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# Ontology-Based Modelling of AI Fundamental Rights Impacts(FRIA): Integrating Impact Assessment based on VAIR, AIRO, CIDS and LLMs

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[0] Mantelero, Alessandro and Esposito, Samantha, An Evidence-Based Methodology for Human Rights Impact Assessment (HRIA) in the Development of AI Data-Intensive Systems (March 22, 2021). Computer Law & Security Review, 2021, Available at SSRN: https://ssrn.com/abstract=3829759
[1] https://public-buyers-community.ec.europa.eu/communities/procurement-ai/news/new-version-procurement-clauses-ai-available-supporting-responsible
[2] Delaram Golpayegani, Harshvardhan J. Pandit, and Dave Lewis. 2023. To Be High-Risk, or Not To Be—Semantic Specifications and Implications of the AI Act's High-Risk AI Applications and Harmonised Standards. In Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency (FAccT '23). Association for Computing Machinery, New York, NY, USA, 905–915. https://doi.org/10.1145/3593013.3594050
[3] https://www.aiaaic.org/aiaaic-repository

Despite the early stage of **AI impact prediction** [0], the **EU's proposed AI Act** may require **impact assessments** for new AI projects[1], focusing on **fundamental rights** and other key areas. This project aims to explore how to make semantic models become a help for AI risk assessment [2] and how it can be applied to publicly available AI incident reports from AIAAIC[3] to support compliance and oversight under the AI Act.

Ontologies provide a formal representation of knowledge and the relationships between concepts of a domain. They are used in the requirements specification to guide formal and unambiguous specification of the requirements, particularly in expressing concepts, relations and business rules of domain model with varying degrees of formalization and precision[4][5]

[4] Emebo, Onyeka & Varde, Aparna & Daramola, Olawande. (2021). Common Sense Knowledge, Ontology and Text Mining for Implicit Requirements.
[5] Sugumaran, V., & Storey, V. C. (2002). Ontologies for conceptual modeling: their creation, use, and management. Data & knowledge engineering, 42(3), 251-271.

# Fundamental Rights Impact Assessment (FRIA)[6]

Artificial intelligence can incredibly enhance law enforcement agencies' capabilities to prevent, investigate, detect and prosecute crimes, as well as to predict and anticipate them. However, despite the numerous promised benefits, the use of AI systems in the law enforcement domain raises numerous ethical and legal concerns.

The ALIGNER Fundamental Rights Impact Assessment (AFRIA) is a tool addressed to LEAs who aim to deploy AI systems for law enforcement purposes within the EU. The AFRIA is a reflective exercise, seeking to further enhance LEAs' already existing legal and ethical governance systems, by assisting them in building and demonstrating compliance with ethical principles and fundamental rights while deploying AI systems.

| Fundamental Rights Impact Assessment Template | |
|---|---|
| Name | |
| Organisation/Position | |
| Date | |
| Contributors | |
| AI system assessed | |
| Detailed description of the technology and input data | |
| Detailed description of the purposes and context of use | |

| 1. Presumption of innocence and right to an effective remedy and to a fair trial<br>Everyone charged with a criminal offence must be presumed innocent until proved guilty according to law.<br>Everyone whose rights and freedoms are violated has the right to an effective remedy before a tribunal.<br>Everyone is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal previously established by law, including rights:<br>❖ to be informed promptly of the nature and cause of the accusation;<br>❖ to bring their arguments and evidence as well as scrutinise and counteract the evidence presented against them; and<br>to obtain an adequately reasoned and accessible decision. | | |
|---|---|---|
| Challenge | Evaluation | Estimated impact level |
| 1.1 The AI system does not communicate that a decision/advice or outcome is the result of an algorithmic decision | | - |
| 1.2 The AI system does not provide percentages or other indication on the degree of likelihood that the outcome is correct/incorrect, prejudicing the user that there is no possibility of error and therefore that the outcome is undoubtedly incriminating | | - |
| 1.3 The AI system produces an outcome that forces a reversal of burden of proof upon the suspect, by presenting itself as an absolute truth, practically depriving the defence of any chance to counter it | | - |
| 1.4 There is no explanation of reasons and criteria behind a certain output of the AI system that the user can understand | | - |
| 1.5 There is no indication of the extent to which the AI system influences the overall decision-making process | | - |
| 1.6 There is no set of measures that allow for redress in case of the occurrence of any harm or adverse impact | | - |



[6] https://aligner-h2020.eu/fundamental-rights-impact-assessment-fria/

**AI Risk Ontology (AIRO)**[7]

AIRO is an ontology for expressing risk of harm associated with AI systems based on the EU AI Act and ISO/IEC 23894 on AI risk management.

**Vocabulary of AI Risks (VAIR)** [8]

VAIR is an open vocabulary for AI risks. VAIR is intended to assist with identification and documentation of risks by providing a common vocabulary that facilitates knowledge sharing and interoperability between actors in the AI value chain. VAIR provides semantic specifications for cataloguing AI risks in a FAIR (Findable, Accessible, Interoperable, Reusable) manner.

**Common Impact Data Standard(CIDS)** [9]

The Common Impact Data Standard is a standardized way to represent a social purpose organization's (SPO) impact model (i.e. their theory of change, logic model, outcome chain, etc). It is a way to represent impact as defined by the Impact Management Project Norms (now housed at Impact Frontiers). It enables the exchange of impact information between organizations regardless of the impact models being used.

[7] https://w3id.org/airo
[8] https://w3id.org/vair
[9] https://www.commonapproach.org/common-impact-data-standard/

# Research Questions

1. How can we integrate **Fundamental Rights Impact Assessment (FRIA)** into existing ontological frameworks such as **AI Risk Ontology (AIRO)**, **Vocabulary of AI Risks (VAIR)**, and **Common Impact Data Standard (CIDS)** to create a more comprehensive **ontological** structure for impact assessment?
2. To what extent can **Large Language Models (LLMs)** be effectively utilized to populate Fundamental Rights Impact Assessment (FRIA) reports and related ontologies, thereby assisting in the completion of AI impact assessments?

# Motivation

New technologies have profoundly changed how we organise and live our lives. In particular, new data-driven technologies have spurred the development of **artificial intelligence (AI)**, including increased automation of tasks usually carried out by humans. The COVID-19 health crisis has boosted AI adoption and data sharing – creating new opportunities, but also **challenges and threats to human and fundamental rights.**[10]

Artificial Intelligence (AI) impact assessments **are crucial** for evaluating the potential impact of AI systems on **fundamental rights** such as privacy, non-discrimination, and freedom of expression.

LLMs can extract and categorize information from vast amounts of text into structured data that can be **integrated into ontologies**, contributing to the creation of comprehensive and accurate knowledge graphs.



[10] https://fra.europa.eu/en/publication/2020/artificial-intelligence-and-fundamental-rights

# Main Goal

- Develop FIRA ontology
- Find the relationship between FRIA and CIDS, AIRO, VAIR
- Develop the relationship
- Have some useful prompt for LLMs to generate the instances based on the designed ontology and given incidents
- Evaluation
- GraphDB show cases

# Main Goal

Research Question 1

- Develop FIRA ontology
- Find the relationship between FRIA and CIDS, AIRO, VAIR
- Develop the relationship

Research Question 2

- Have some useful prompt for LLMs to generate the instances based on the designed ontology and given incidents
- Evaluation
- GraphDB show cases

# Why I did this?

- Respond to the **EU AI Act**
- Aligning with **legal** and regulatory requirements, promoting compliance and responsible AI development.
- Sharing and reusing knowledge across domains, contributing to develop **a basic farmwork for AI impact Assessment**.
- Advancing AI governance and ensuring AI systems respect **fundamental rights** and ethical principles.
- Ensuring consistency and compatibility across various AI impact assessment frameworks. Make sure the information sharing and collaboration.
- Developing a comprehensive and holistic approach to assessing AI system risks and impacts.

