



DigitalWorld 2024  
May 26th-30th, 2024  
Barcelona, Spain

# Playing with the ThinkMind Corpus



Lasse Berntzen



# Open data

## Open source movement

- Software should be free

## Open data

- Data should be free



# History

- Before 2011 – IARIA conferences were published by IEEE CPS
  - In 2010 it was decided to move to Open Access
  - From 2011 all contributions from all IARIA conferences are available from [thinkmind.org](http://thinkmind.org)
  - The truth is: IARIA has been a pioneer in Open Access
-

# The ThinkMind Corpus

25.76 GB of  
information

38.435 files  
including  
index pages

As of May 28th, 2024

# Indexing and searching

- Indexing services are somewhat unpredictable
- Driven by money and politics
- It is the same with search engines
- Driven by money and politics
- Open access is now a battleground

## Three student projects

Searching the ThinkMind corpus

Visualizing research collaboration

A ThinkMind ChatGPT

# Searching the ThinkMind Corpus

Students: Rakhman Ruslanovich Alkhazurov, Mikael Fossli, Rinor Krasniqi,  
Tor Einar Horntvedt Molland

Supervisor: Lasse Berntzen

# Aim

- To create a better user interface for the IARIA ThinkMind library
- Testing of existing web site to identify weaknesses
  - Incomplete search results
  - Outdated layout
  - Some accessibility issues (colors)
- Need for a better searching mechanism
- Creating a better user experience (UX)





#### InfoSys 2025 Congress

March 09, 2025 to March 13, 2025 - Lisbon, Portugal

- **ICNS 2025**, The Twenty-Second International Conference on Networking and Services
- **ICAS 2025**, The Twenty-Second International Conference on Autonomic and Autonomous Systems
- **ENERGY 2025**, The Fifteenth International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies
- **WEB 2025**, The Thirteenth International Conference on Building and Exploring Web Based Environments
- **DBKDA 2025**, The Seventeenth International Conference on Advances in Databases, Knowledge, and Data Applications
- **SIGNAL 2025**, The Tenth International Conference on Advances in Signal, Image and Video Processing
- **BIOTECHNO 2025**, The Seventeenth International Conference on Bioinformatics, Biocomputational Systems and Biotechnologies
- **AIHealth 2025**, The Second International Conference on AI-Health

#### InfoWare 2025 Congress

March 09, 2025 to March 13, 2025 - Lisbon, Portugal

- **ICCGI 2025**, The Twentieth International Multi-Conference on Computing in the Global Information Technology

# Think Mind

## IARIA Congress 2025

July 6 - 10, 2025 - Athens, Greece

submission deadline: March 18, 2025

[ThinkMind](#) // ...

### Journals

**IntSys** ::: [International Journal On Advances in Intelligent Systems](#)

**IntTech** ::: [International Journal On Advances in Internet Technology](#)

**LifSci** ::: [International Journal On Advances in Life Sciences](#)

**NetSer** ::: [International Journal On Advances in Networks and Services](#)

**Sec** ::: [International Journal On Advances in Security](#)

**Soft** ::: [International Journal On Advances in Software](#)

**SysMea** ::: [International Journal On Advances in Systems and Measurements](#)

**Tele** ::: [International Journal On Advances in Telecommunications](#)

### Conferences

**ACCESS** ::: [International Conference on Access Networks](#)

**ACCSE** ::: [International Conference on Advances in Computation, Communications and Services](#)



# Search result



About 1 results (0.29 seconds)

## Citizens as Sensors - UPV

[www.thinkmind.org](http://www.thinkmind.org) > download



File Format: PDF/Adobe Acrobat

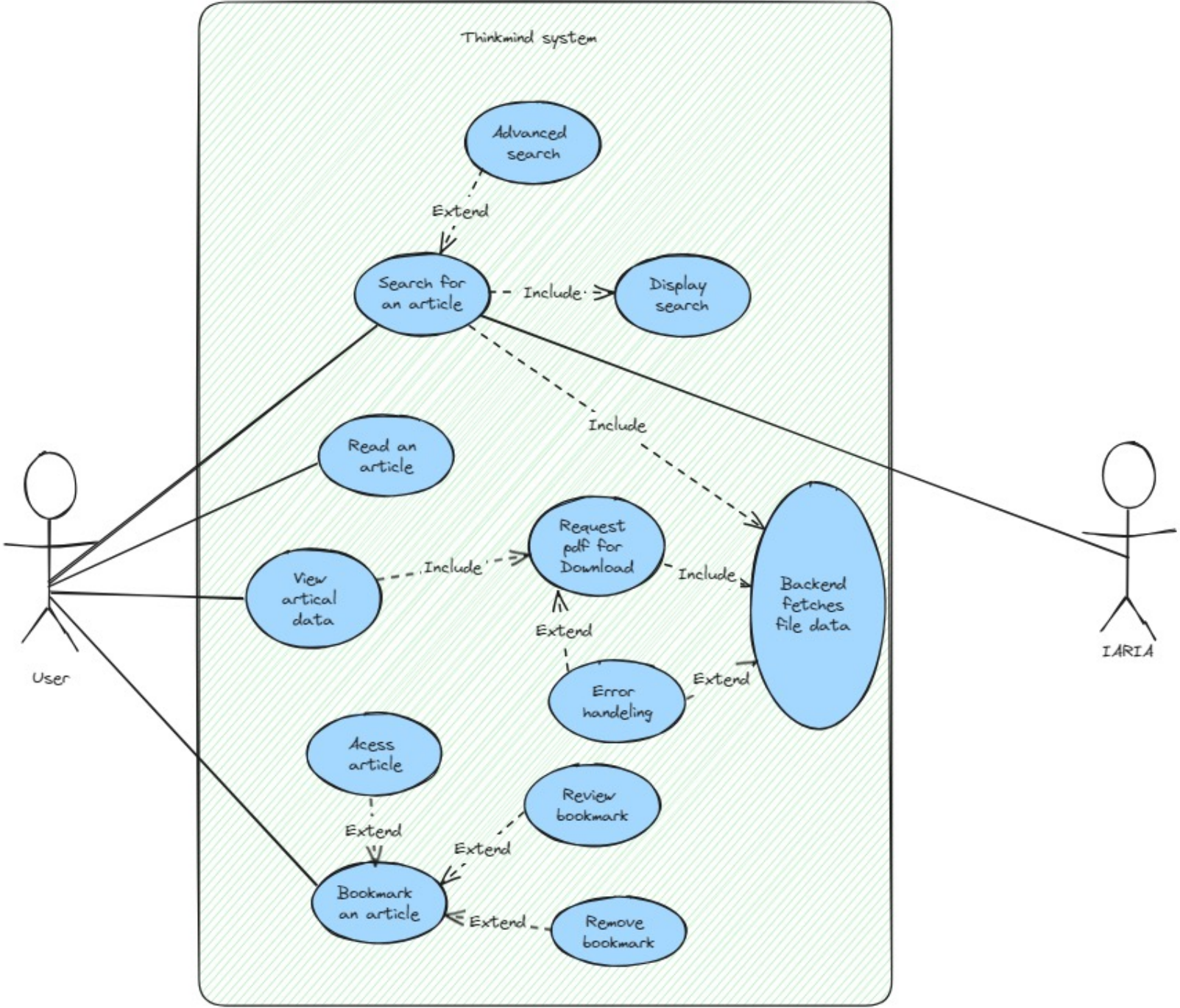
**Lasse Berntzen**,. Marius Rohde Johannesen. School of Business. University of South-Eastern Norway. Horten, Norway e-mail:

**lasse.berntzen@usn.no** marius ...

 Search for **Lasse Berntzen** on Google

ENHANCED BY Google

# Use Case Diagram



## ACHI+2016

Save Open

### Reduction of Dental Anxiety and Pain in Children using Robots

Robotics — dental treatment — WoZ experimentation — human robot interaction — multi-modal interaction — healthcare robotics  
 Mine Yasemin — Yelda KasÄ±moÄlu — Simin Kocaoglu — Emine Karsli — Elif Bahar Tuna Ince — Gokhan Ince

In this study, we aim to use humanoid robots to implement a techno-psychological distraction technique for children between 4-10 years of age in order to reduce their anxiety and stress-related pain during their dental treatment. A multi-modal system supporting audio-based dialogues, videos, gestures and expressions based on face, head, arm, body movements have been developed for a robot. We have employed the Wizard-of-Oz technique, a popular approach in human robot interaction research. The effectiveness of the system is shown by carrying out experiments on two groups of children; one group whose treatment is conducted by the dentist's own skills alone, the other whose treatment is conducted by a dentist with the assistance of the robot. In order to evaluate the robot's effect on the anxiety and fear of children during these experiments, procedures with no anesthesia (not requiring the use of needles) have been carried out. The system has been evaluated subjectively by applying a variety of questionnaires to patients, and dentists as well as objectively by measuring patient's heart rates.

