DQM