# Design of the ontology

```
@prefix fria: <http://www.example.org/fria-report#> .
@prefix airo: <https://w3id.org/airo#> .
@prefix vair: <https://w3id.org/vair#> .
@prefix cids: <http://www.example.org/cids#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

# Basic Things
fria:FRIA-report a rdfs:Class ;
    rdfs:comment "A class representing the FRIA report." .

fria:FRIA-reportName a rdfs:Class ;
    rdfs:comment "A class representing the name of the FRIA report." ;
    owl:equivalentClass cids: hasName .

fria:hasReportName a rdf:Property ;
    rdfs:domain fria:FRIA-report ;
    rdfs:range xsd:string ;
    rdfs:comment "A property to hold the name of the FRIA report." .

fria:FRIA-reportorganisationPosition a rdfs:Class ;
    rdfs:comment "A class representing the organisation position in the FRIA report." .

fria:hasOrganisationPositionDescription a rdf:Property ;
    rdfs:domain fria:FRIA-reportorganisationPosition ;
    rdfs:range xsd:string ;
    rdfs:comment "A property to hold the description of the organisation position in the FRIA report." .

fria:FRIA-reportcontributors a rdfs:Class ;
    rdfs:comment "A class representing the contributors to the FRIA report." .

fria:hasContributorDetails a rdf:Property ;
    rdfs:domain fria:FRIA-reportcontributors ;
    rdfs:range xsd:string ;
    rdfs:comment "A property to hold the details of the contributors to the FRIA report." .

fria:FRIA-reportaiSystemAssessed a rdfs:Class ;
    rdfs:comment "A class representing the AI system assessed in the FRIA report." ;
    owl:equivalentClass cids: hasConsequence, cids: forOutcome, airo: producesOutput, airo: hasConsequence, vair: Assessment, vair: AssessingPeopleRelatedRisk .
```

# FRIA with CIDS, AIRO, VAIR

## Basic Things

| FRIA | CIDS | AIRO | VAIR |
|---|---|---|---|
| hasName | hasName | | |
| organisationPosition | | | |
| date | | | |
| contributors | | | |
| aiSystemAssessed | hasConsequence | producesOutput | Assessment |
| | forOutcome | hasConsequence | AssessingPeopleRelatedRisk |
| technologyAndData | | usesTechnique | |
| purposesAndContext | hasDescription | haspurpose | Purposes |

# FRIA with CIDS, AIRO, VAIR

## Some of the **Challenges Related Things**

Challenge11

The AI system **does not** communicate that a decision/advice or outcome **is the result of an algorithmic decision**

VAIR

**Transparency**

Property of a system that appropriate information about the system **is made available** to relevant stakeholders

**DecisionMaking**

Generation of decisions

# FRIA with CIDS, AIRO, VAIR

## Some of the **Challenges Related Things**

Challenge16

There is no set of measures that allow for redress in case of the occurrence of any harm or adverse impact

AIRO

**hasRisk**

Indicates risks associated with an AI system, an AI component, etc.

**hasSeverity**

Indicates severity of a consequence or an impact

CIDS

**hasImportance**

Specifies the nature of the importance. One of {“high importance”, “moderate important”, “neutral”, “unimportant”}.

**intendedimpact**

Identifies the intended direction of the change.  Note that ImpactReport captures the actual direction. This helps to inform the interpretation of the ImpactReport.helps to inform the interpretation of the ImpactReport.

# Research Questions

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2. To what extent can **Large Language Models (LLMs)** be effectively utilized to populate Fundamental Rights Impact Assessment (FRIA) reports and related ontologies, thereby assisting in the completion of AI impact assessments?

# Prompt

Now, when given an incident report, **find the relevant information** for each part of the RDF definition and **fill in the Turtle format** using the information found. So you need to return Turtle representation for the incident report. Always include **all of the properties** in the RDF output. If there is no relevant information for a given property in the report, return a blank value in the RDF. However, if you can understand and fill in the blank value based on the available information, start the value with "LLM understand: ". For Basic Things like fria:hasAssessmentContent, if the provided information is too long, you then need to **summarize appropriately** based on the content. For the date, try to access the specific AIAAIC Link and retrieve the time information, if you can't access the provided link, try to find it based on provided information.
If there are some details you cannot find or understand, leave those properties blank.
For the Challenges, Evaluation, and Impact Level sections, follow the guidelines provided:
Review the FRIA template's pre-listed challenges, adding any system-specific ones. Evaluate each challenge's relevance to the AI system, explaining its embedding and impact **within the law enforcement context**. Assess the severity of prejudice and affected population to determine the overall impact level using the provided matrix. Consider the predetermined context of use, including target group, geographical area, deployment period, and trigger conditions. Provide detailed explanations for each evaluation and impact estimate. Regularly update the FRIA to reflect changes in the AI system's functioning or deployment circumstances.
When evaluating the impact level, **follow the guidelines provided in the prompt**:
1.Determine the severity of prejudice: Negligible, Critical, or Catastrophic.
2.Evaluate the number of affected individuals: Low, Medium, or High.
3.Use the impact matrix to determine the overall impact level: Low, Medium, High, or Very High.
**Based on the instructions provided, you can only have 4 impact level! Decide inside 4 of them(Low, Medium, High, or Very High)!!**
You need to return complete RDF/Turtle representation for the incident report, including all basic things, challenges, evaluations and impact levels for each challenge.
Do you understand? if so reply yes with no further follow up and await an incident report.

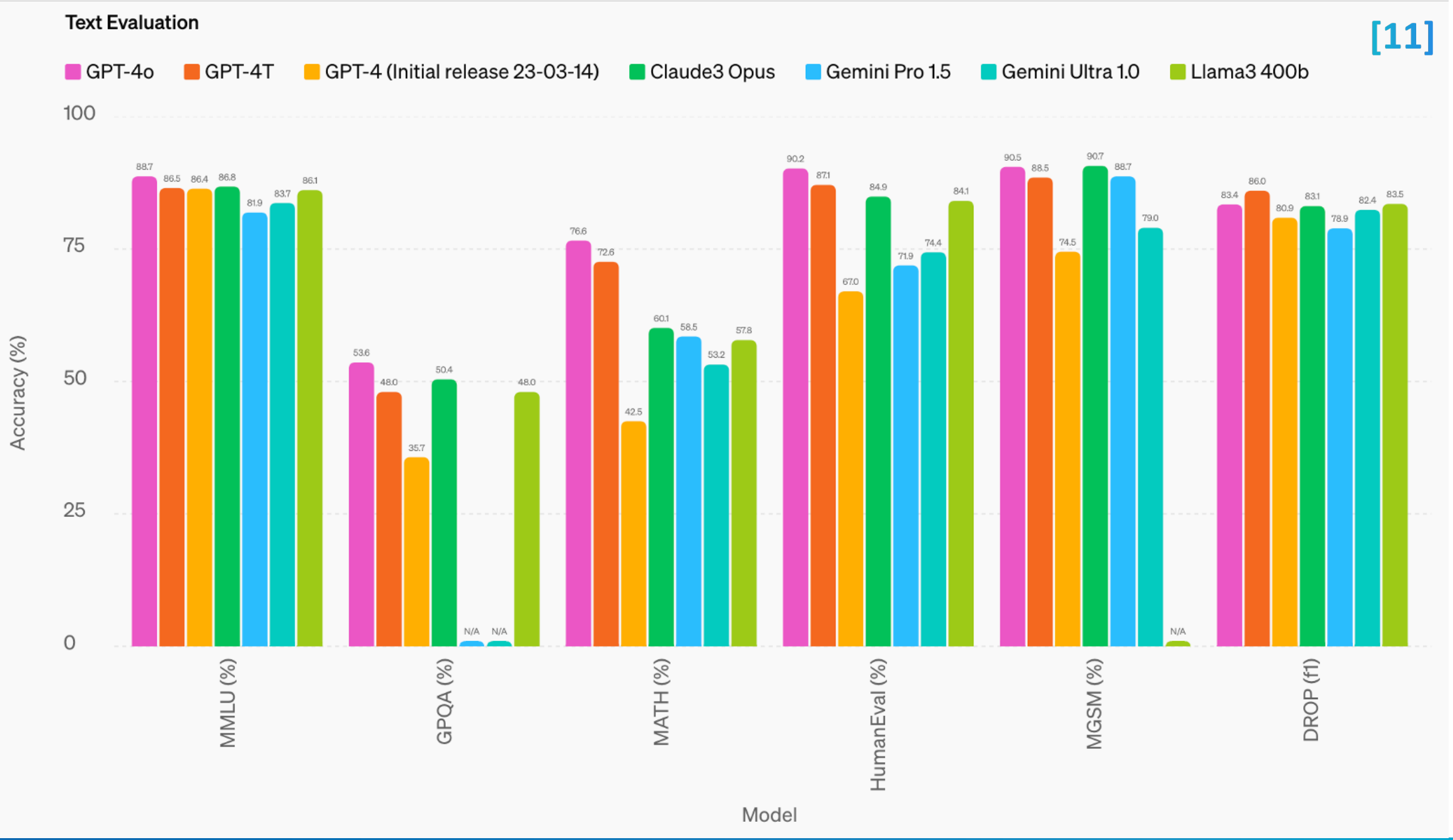
## Claude 3.5 Sonnet

Claude 3.5 Sonnet raises the industry bar for intelligence, outperforming competitor models and Claude 3 Opus on a wide range of evaluations, with the speed and cost of our mid-tier model, Claude 3 Sonnet.