From: April 24, 2016  
 To: April 28, 2016

2308-4138  
 978-1-61208-468-8

## Articles

Showing 1 to 12 of 1256

- |   |   |  |
|---|---|--|
| <b>Reduction of Dental Anxiety and</b><br>ACHI+2016<br>April 24, 2016      2308-4138  | <b>Analysis and Design in Providing</b><br>SERVICE+COMPUTATION+2012<br>July 22, 2012      2308-3549 | <b>Design and Characterization of th</b><br>SENSORDEVICES+2013<br>August 25, 2013      2308-3514 |
| <b>A Robust Polyurethane Depositio</b><br>ICAS+2019<br>June 2, 2019      2308-3913    | <b>Mobile Robots Path Planning usin</b><br>ICAS+2011<br>May 22, 2011      2308-3913                 | <b>Robot Cognition in Disassembly -</b><br>ADAPTIVE+2020<br>April 26, 2020      2308-4146        |
| <b>Smart Factory Automation for R</b><br>INTELLI+2022<br>May 22, 2022      2308-4065  | <b>Digital Badges in Informal Learn</b><br>ICITW+2013<br>June 23, 2013      2308-3972               | <b>Dynamic Configuration of Distrib</b><br>ICONS+2015<br>April 19, 2015      2308-4243           |
| <b>Face Detection on Infrared Therm</b><br>SIGNAL+2017<br>May 21, 2017      2519-8432 | <b>Novel Nanoparticle Enhanced Dig</b><br>CENICS+2016<br>July 24, 2016      2308-426X               | <b>Requirements for 3D Printed App</b><br>CENICS+2016<br>July 24, 2016      2308-426X            |

## ACHI+2016

### Reduction of Dental Anxiety and Pain in Children using Robots

*Robotics — dental treatment — WoZ experimentation — human robot interaction — multi-modal interaction — healthcare robotics*

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- Articles  Name  Authors
- Events  Keywords  Location
- Conferences  Abstract  ISSN / ISBN

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## Bookmarked Articles

ACCESS+2012 ★

*Optical Access Network Migration from GPON to XG-PON*

ACCESS+2011 ★

*Digital Complexity in DSL: An Extrapolated Historical Overview*

ACCESS+2012 ★

*A Novel MIMO-OFDM Scheme Based on Modulation Diversity for IEEE 802.11ac Standard*

ACCESS+2012 ★

*Extending Neutrality to Experimental Facilities*

ACCESS+2011 ★

*Adaptive Resource Allocation Scheme for TETRA Networks with Multi-operators*

# Searching

Search: Robotics [X] [Settings]

Articles  
Events  
Conferences

Name  Authors  
 Keywords  Location  
 Abstract  ISSN / ISBN

*- healthcare*  
n Ince

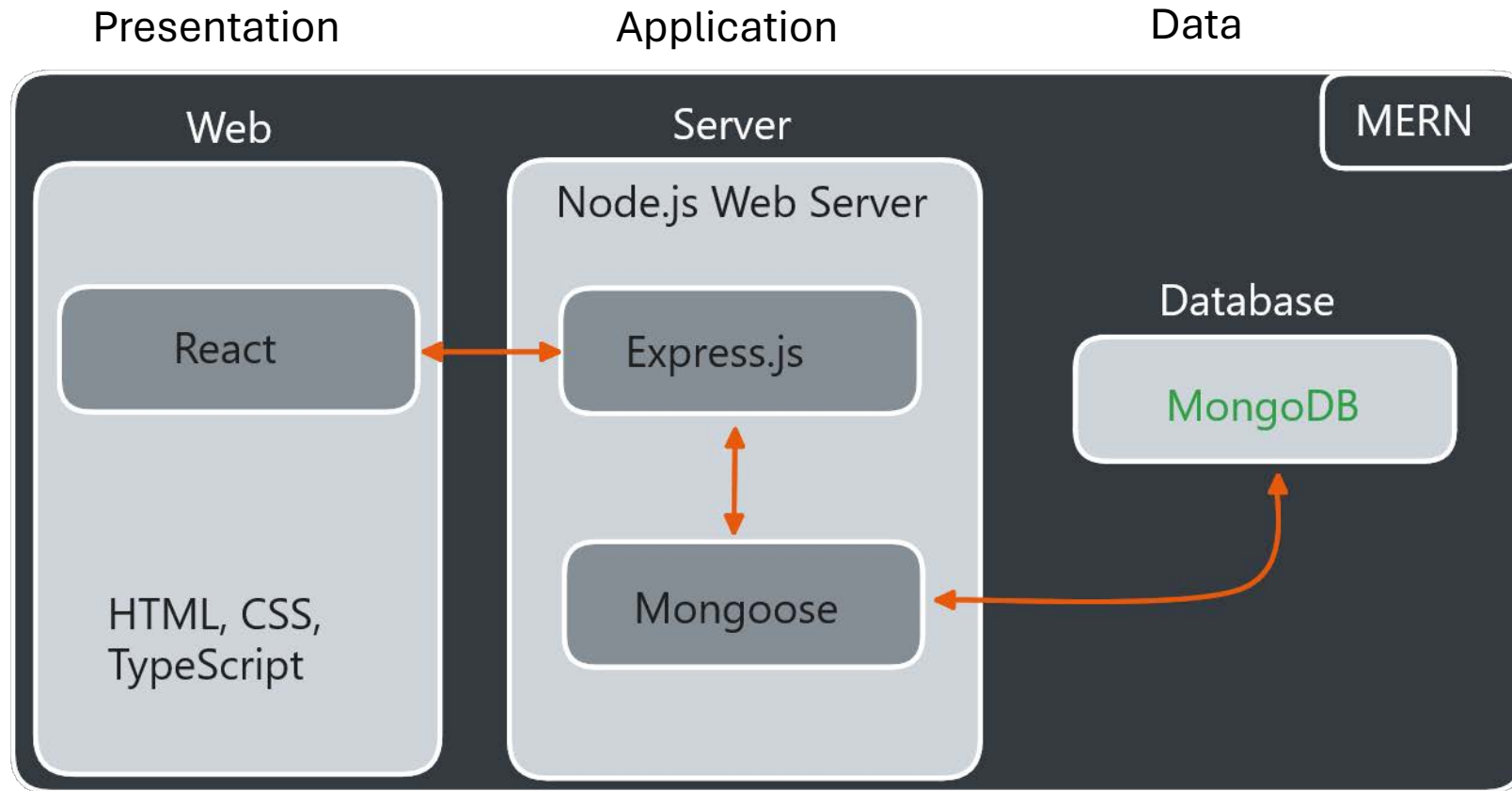
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**Reduction of I**  
ACHI+2016

# Data collection

- Two Python scripts:
  - Downloading, parsing, and data insertion of .htm files
  - Downloading, and data insertion of .pdf files

# Architecture



Uses Fuse for fuzzy search, nodemon for automatic restart after changes



# Visualizing Research Collaboration

Students: Martin Havsgård, Simen Sørli Helgeby, Arman Asadi Laleh

Christoffer André Oseberg, Herman Aleksander Solberg

Supervisor: Marius Rohde Johannessen

# Research collaboration

- Based on the following paper: Marius Rohde Johannessen, Lasse Berntzen. A Decade of eParticipation Research. 11th International Conference on Electronic Participation (ePart), Sep 2019, San Benedetto Del Tronto, Italy. pp.3-14 (Springer)
- Checked for collaboration among researchers.
- Found several clusters
- Made manual visualizations

# Aim

- Use the ThinkMind Corpus as a data source
- Automate visualizations

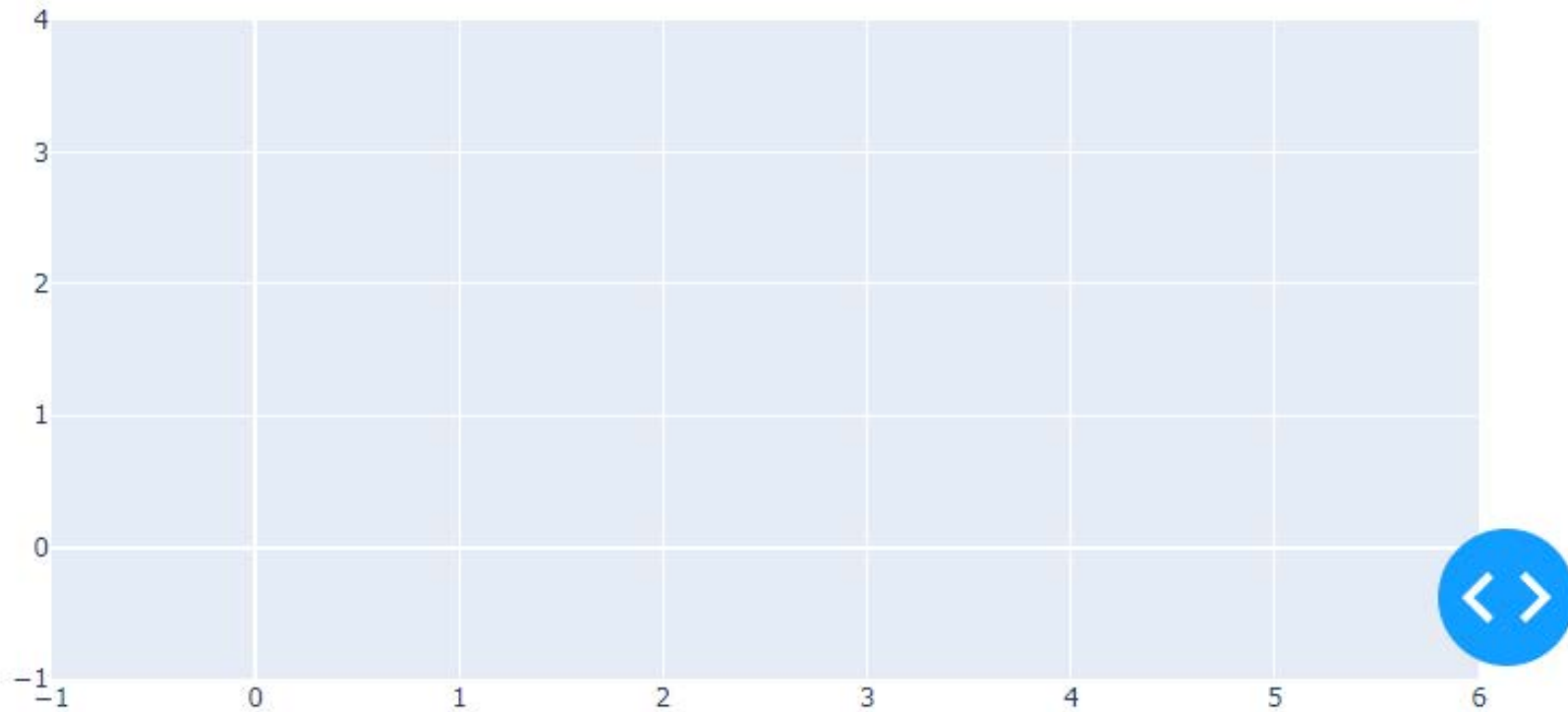
# Co-Authorship Network Analysis

Enter author name



1

Search



# Co-Authorship Network Analysis

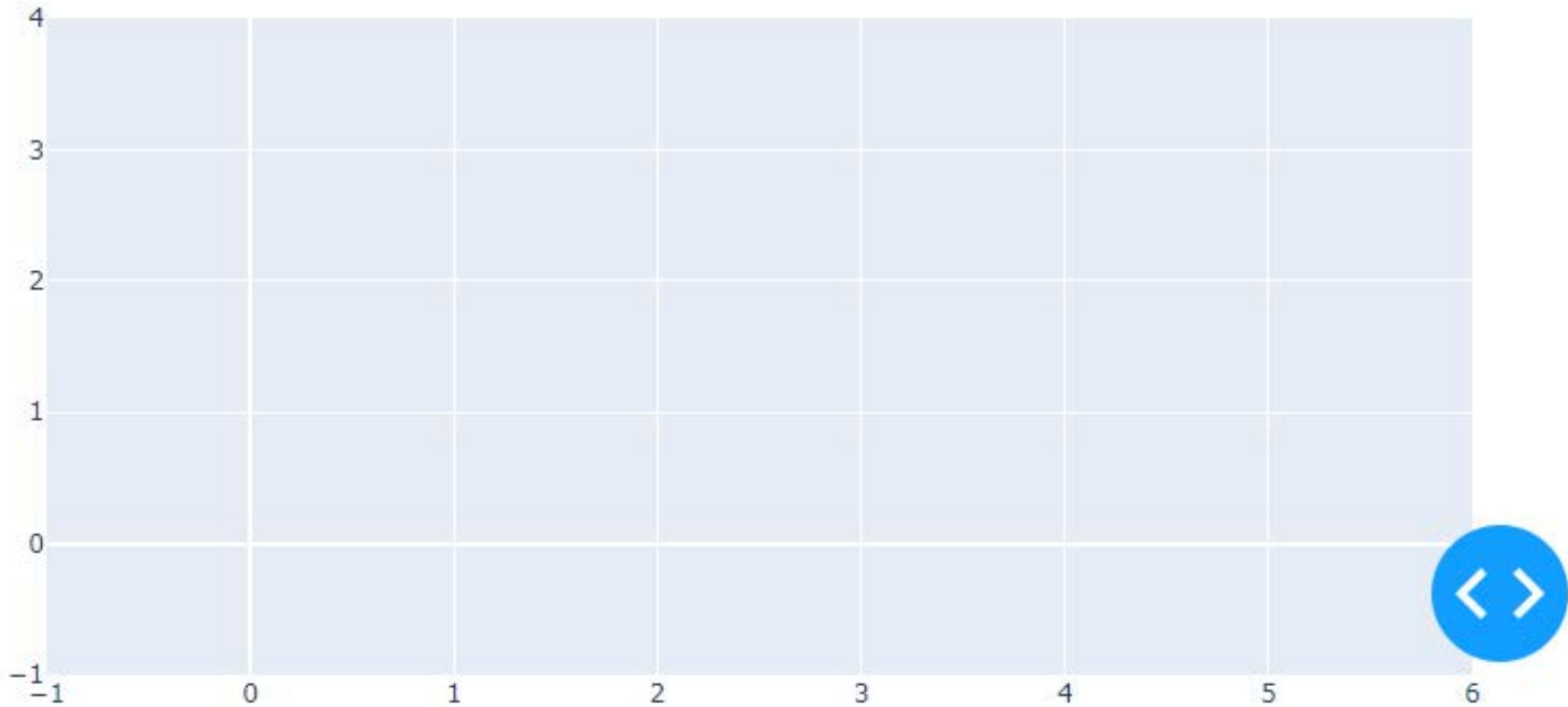
Lass

Lasse Berntzen

Lassi Lehto

Abdulrahman Alassadi

Lasse Seppnen