## GPT-4o

GPT-4o (“o” for “omni”) is a step towards much more natural human-computer interaction—it accepts as input any combination of text, audio, image, and video and generates any combination of text, audio, and image outputs. It can respond to audio inputs in as little as 232 milliseconds, with an average of 320 milliseconds, which is similar to human response time(opens in a new window) in a conversation.

[11]






[11] https://openai.com/index/hello-gpt-4o/

[12]

| | Claude 3.5 Sonnet | Claude 3 Opus | GPT-4o | Gemini 1.5 Pro | Llama-400b (early snapshot) |
|---|---|---|---|---|---|
| Graduate level reasoning *GPQA, Diamond* | **59.4%*** 0-shot CoT | 50.4% 0-shot CoT | 53.6% 0-shot CoT | — | — |
| Undergraduate level knowledge *MMLU* | **88.7%**** 5-shot<br>88.3% 0-shot CoT | 86.8% 5-shot<br>85.7% 0-shot CoT | —<br>**88.7%** 0-shot CoT | 85.9% 5-shot<br>— | 86.1% 5-shot<br>— |
| Code *HumanEval* | **92.0%** 0-shot | 84.9% 0-shot | 90.2% 0-shot | 84.1% 0-shot | 84.1% 0-shot |
| Multilingual math *MGSM* | **91.6%** 0-shot CoT | 90.7% 0-shot CoT | 90.5% 0-shot CoT | 87.5% 8-shot | — |
| Reasoning over text *DROP, F1 score* | **87.1** 3-shot | 83.1 3-shot | 83.4 3-shot | 74.9 Variable shots | 83.5 3-shot Pre-trained model |
| Mixed evaluations *BIG-Bench-Hard* | **93.1%** 3-shot CoT | 86.8% 3-shot CoT | — | 89.2% 3-shot CoT | 85.3% 3-shot CoT Pre-trained model |
| Math problem-solving *MATH* | 71.1% 0-shot CoT | 60.1% 0-shot CoT | **76.6%** 0-shot CoT | 67.7% 4-shot | 57.8% 4-shot CoT |
| Grade school math *GSM8K* | **96.4%** 0-shot CoT | 95.0% 0-shot CoT | — | 90.8% 11-shot | 94.1% 8-shot CoT |

* Claude 3.5 Sonnet scores 67.2% on 5-shot CoT GPQA with maj@32
** Claude 3.5 Sonnet scores 90.4% on MMLU with 5-shot CoT prompting



[12] https://www.anthropic.com/news/claude-3-5-sonnet

# AIAAIC is an independent, non-partisan, grassroots public interest initiative that examines and makes the case for real AI, algorithmic, and automation transparency and openness.[13]