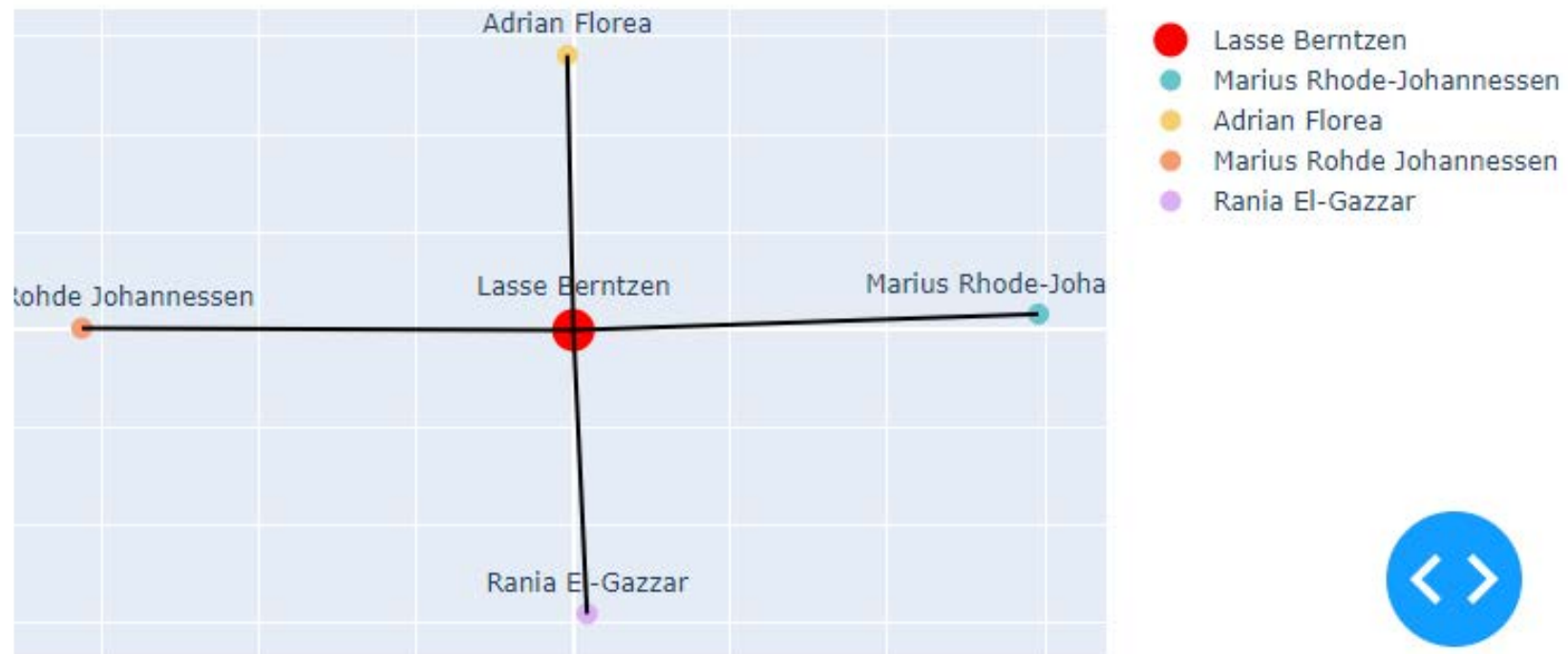
# Co-Authorship Network Analysis

Lasse Berntzen

1

Search

Co-Authorship Network for Lasse Berntzen

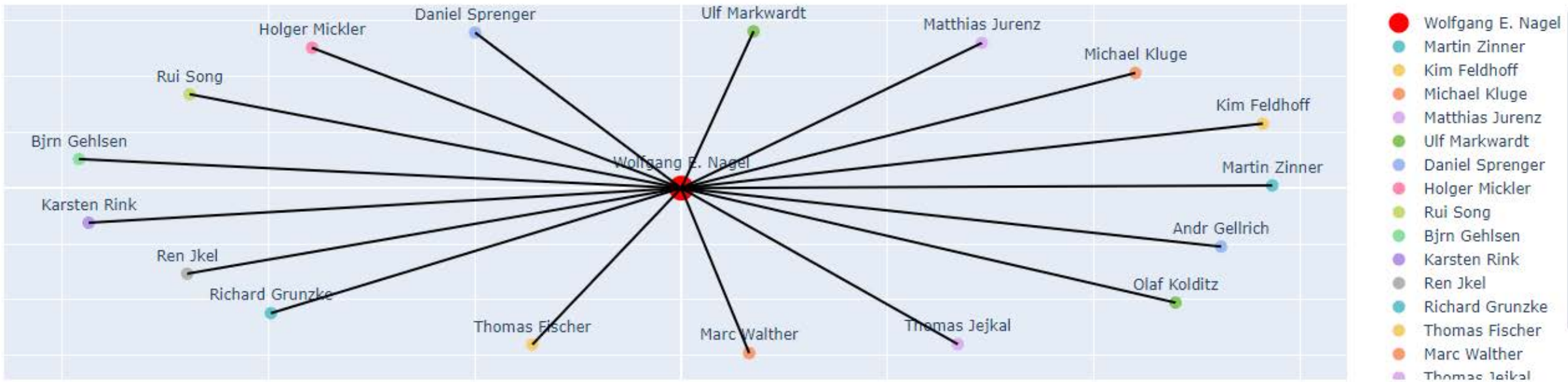


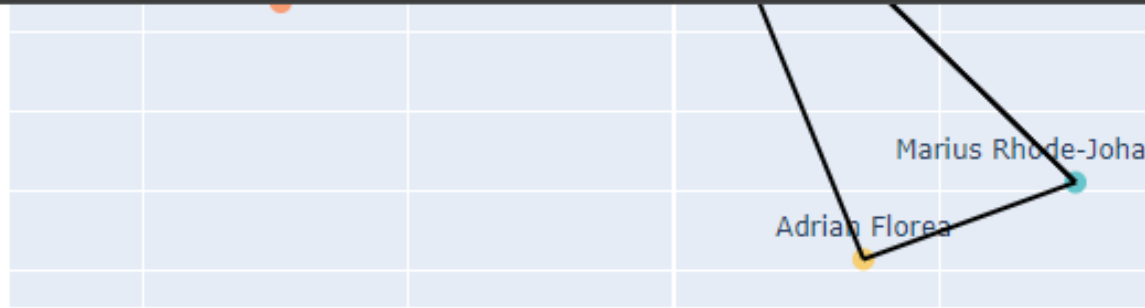
Wolfgang E. Nagel

1

Search

### Co-Authorship Network for Wolfgang E. Nagel





## Author: Lasse Berntzen

Articles: 314, 385

Collaborators per article:

- [Article 314](#) (Event: IntSys, Edition: IntSys+v9+n34+2016): Marius Rhode-Johannessen, Adrian Florea
- [Article 385](#) (Event: IntSys, Edition: IntSys+v12+n12+2019): Marius Rohde Johannessen, Rania El-Gazzar

Keywords:

[smart cities \(2\)](#) [sensors \(2\)](#) [smart buildings](#) [sustainability](#) [research design](#) [smart decision-making](#)  
[big data](#) [analytics](#) [autonomous systems](#)

PDF URLs:

- [/articles/intsys\\_v9\\_n34\\_2016\\_30.pdf](/articles/intsys_v9_n34_2016_30.pdf)
- [/articles/intsys\\_v12\\_n12\\_2019\\_3.pdf](/articles/intsys_v12_n12_2019_3.pdf)





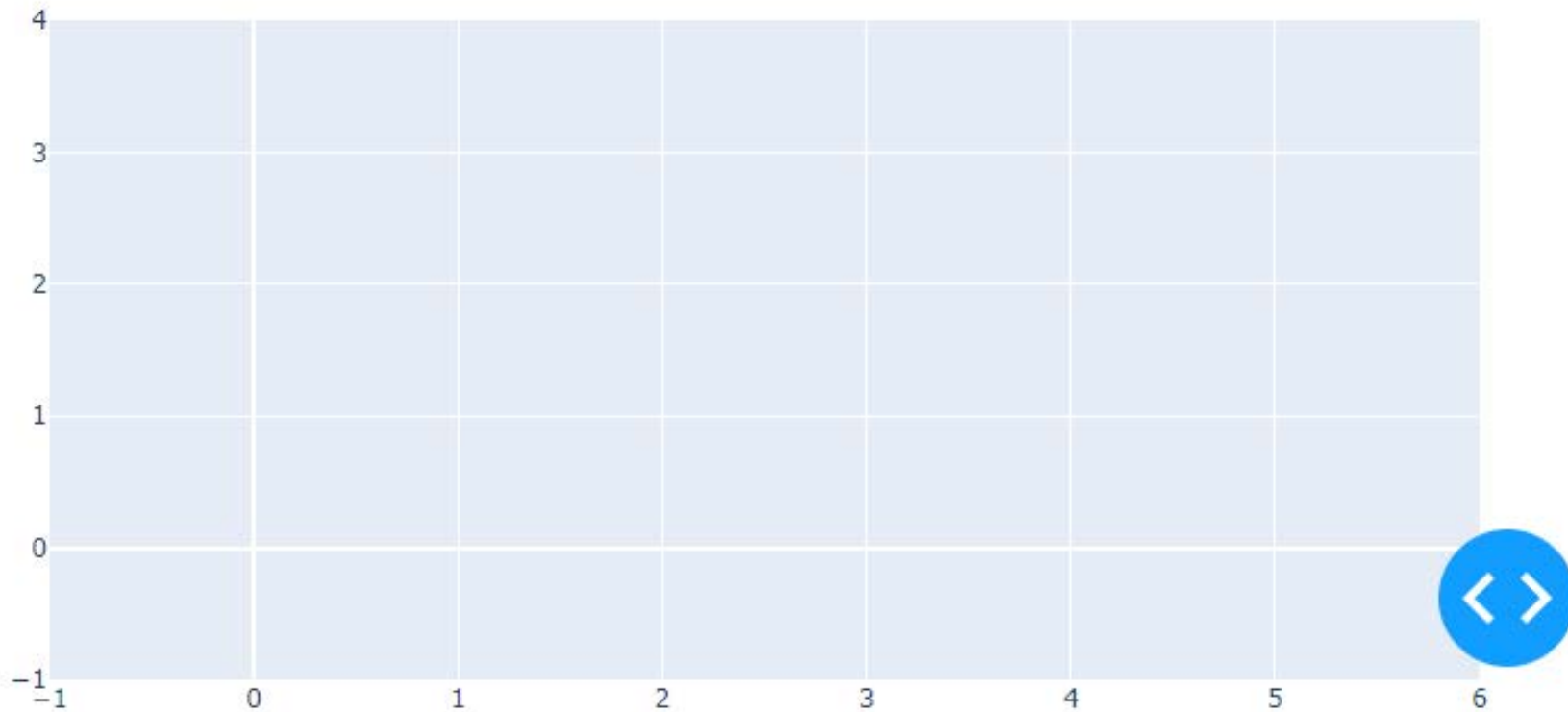
# Co-Authorship Network Analysis

Lasse Berntzen

-1

Search

Depth must be zero or a positive number



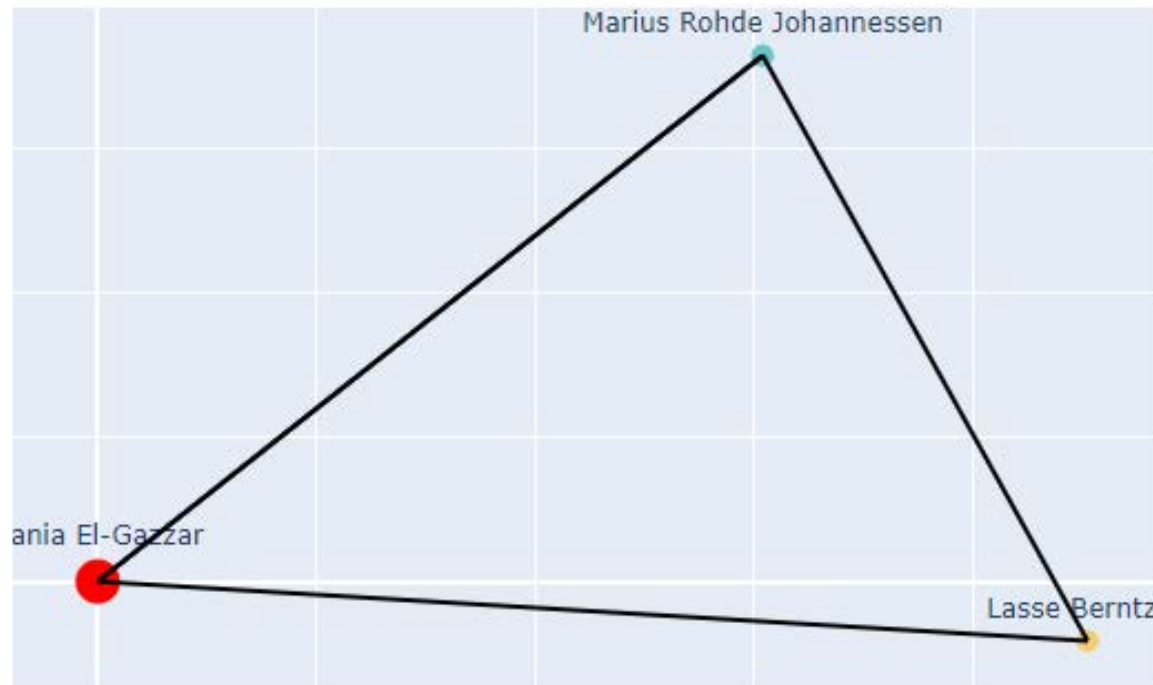
# Co-Authorship Network Analysis

Lasse Berntzen

2

Search

Co-Authorship Network for Rania El-Gazzar



- Rania El-Gazzar
- Marius Rohde Johannessen
- Lasse Berntzen



Move  
focus

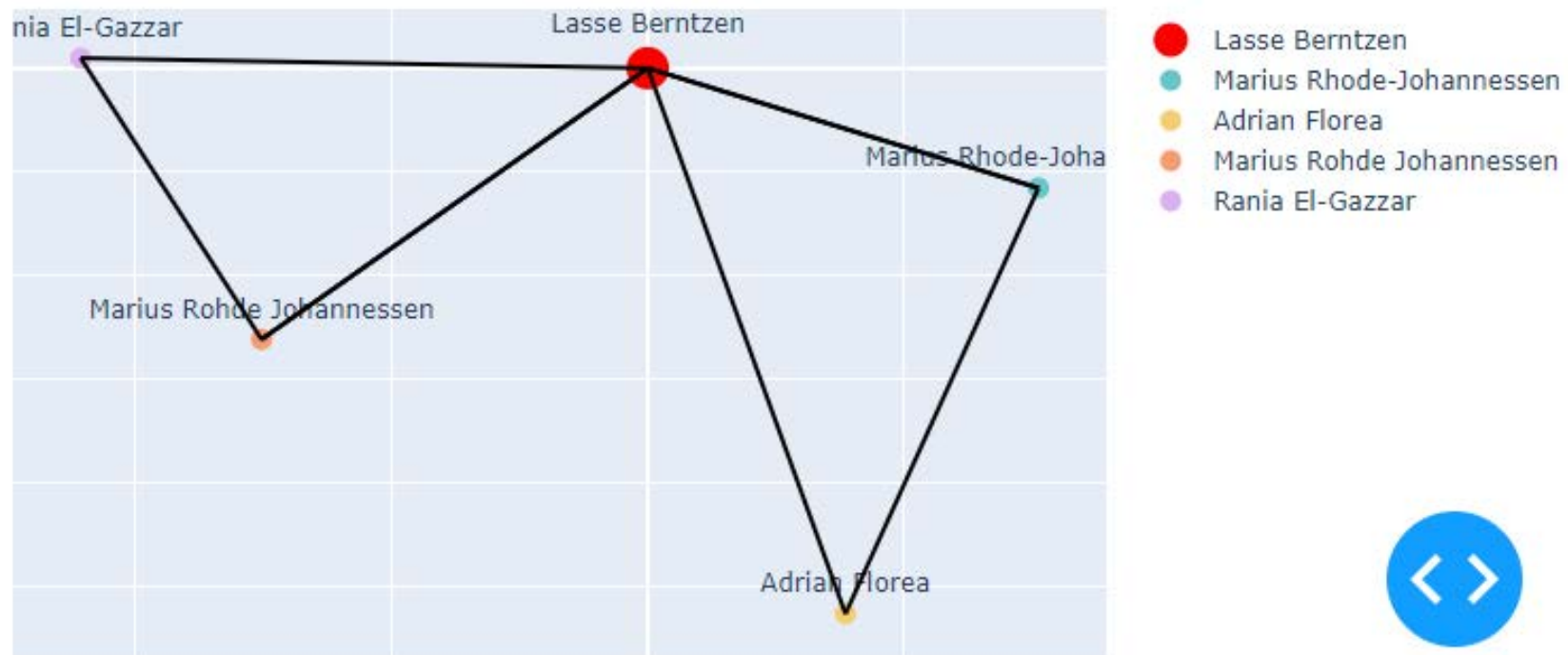
# Co-Authorship Network Analysis

Lasse Berntzen

2

Search

Co-Authorship Network for Lasse Berntzen



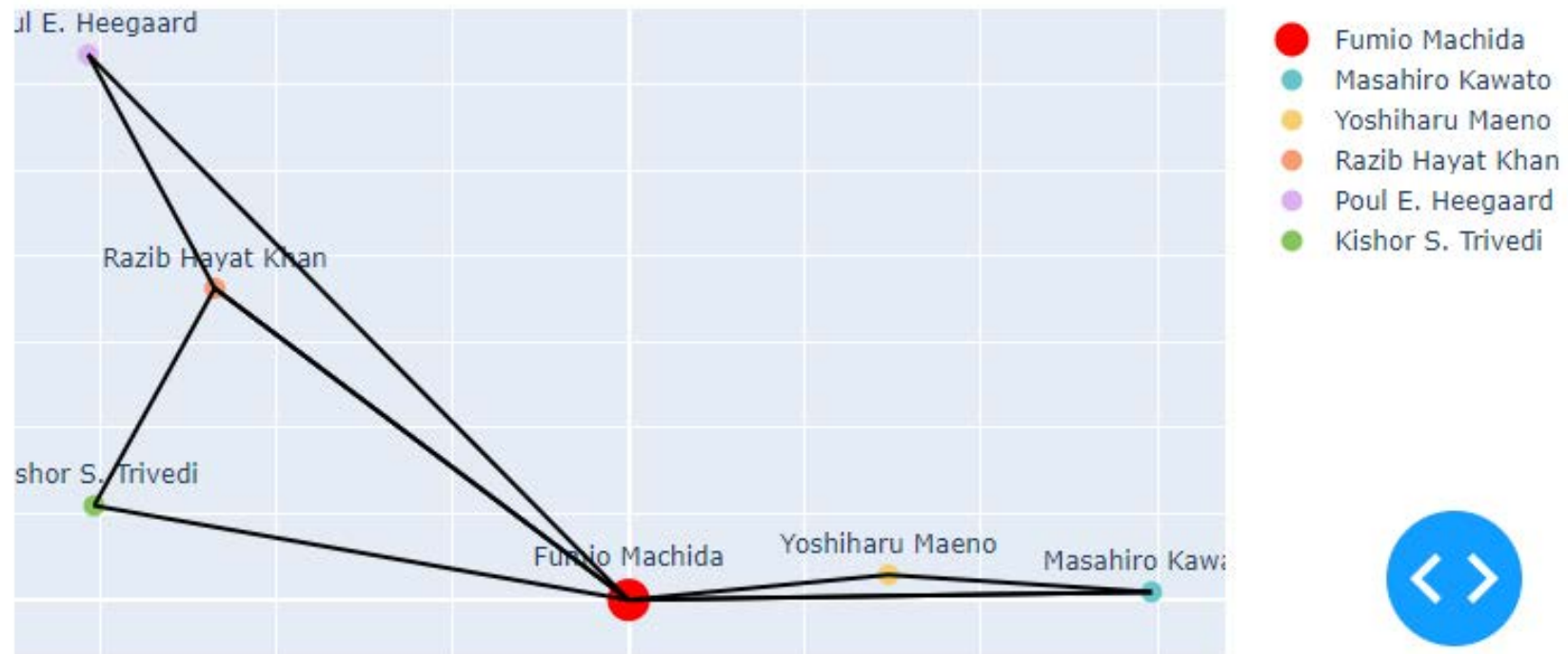
# Co-Authorship Network Analysis

Fumio Machida

2

Search

Co-Authorship Network for Fumio Machida



# Co-Authorship Network Analysis

Fumio Machida

3

Search

Co-Authorship Network for Fumio Machida



# Libraries used

- Programmed in Python
  - BeautifulSoup (web scraping)
  - Pandas (handling data)
  - Fitz (handling .pdf)
  - Dash (for web application)
  - NetworkX (graphs)
  - Re (regular expressions)
  - Plotly (graphics)

# A ThinkMind ChatGPT

Students: Aldar Ali, Mia Bergseter Jonsrud, Lars Wear Nilsen, Ema Sedyte

Supervisors: Marius Rohde Johannessen and Lasse Berntzen

# Aim

- By combining AI techniques with natural language processing and machine learning, the goal of the project was to develop a chatbot that could assist in finding the right documents from ThinkMind in an efficient and intuitive way.
- The chatbot answers questions about IARIA's published articles and their conferences.
  - For example, you can ask for information about a topic, an author, or a conference.
  - You can also link to the article(s) that the chatbot uses to answer the question.