| AIAAIC Repository (beta) [ REPORT INCIDENT ] | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIAAIC ID# | Headline | Type | Released | Occurred | Country(ies) | Sector(s) | Deployer(s) | Developer(s) | System name(s) | Technology(ies) | Purpose(s) | Media trigger(s) | Issue(s) | Transparency | Desc |
| AIAAIC1607 | Paris Olympics AI scans fuel surveillance fears | Issue | | 2023-2024 | France | Media/entertainment/ | Paris Police Prefecture; | Videtics; Orange Busi | ChapsVision; Flux Visi | Computer vision; Machine | Detect abandoned packag | | Accuracy/reliability; Huma | | |
| AIAAIC1606 | Runway uses YouTube videos without consent for AI training | Incident | 2024 | 2024 | USA | Media/entertainment/ | Runway | Runway | Gen-3 Alpha | Generative AI; Machine lea | Train AI models | Media investigation | Cheating/plagiarism; Copy | Governance; Marketin | https |
| AIAAIC1605 | Activision accused of selling AI-generated cosmetic in Call Of Du | Issue | | 2024 | USA | Media/entertainment/ | Activision Blizzard | Activision Blizzard | | Generative AI; Machine lea | Design cosmetic items | Media investigation | Employment | Governance | https |
| AIAAIC1604 | Chelmer Valley High School illegally used facial recognition to tak | Incident | | 2023-2024 | UK | Education | Chelmer Valley High Sc | | | Facial recognition | Process canteen payment | Regulatory investigation | Privacy | Governance | https |
| AIAAIC1603 | Chinese novel platform trains AI on authors works without payme | Incident | | 2024 | China | Media/entertainment/ | ByteDance/Tomato Nov | ByteDance/Tomato Ne | Fanqie/Tomato Novel | Generative AI; Machine lea | Support fiction writing | User comments/complaints | Cheating/plagiarism; Copy | Governance; Legal | https |
| AIAAIC1602 | HR tech company plan to treat AI bots as employees backfires | Issue | 2024 | 2024 | USA | Business/professiona | Lattice | | | Machine learning | | Company statement | Anthropomorphism; Empl | | https |
| AIAAIC1601 | Illegal pirate streaming worlds discovered on VRChat | Incident | | 2024 | Netherlands | Media/entertainment/ | | VRChat | VRChat | Machine learning; Safety m | Manage system safety | Legal complaint | Copyright; Ethics/values | | https |
| AIAAIC1600 | VRChat users' avatars make sexual and violent threats against mi | Incident | | 2021 | USA; Global | Media/entertainment/ | VRChat | VRChat | VRChat Safety and Tru | Machine learning; Safety m | Manage system safety | NGO research study/report | Safety | Governance | https |
| AIAAIC1599 | Conde Nast demands Perplexity AI stop using its content | Incident | 2022 | 2024 | USA | Media/entertainment/ | Perplexity AI | Perplexity AI | Perplexity | Chatbot; Machine learning; | Generate information | Lawsuit filing/litigation | Cheating/plagiarism; Copy | Governance | https |
| AIAAIC1598 | VRChat allows kids into virtual strip clubs | Incident | | 2022 | UK; Global | Media/entertainment/ | VRChat; Meta/Quest; M | VRChat | VRChat Safety and Tru | Machine learning; Safety m | Manage system safety | NGO investigation | Safety; Privacy; Security | Governance; Black bo | https |
| AIAAIC1597 | Taylor & Francis sells access to authors' research to Microsoft AI | Issue | | 2024 | Global | Media/entertainment/ | Microsoft | Informa/Taylor & Fran | Multiple | Database/dataset | Train AI models | Company statement | Copyright; Ethics/values | Governance | https |
| AIAAIC1596 | The Pile dataset | Data | 2020 | | Global | Multiple | Apple; Beijing Academy | EleutherAI | The Pile | Database/dataset | Train large language mod | | Bias/discrimination; Copy | Governance | https |
| AIAAIC1595 | Warner Music warns AI companies about training models on its c | Issue | | 2024 | Global | Media/entertainment/ | | | | Generative AI; Machine lea | Generate music | Industry complaint | Copyright; Personality rig | Governance | https |
| AIAAIC1594 | Australian voice artists lose work to AI clones | Incident | | 2024 | Australia | Media/entertainment/ | Amazon/Audible | | | Machine learning; Speech | Replicate voice | Employment | Employment | | https |
| AIAAIC1593 | New Google UK data centre 'ruining lives,' 'making people ill' | Incident | | 2024 | UK | Health | Alphabet/Google | Alphabet/Google | Gemini; Multiple | Machine learning | Multiple | Local community comments | Environment | | https |
| AIAAIC1592 | Microsoft emissions rise 30 percent due to AI | Issue | | 2020-2023 | Global | Multiple | Microsoft | Microsoft | Copilot; Multiple | Machine learning | Multiple | Company statement | Environment | | https |
| AIAAIC1591 | AI increases Google emissions by 48 percent | Issue | | 2020-2023 | Global | Multiple | Alphabet/Google | Alphabet/Google | Gemini; Multiple | Machine learning | Multiple | Company statement | Environment | | https |
| AIAAIC1590 | YouTube Subtitles dataset | Data | 2020 | | USA | Media/entertainment/ | Anthropic; Apple; Nvidia | EleutherAI | YouTube Subtitles | Database/dataset | Train AI models | | Cheating/plagiarism; Copy | Governance; Marketin | https |
| AIAAIC1589 | Apple, Nvidia, Anthropic use thousands of YouTube videos witho | Issue | 2020 | 2024 | USA | Media/entertainment/ | Anthropic; Apple; Nvidia | EleutherAI | YouTube Subtitles | Database/dataset | Train AI models | Media investigation | Cheating/plagiarism; Copy | Governance; Marketin | https |
| AIAAIC1588 | Tony Blair Institute criticised for using AI to predict job losses | Issue | | 2024 | UK | Politics | Tony Blair Institute | OpenAI; Tony Blair In | GPT-4 | Large language model | Generate text | Media investigation | Accuracy/reliability | | https |
| AIAAIC1587 | US FTC and 17 states accuse Amazon of illegally blocking compe | Issue | | 2023 | USA | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Lawsuit filing/litigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1586 | Arizona accuses Amazon of harming consumers with its Buy Box | Issue | | 2024 | USA | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Lawsuit filing/litigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1585 | UK lawsuit accuses Amazon of over-charging consumers by GBP | Issue | | 2023 | UK | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Lawsuit filing/litigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1584 | UK, Amazon settle anti-trust investigation | Incident | | 2023 | UK | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Regulatory investigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1583 | Italy fines Amazon USD 1.3 billion for abusing market position | Incident | | 2021 | Italy | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Regulatory investigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1582 | The EU rules Amazon's Buy Box algorithm to be anti-competitive | Incident | | 2022 | EU; France; Ger | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Regulatory investigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1581 | Amazon Buy Box pricing algorithm 'hides' best deal from custom | Incident | | 2016 | USA | Retail | Amazon | Amazon | Buy Box | Pricing algorithm; Machine | Determine seller | Media investigation | Business model; Competi | Governance; Black bo | https |
| AIAAIC1580 | RT bot farm spreads disinformation via 968 X accounts | Issue | 2024 | 2024 | USA | Politics | RT | RT | Meliorator | Bot/intelligent agent | Scare/confuse/destabilise | Government statement | Mis/disinformation | Governance; Marketin | https |
| AIAAIC1579 | Allegheny child neglect screening tool may harden bias against p | Issue | 2016 | 2023 | USA | Govt - welfare | Allegheny County Child | Rhema Vaithianathan | Allegheny Family Scre | Prediction algorithm | Predict child neglect/abus | Media investigation | Accuracy/reliability; Bias/c | Black box; Marketing | https |
| AIAAIC1578 | Allegheny child neglect screening system unfairly flags Blacks fo | Issue | 2016 | 2022 | USA | Govt - welfare | Allegheny County Child | Rhema Vaithianathan | Allegheny Family Scre | Prediction algorithm | Predict child neglect/abus | Media investigation | Accuracy/reliability; Bias/c | Black box; Marketing | https |
| AIAAIC1577 | ChatGPT invents fake links to news partners' investigations | Issue | 2022 | 2024 | USA | Media/entertainment/ | | OpenAI | ChatGPT | Chatbot; Machine learning | Generate text | NGO research study/report | Accuracy/reliability | Governance | https |
| AIAAIC1576 | DWP algorithm wrongly flags 200,000 people for possible fraud ar | Incident | | 2024 | UK | Govt - welfare | Department of Work an | Department of Work a | | Fraud detection algorithm | Detect fraud | NGO research study/report | Accuracy/reliability | Governance | https |
| AIAAIC1575 | RT fails to disclose AI 'journalists' | Issue | | 2024 | Spain; | Media/entertainment/ | RT Espanol | | | | Present news | Academic research study/re | Ethics/values | Governance; Marketin | https |
| AIAAIC1574 | Korean government robot falls down stairs | Incident | 2023 | 2024 | S Korea | Govt - municipal | Gumi City Council | Bear Robotics | | Robotics | Deliver documents | Physical accident | Accuracy/reliability; Robu | | https |
| AIAAIC1573 | AI robocall service is caught lying and pretending to be human | Issue | | 2024 | USA | Business/professiona | | Bland AI | | Text-to-speech; Deep learr | Support customer service | Media investigation | Anthropomorphism; Dual/ | Governance | https |
| AIAAIC1572 | VGG Face dataset used personal data without explicit consent fro | Issue | 2015 | 2019 | UK | Research/academia | ChaLearn; Chinese Aca | University of Oxford | VGG-Face | Database/dataset; Facial r | Develop facial recognition | Media investigation | Privacy; Copyright | Privacy | https |
| AIAAIC1571 | Colorado university professor secretly films campus students to | Issue | 2016 | 2019 | USA | Education | Beckman Institute; Beih | University of Colorado | Unconstrained College | Database/dataset; Facial r | Train facial detection and | Media investigation | Ethics/values; Privacy | Governance; Complair | https |
| AIAAIC1570 | SMFRD dataset criticised for eroding privacy, enabling surveillan | Issue | 2021 | 2021 | China | Research/academia | | Wuhan University | Simulated Masked Fac | Database/dataset; Facial r | Train facial recognition sy | | Privacy; Dual/multi-use; S | | https |
| AIAAIC1569 | Images of Australian children are used to train AI | Incident | | 2024 | Australia | Multiple | | LAION | LAION-5B | Database/dataset | Pair text and images | NGO research study/report | Privacy; Safety | Governance | https |
| AIAAIC1568 | AI-generated Toys 'R' Us video ad sparks backlash | Issue | | 2024 | USA | Media/entertainment/ | | OpenAI | Sora | Text-to-video; Machine lea | Generate video | User comments/complaints | Accuracy/reliability; Empl | Governance | https |
| AIAAIC1567 | Sora video generation | System | 2024 | | Italy; USA | Media/entertainment/ | OpenAI | OpenAI | Sora | Text-to-video; Machine lea | Generate video | | Accuracy/reliability; Empl | Governance | https |
| AIAAIC1566 | ChatGPT misdirects US voters in key battleground states | Issue | 2022 | 2024 | USA | Politics | CBS News | OpenAI | ChatGPT | Chatbot; Machine learning | Generate text | Media investigation | Accuracy/reliability; Mis/di | Governance | https |

[13] https://www.aiaaic.org/

# Generated Instances Example

```
@prefix fria: <http://www.example.org/fria-report#> .
@prefix airo: <https://w3id.org/airo#> .
@prefix vair: <https://w3id.org/vair#> .
@prefix cids: <http://www.example.org/cids#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

fria:FRIA-report-3D-masks-fool-facial-recognition a fria:FRIA-report ;
    fria:hasReportName "3D masks fool payment, airport facial recognition systems" ;
    fria:hasOrganisationPositionDescription "Kneron, an artificial intelligence company, conducted the research" ;
    fria:hasContributorDetails "Researchers from Kneron, including CEO Albert Liu" ;
    fria:hasAssessmentContent "Researchers found that facial recognition technology can be fooled by using 3D-printed masks depicting
    fria:hasTechnologyAndDataDescription "Facial recognition technology used in payment systems, airport security, and transportation
    fria:hasPurposesAndContextDescription "To test the security and reliability of facial recognition systems in public spaces and pa
    fria:reportDate "2023-10-10"^^xsd:date ;
    fria:hasAIAAICLink "https://www.aiaaic.org/aiaaic-repository/ai-algorithmic-and-automation-incidents/3d-masks-fool-payment-airpor

fria:FRIA-reportChallenge11 a fria:FRIA-reportChallenge ;
    fria:FRIA-reporthasEvaluation fria:FRIA-reportEvaluation11 ;
    fria:FRIA-reporthasImpactLevel fria:FRIA-reportImpactLevel11 ;
    rdfs:comment "The AI system does not communicate that a decision/advice or outcome is the result of an algorithmic decision" ;
    rdfs:subClassOf fria:FRIA-reportChallenge1 ;
    owl:equivalentClass airo:Transparency, vair:OperatingCriticalDigitalInfrastructure .

fria:FRIA-reportEvaluation11 a fria:FRIA-reportEvaluation ;
    fria:hasEvaluationContent "The facial recognition systems tested did not indicate that they were using AI for identification." .

fria:FRIA-reportImpactLevel11 a fria:FRIA-reportImpactLevel ;
    fria:hasImpactLevelContent "High" .
```

## Generated Instances

I've generate **50** instances using both the most advanced LLMs right now: Claude 3.5 Sonnet and GPT-4o

# Evaluation

| file_name | report_name | organisation_description | contributor_details | assessment_content | technology_description | purposes_description | report_date | aiaaic_link | challenge_11 | evaluation_11 | impact_level_11 | challenge_12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| fria-instance-gpt-1.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-2.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-3.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-4.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-5.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-6.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-7.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-8.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-9.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-10.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-11.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-12.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-13.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-14.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 0.0 | 0.0 | 0.0 | 0.0 |
| fria-instance-gpt-15.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-16.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-17.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-18.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-19.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-20.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-21.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-22.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-23.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-24.ttl | 1 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-25.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-26.ttl | 1 | 0.5 | 0.5 | 1 | 0 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-27.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-28.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-29.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-30.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-31.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.8152754424233370 |
| fria-instance-gpt-32.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-33.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-34.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-35.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-36.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-37.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-38.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-39.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-40.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-41.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-42.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-43.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-44.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 0.0 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-45.ttl | 1 | 1.0 | 1.0 | 0 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 0.5 | 0.5 | 1.0000000000000000 |
| fria-instance-gpt-46.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| fria-instance-gpt-47.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-48.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-49.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| fria-instance-gpt-50.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 0.14968883751210100 | 1.0 | 1.0 | 0.12928149652243100 |

# Evaluation

| file_name | report_name | organisation_description | contributor_details | assessment_content | technology_description | purposes_description | report_date | aiaaic_link | challenge_11 | evaluation_11 | impact_level_11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| fria-instance-gpt-1.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-2.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-3.ttl | 1 | 0.5 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-4.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-5.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-6.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-7.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |
| fria-instance-gpt-8.ttl | 1 | 1.0 | 1.0 | 1 | 1 | 1 | 1 | 1 | 1.0000000000000000 | 1.0 | 1.0 |

Since this is used for frequency analysis,
if the defined properties exist and are filled by the LLMs, then the value is **1**,
If the if the defined properties exist but aren't filled by the LLMs, then the value is **0.5**,
If the defined properties don't exist, then the value is **0**.

# Evaluation

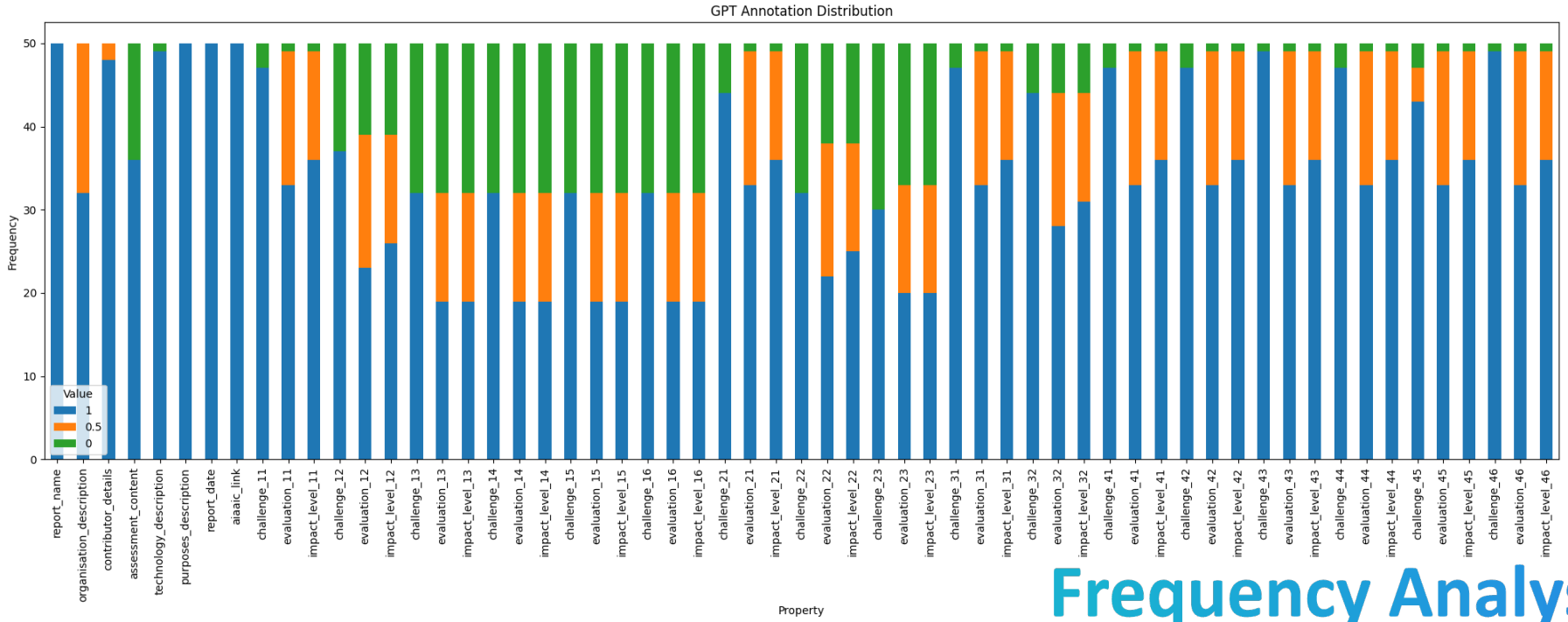
| | | | | |
|---|---|---|---|---|
| 1 | 1.0000000000000000 | 1.0 | 1.0 | 1.0000000000000000 |
| 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| 1 | 1.0000000000000000 | 1.0 | 1.0 | 0.0 |
| 1 | 0.14968883751210100 | 1.0 | 1.0 | 0.12928149652243100 |