# Software and libraries

- BeautifulSoup4 og PDFMiner
- LangChain (framework for chatbot development)
- PineCon (vector database)
- OpenAIs Embedding and Large Language Model (LLM)
- NLTK (Natural Language Toolkit)
- Streamlit - Frontend application development



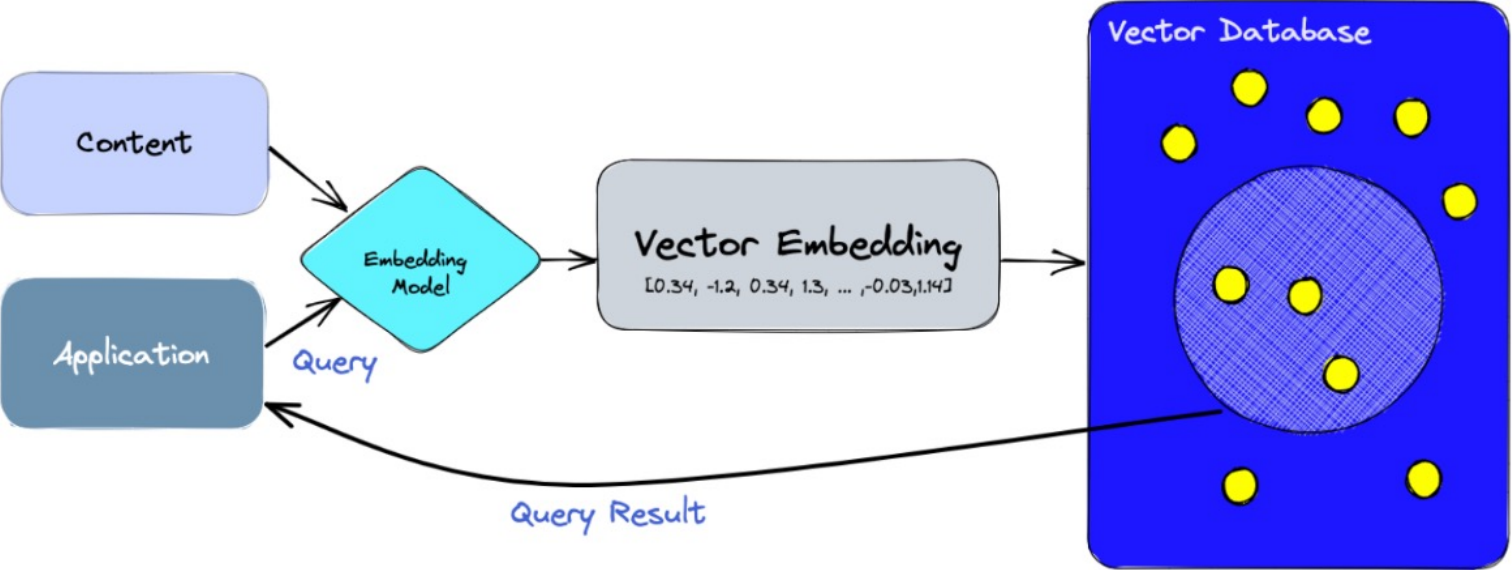
[https://youtu.be/KzHmMSz\\_ptk](https://youtu.be/KzHmMSz_ptk)

# Indexing

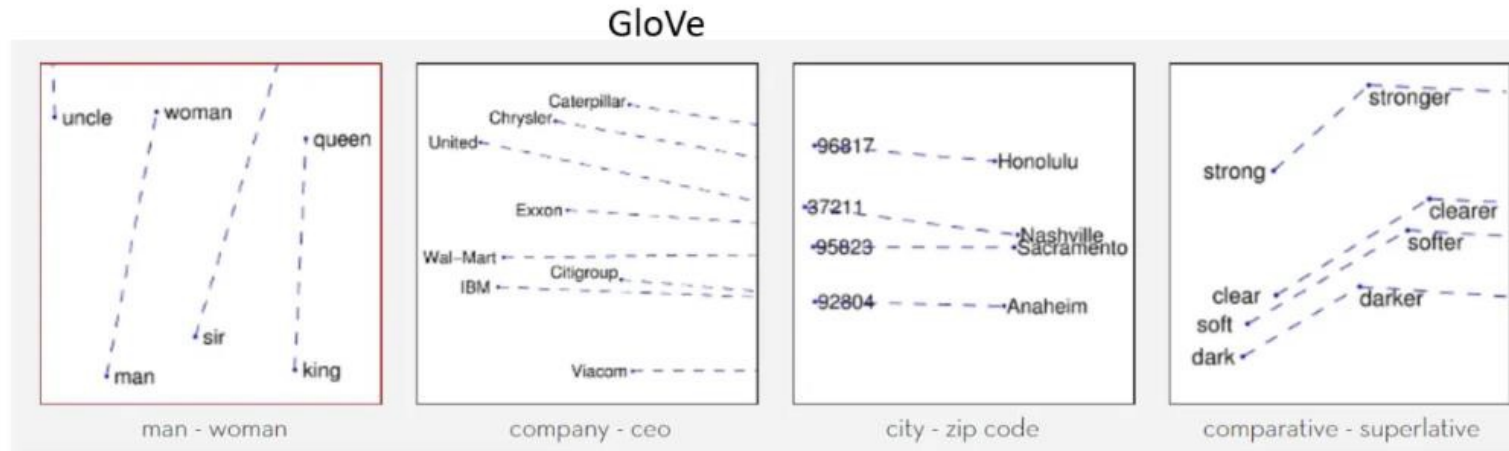
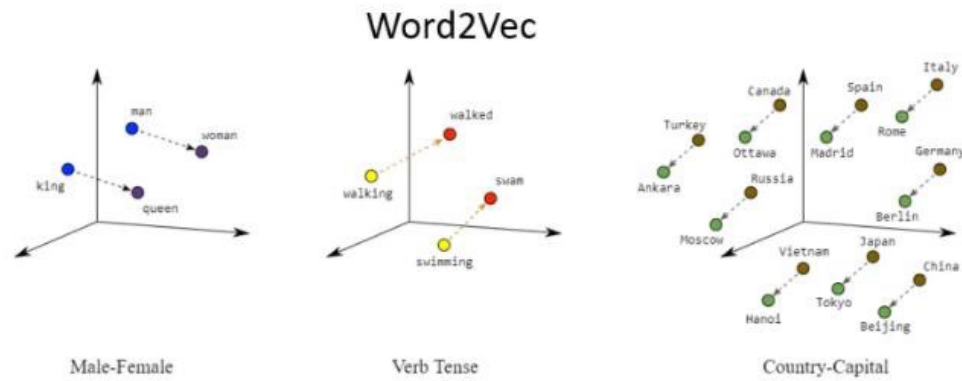
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- First, the documents were loaded using DocumentLoaders
- The text was split into smaller pieces for indexing, and for the text to fit in the model's context window.
- The last step in the indexing was to embed these splits and store them in the vector database.