**Similarity Scores** Calculated for **evaluate the challenge in Frequency Analysis**

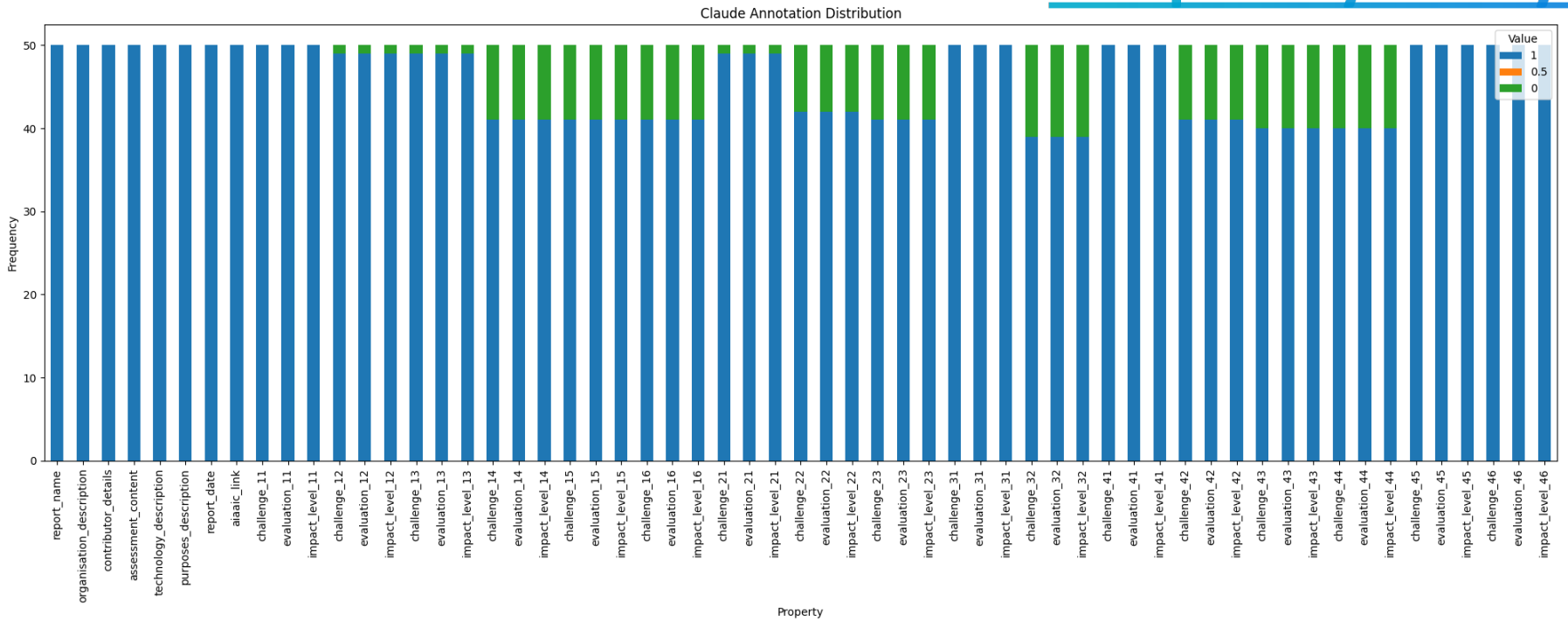
| |
|---|
| The AI system does not communicate that a decision/advice or outcome is the result of an algorithmic decision. |
| The AI system does not communicate that a decision/advice or outcome is the result of an algorithmic decision. |
| The AI system does not communicate that a decision/advice or outcome is the result of an algorithmic decision. |
| Personal data may be captured from people who are not even aware that the device is there, or that it records and processes audio and personal data. |

For Challenge, they should look the same since it's designed in the ontology.
So if it's different, it means that the LLMs didn't follow the prompt well and may have wrong understanding of the ontology.
In this example, the challenge is wrong. The **Similarity Scores** are used to see the correctness of the ontology instance.
**Higher** the scores, **more correct** the instance is.

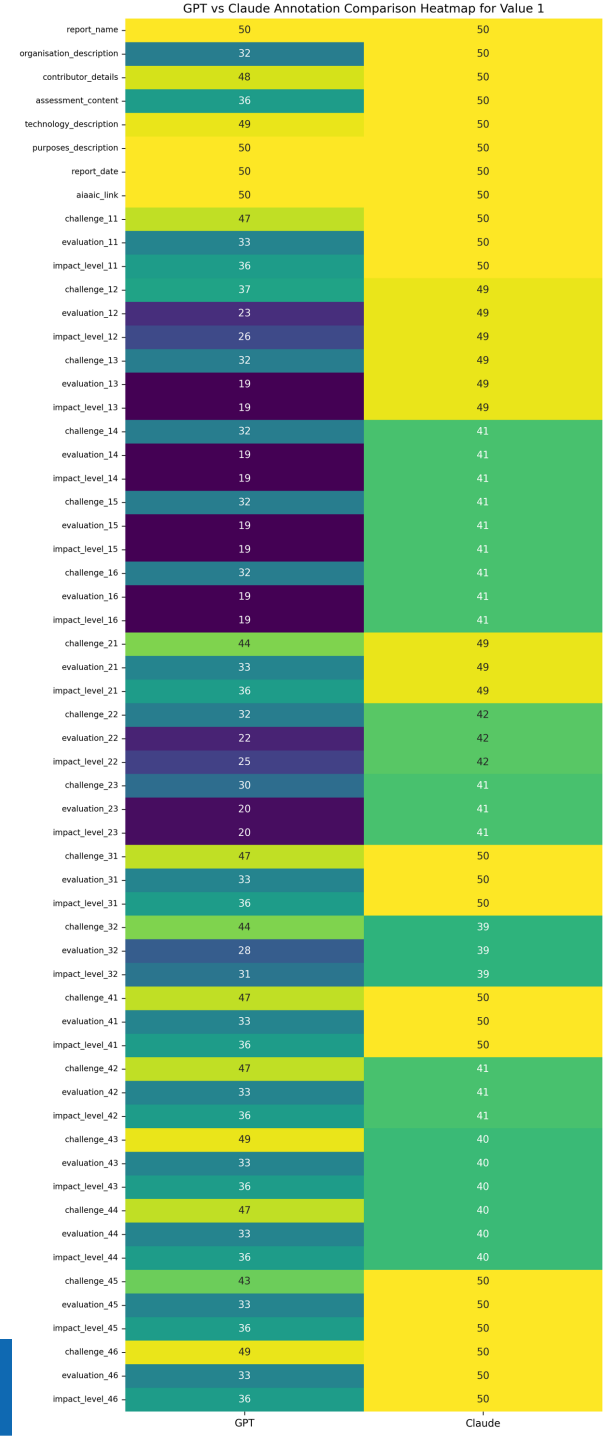
# Evaluation

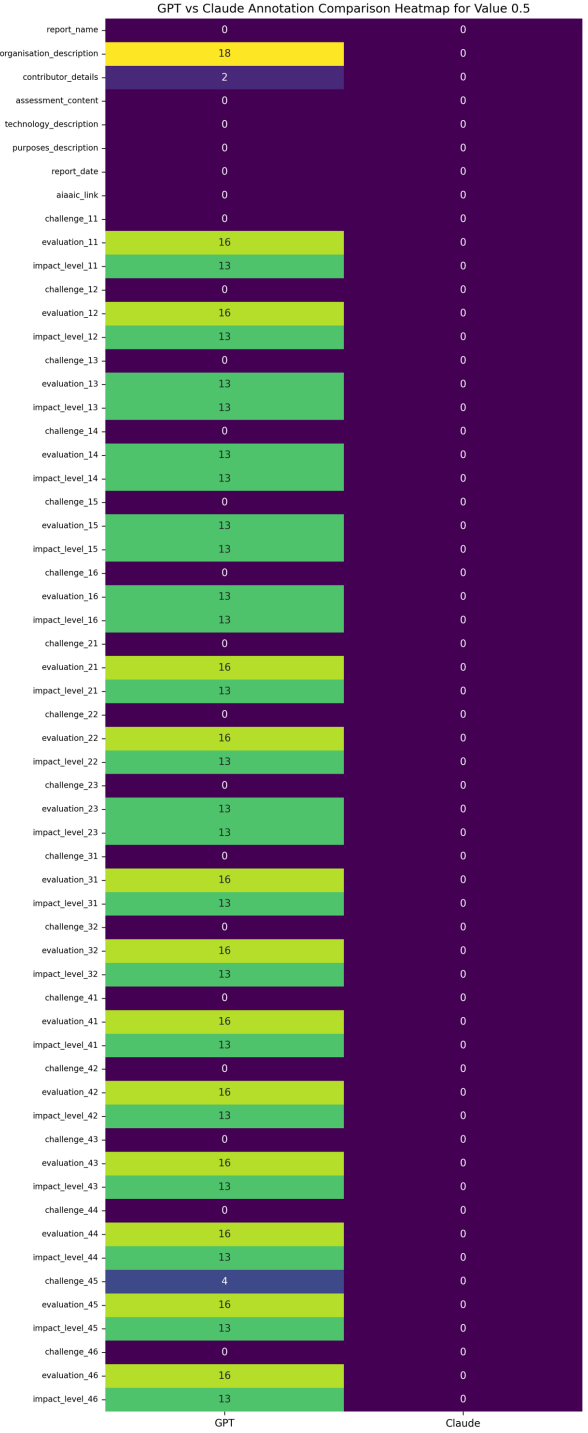


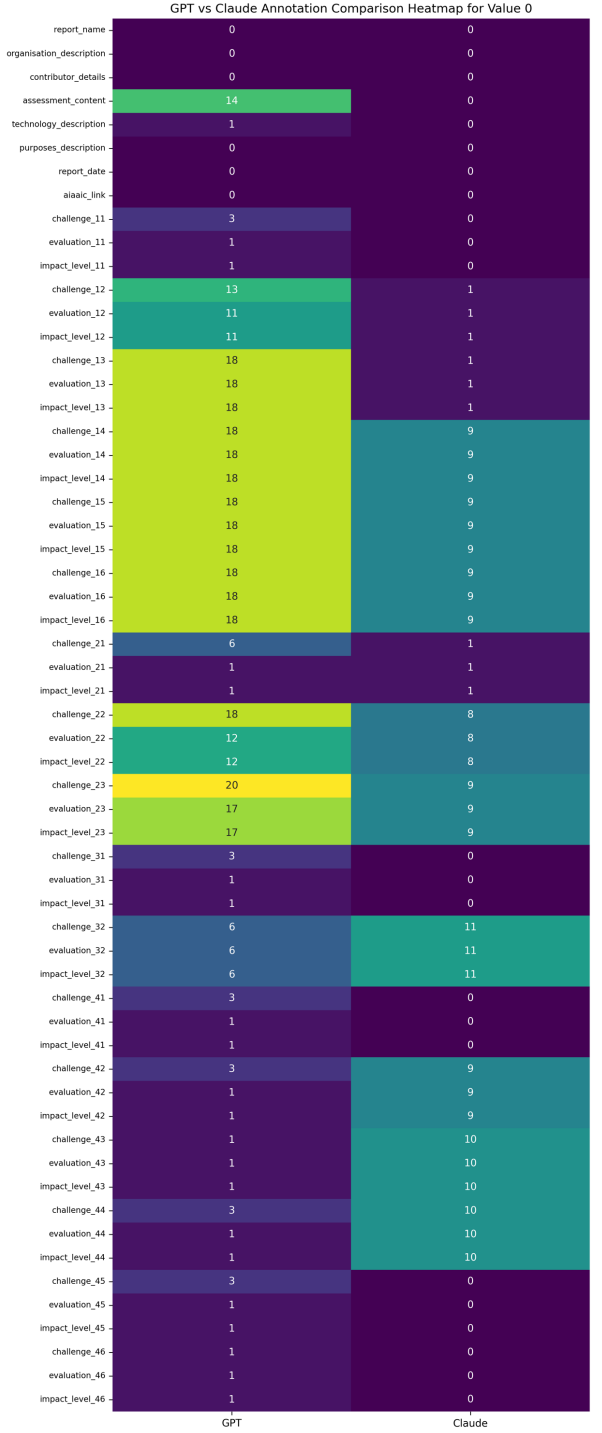

## Frequency Analysis

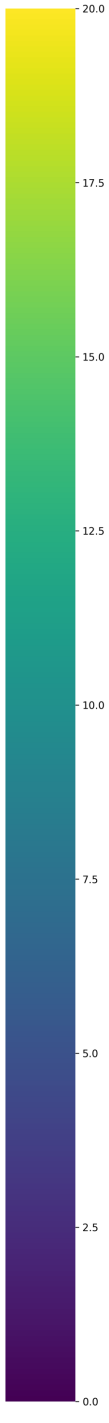



**Claude**'s performance is better than ChatGPT in this analysis.




# Frequency Analysis

**Claude**'s performance is better than ChatGPT in this analysis.

# Evaluation

| file_name | report_name | organisation_description | contributor_details |
|---|---|---|---|
| fria-instance-gpt-1.ttl | 3D masks fool payment, airport facial recognition systems | | AI development company Kneron |
| fria-instance-gpt-2.ttl | 4 Little Trees (4LT) student emotion recognition | | Find Solution AI |
| fria-instance-gpt-3.ttl | 7-Eleven customer survey facial recognition | | 7-Eleven |
| fria-instance-gpt-4.ttl | Aadhaar COVID-19 facial recognition marginalisation | Plans by the Indian government to use facial recognition integrated within the Aadhaar biometric ID system have raised fears that millions of vulnerable people without mobile phones or internet access will lose out on receivi | Reuters, Internet Freedom Foundation |
| fria-instance-gpt-5.ttl | Aadhaar glitches result in villagers' starvation | India's Aadhaar biometric ID system faced technical problems leading to villagers being unable to access food rations or subsidized grain, resulting in starvation and deaths. | Campaigners, The Guardian |
| fria-instance-gpt-6.ttl | AccessiBe automated web accessibility | The use of AccessiBe's automated web accessibility solution by Eyebobs led to a lawsuit due to failure to provide users of its website with equal access, especially for screen readers. | Accessibility advocates, software deve |
| fria-instance-gpt-7.ttl | Adobe Creative Cloud content analysis | Adobe's automated content analysis of Creative Cloud files to train AI algorithms raised privacy and employment concerns among users. | Adobe, Adobe Creative Cloud users, B |
| fria-instance-gpt-8.ttl | Adobe Firefly AI art generator training | Adobe's use of Adobe Stock content to train the Firefly AI art generator without explicit consent from contributors raises significant ethical, copyright, and employment concerns. | Adobe, Adobe Stock contributors, Ven |
| fria-instance-gpt-9.ttl | Adobe Sensei Project Morpheus | | Adobe |
| fria-instance-gpt-10.ttl | Aespa virtual K-pop anthropomorphism, sexualisation | | SM Entertainment |
| fria-instance-gpt-11.ttl | Agricultural Bank of China facial recognition age bias | | Agricultural Bank of China |
| fria-instance-gpt-12.ttl | AI confuses bus ad for jaywalker | | Ningbo Police |
| fria-instance-gpt-13.ttl | AI converts Asian-American student into Caucasian | | Playground AI |
| fria-instance-gpt-14.ttl | AI Dungeon GPT-3 offensive speech filter | Content moderation system \| NLP/text analysis | AI Dungeon, Latitude, OpenAI, Suchin |
| fria-instance-gpt-15.ttl | AI-generated article calls fake tanning 'racist' | | Irish Times |
| fria-instance-gpt-16.ttl | AI impersonation scams Canadian couple of USD 21,000 | | Canadian Authorities, Washington Post |
| fria-instance-gpt-17.ttl | AI invents 40,000 biochemical warfare agents | | Researchers from USA, UK, Switzerlan |
| fria-instance-gpt-18.ttl | AI meal planner app suggests chlorine gas recipe | | Pak 'n Save, New Zealand political con |
| fria-instance-gpt-19.ttl | AI Portrait Ars racial bias | Generative adversarial network (GAN)\| Neural network\| Machine learning | Mashable journalist Morgan Sung disc |
| fria-instance-gpt-20.ttl | AI satellite location spoofing | | University of Washington |
| fria-instance-gpt-21.ttl | AI Stefanie Sun (AI孙燕姿) | | Bilibili |
| fria-instance-gpt-22.ttl | AI text detector language bias | | Stanford University |
| fria-instance-gpt-23.ttl | Airbnb Smart Pricing algorithm racial bias | | Carnegie Mellon University |
| fria-instance-gpt-24.ttl | Ajin USA worker crushed to death by robot | | |
| fria-instance-gpt-25.ttl | Alexei Navalny Smart Voting Bot Blocking Report | This report was conducted to evaluate the blocking of Alexei Navalny's Smart Voting bot by Apple, Google, and Telegram. | Research Team at Example.org |
| fria-instance-gpt-26.ttl | Alfi personalised, real-time advertising | | |
| fria-instance-gpt-27.ttl | Algorithm misses gambling addict red flags | Machine learning | Luke Ashton, from Leicester, UK, was |
| fria-instance-gpt-28.ttl | Allocation algorithm wrongly places thousands of Italian teachers | Resource allocation algorithm | An algorithm used by the Italian goverr |
| fria-instance-gpt-29.ttl | Allstate car insurance 'suckers list' overcharging | Price adjustment algorithm | A joint investigation by The Mark Up ar |
| fria-instance-gpt-30.ttl | Alonzo Sawyer facial recognition wrongful arrest, jailing | CCTV\| Facial recognition | 54-year old Alonzo Sawyer was arreste |
| fria-instance-gpt-31.ttl | Amazon, Waterstones algorithms promote vaccine misinformation | Researchers at the University of Washington and Sky News conducted studies revealing the promotion of vaccine misinformation by Amazon, Waterstones, and Foyles algorithms. | Researchers at the University of Washi |
| fria-instance-gpt-32.ttl | Amazon Astro home robot | Robotics; Computer vision; Facial recognition | USA |
| fria-instance-gpt-33.ttl | Amazon UK automated pricing glitch | Pricing automation | UK |
| fria-instance-gpt-34.ttl | Amazon AWS Panorama automated workplace surveillance | CCTV, Computer vision | USA |
| fria-instance-gpt-35.ttl | Amazon botches delivery drone commercial launch | Drone | USA |
| fria-instance-gpt-36.ttl | Amazon chemical food preservative suicides | Recommendation algorithm | USA; India |
| fria-instance-gpt-37.ttl | Amazon Driveri delivery driver safety monitoring | CCTV \| Computer vision | USA |
| fria-instance-gpt-38.ttl | Amazon delivery drone malfunctions, sparks 25-acre fire | Drone | USA |
| fria-instance-gpt-39.ttl | Amazon Echo Dot Kids remembers kids' conversations | Speech recognition\| Natural language understanding (NLU) | USA |
| fria-instance-gpt-40.ttl | Amazon employees use Ring to spy on customers | CCTV\| Computer vision | USA |
| fria-instance-gpt-41.ttl | Amazon Flex algorithm fires delivery drivers | Automated management system\| Image recognition | USA |
| fria-instance-gpt-42.ttl | Amazon Flex delivery drivers forced to take unsafe routes | Routing algorithm | USA; EU; UK; Australia |
| fria-instance-gpt-43.ttl | Amazon Go fails to inform NYC customers about facial recognition | Facial recognition; Computer vision; Deep learning | USA |
| fria-instance-gpt-44.ttl | Amazon India own brand search engine rigging | Search engine algorithm | Amazon, Diego Piacentini, Russell Gra |
| fria-instance-gpt-45.ttl | Amazon Mentor delivery driver scoring | Performance scoring algorithm | USA |
| fria-instance-gpt-46.ttl | Amazon One Palmprint Biometric Opacity | Palm print scanning | TechCrunch, Albert Fox Cahn, Surveill |
| fria-instance-gpt-47.ttl | Amazon Ring Always Home Cam | Drone; Computer vision | Amazon, TechCrunch, Evan Greer, Figh |