# Vector database



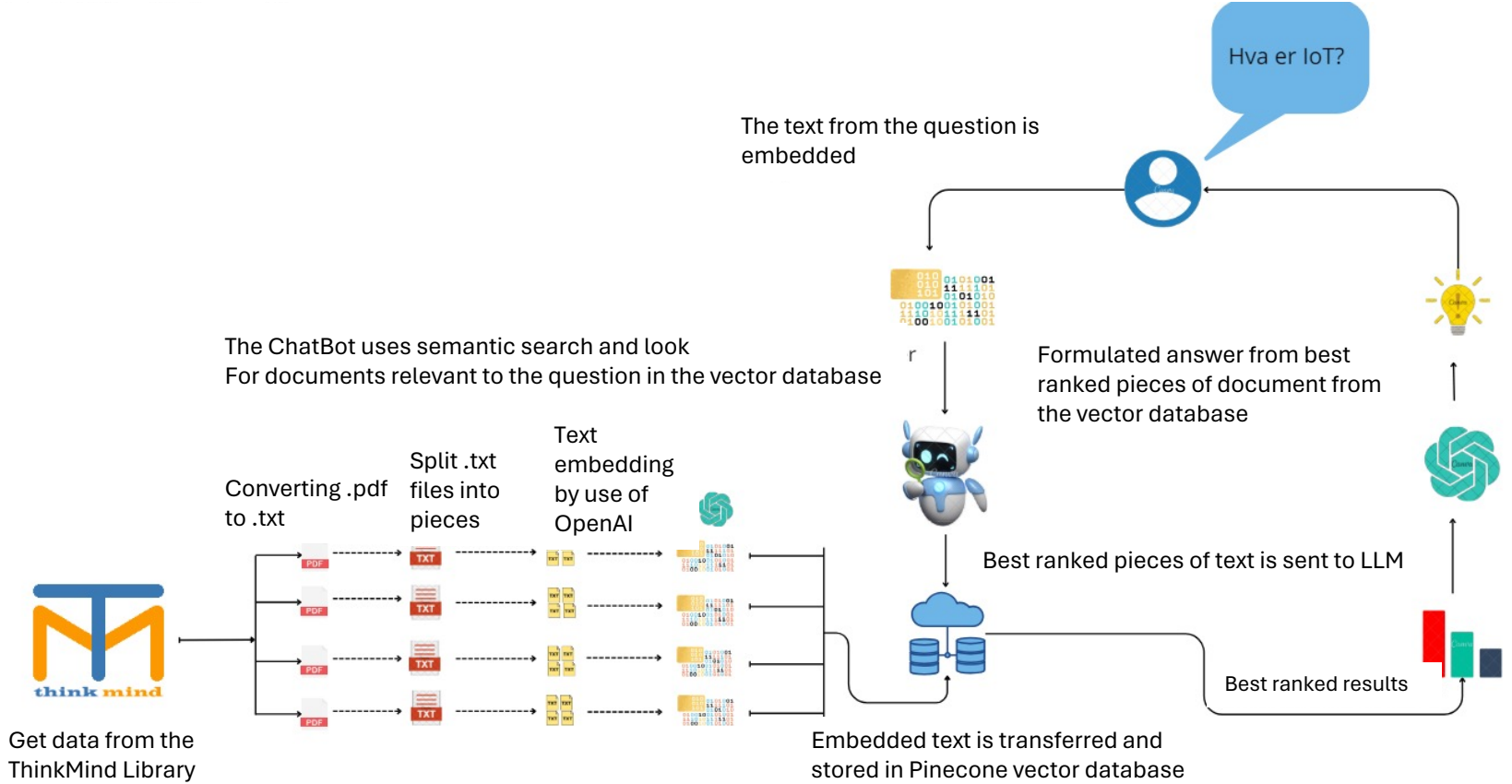
# Embedding



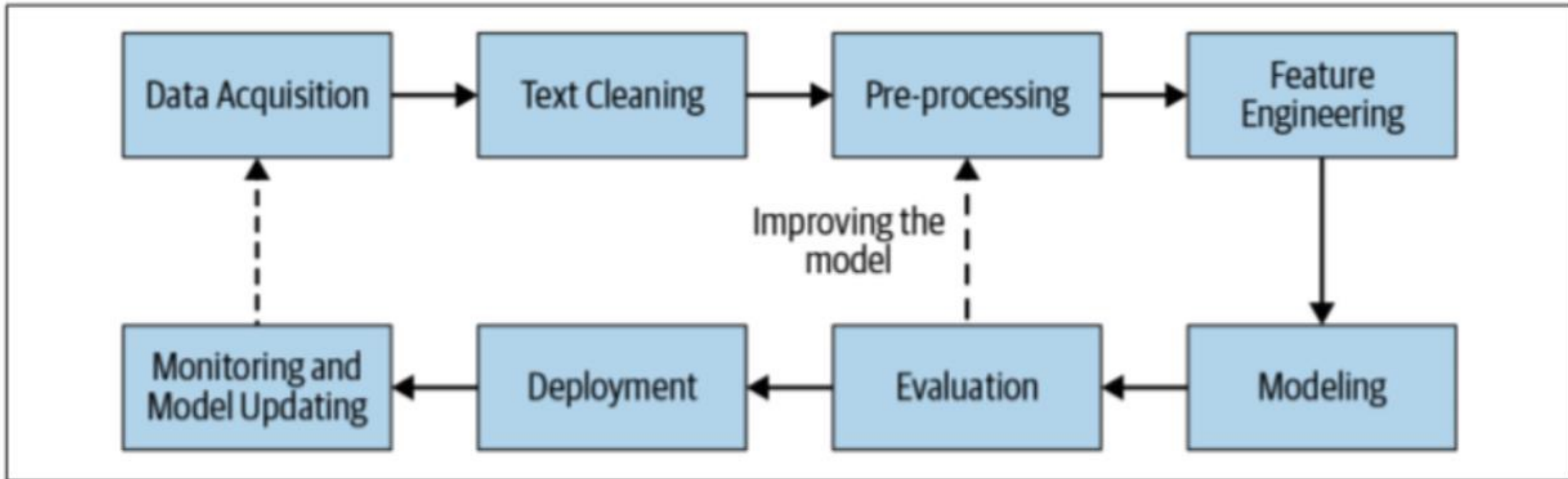
# Retrieval and generation

- When a user asks a question to the chatbot, the retrieve function will find the best ranked bits from the vector database.
- The language model then produces an answer by building a new "prompt" that takes into account the original question and the data from the retrieve function.

# TalkMind flow diagram



# Workflow






# Example





Can you tell me anything about Bastøy?


I don't have information on Bastøy in the context provided. If you have any other questions or need information on a different topic, feel free to ask!


# Example

 Ask me anything about thinkmind!

 what is intelligent system

 An intelligent system is a complex system that incorporates the concept of intelligent collaboration and autonomous behavior. It allows the system to evolve and be managed more easily. Intelligent systems are equipped with cognitive capabilities enabled by flexible control loops and cognitive algorithms, enabling them to act autonomously in an increasingly intelligent human-like manner. These systems can maintain multiple goals, perform context-sensitive reasoning, and make appropriate decisions based on complex and uncertain information, making them more robust in adapting to dynamic environments.

 give examples

 Can you provide examples of intelligent systems? Some examples of intelligent systems include IBM Watson, Amazon's Alexa, and various cognitive products that operate with flexible control loops and cognitive algorithms. These systems can perform context-sensitive reasoning, make appropriate decisions based on complex information, and adapt to dynamic environments.

# Example





tell me more about ibm watson





Can you provide more information about IBM Watson? IBM Watson is a supercomputer developed by IBM that gained significant attention when it competed on the game show "Jeopardy" in 2011. Watson's architecture is based on question-answering technology. In March 2018, IBM launched the IBM Watson Assistant platform, which allows users to create chatbots within their domain of knowledge. The platform enables users to deploy chatbots on various platforms like Slack or Facebook. Watson's capabilities include accessing and processing vast amounts of data to generate responses based on the input it receives, but it does not possess true intelligence or understanding of the information it processes. Watson demonstrates the power of artificial intelligence and natural language processing in information retrieval and response generation.


# Example

 Ask me anything about thinkmind!

 how to make a pizza?

 I don't have enough information to provide you with specific steps on how to make a pizza based on the context provided. If you have any specific questions related to the process of making a pizza, feel free to ask!

 describe the process of making a pizza

 Can you describe the process of making a pizza?! don't have information on making pizza in the provided context.

# TalkMind vs. ChatGPT



Scope and Use: ChatGPT has been trained on a large corpus of diverse text from the Internet so that it can understand and generate responses on a wide range of topics.



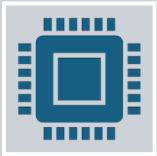
The TalkMind chatbot's knowledge base is more limited, focusing on the specific topics or data in the ThinkMind library.

# TalkMind vs. ChatGPT



Understanding and context: ChatGPT excels at understanding context and generating human-like responses, while TalkMind can have more structured and predefined responses based on ThinkMind.

# TalkMind vs. ChatGPT



Availability and scalability: ChatGPT is available internationally and can handle a virtually unlimited number of simultaneous users.



TalkMind's availability and scalability are dependent on the hosting infrastructure and design.

# TalkMind vs. ChatGPT



Development and maintenance: ChatGPT is a pre-trained model that does not require continuous development or maintenance on the part of the user.



TalkMind chatbot may require continuous updates and improvements to the database, algorithms and integrations.



## Three student projects

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# Future plans

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- Integrate the three projects into one
- Move to a cloud-based service
- Examine additional functionality
  - E.g. keyword use over time



# Thank you for listening!

If you want to  
contribute or stay in  
touch:

[lasse.berntzen@usn.no](mailto:lasse.berntzen@usn.no)