# Evaluation

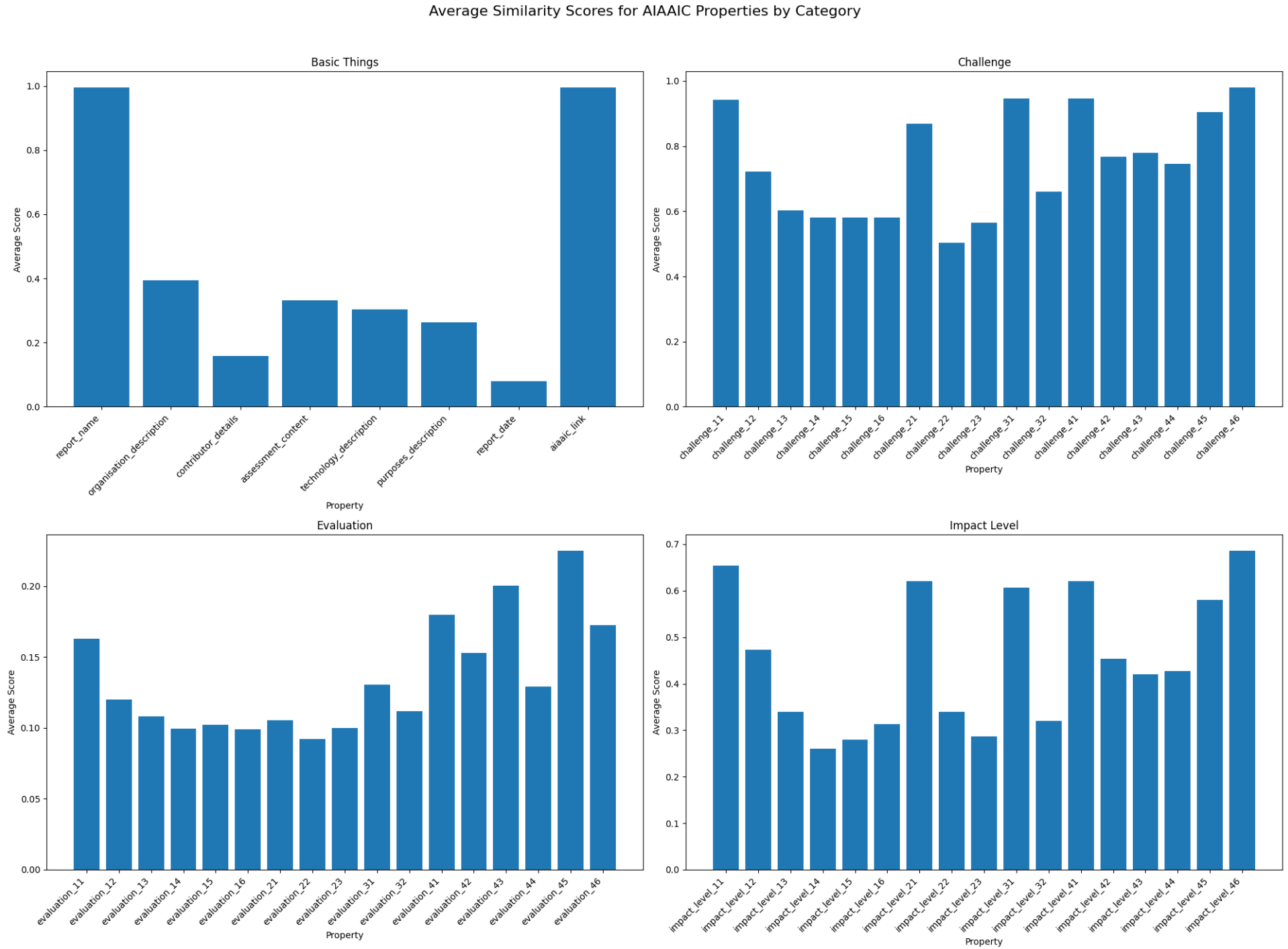
**Similarity Scores** Calculated for evaluation the different LLMs' **Accuracy of Judgments**

| challenge_45 | evaluation_45 | impact_level_45 | challenge_46 | evaluation_46 |
|---|---|---|---|---|
| 1.0000000000000000 | 0.3040753256113660 | 1.0 | 1.0000000000000000 | 0.23872815841786600 |
| 1.0000000000000000 | 0.31258809797206800 | 1.0 | 1.0000000000000000 | 0.17201159982228600 |
| 1.0000000000000000 | 0.22430556321584300 | 1.0 | 1.0000000000000000 | 0.17688982525436600 |
| 0.49304922133780900 | 0.3250015465650920 | 1.0 | 1.0000000000000000 | 0.1742407762264450 |
| 0.7897746636343570 | 0.27824562220363600 | 1.0 | 1.0000000000000000 | 0.14734781282563400 |
| 0.49304922133780900 | 0.1238273358432390 | 0.6666666666666670 | 1.0000000000000000 | 0.12034344390398000 |
| 0.49304922133780900 | 0.25817837206566500 | 1.0 | 1.0000000000000000 | 0.20134299929818600 |
| 0.49304922133780900 | 0.18383925004159200 | 0.6666666666666670 | 1.0000000000000000 | 0.17022838043477500 |
| 1.0000000000000000 | 0.07701564005870900 | 1.0 | 1.0000000000000000 | 0.12082385876388700 |
| 1.0000000000000000 | 0.13045377565199000 | 1.0 | 1.0000000000000000 | 0.1554314700800160 |
| 1.0000000000000000 | 0.15923229953482200 | 0.6666666666666670 | 1.0000000000000000 | 0.14471270582616800 |
| 1.0000000000000000 | 0.5024805573663780 | 0.6666666666666670 | 1.0000000000000000 | 0.2796724903912870 |
| 1.0000000000000000 | 0.36775666078015000 | 0.6666666666666670 | 1.0000000000000000 | 0.25534187135075000 |

For Impact Level, I took the **impact level** out if it's existed. (It should be in "low", "medium", "high" or "very high")
If there is no available value from any of the LLMs' output, then it is **0**.
If it's same, then it is **1**.
If they are different, it calculates the distance and returns score based on distance.

# Evaluation Performance Analysis

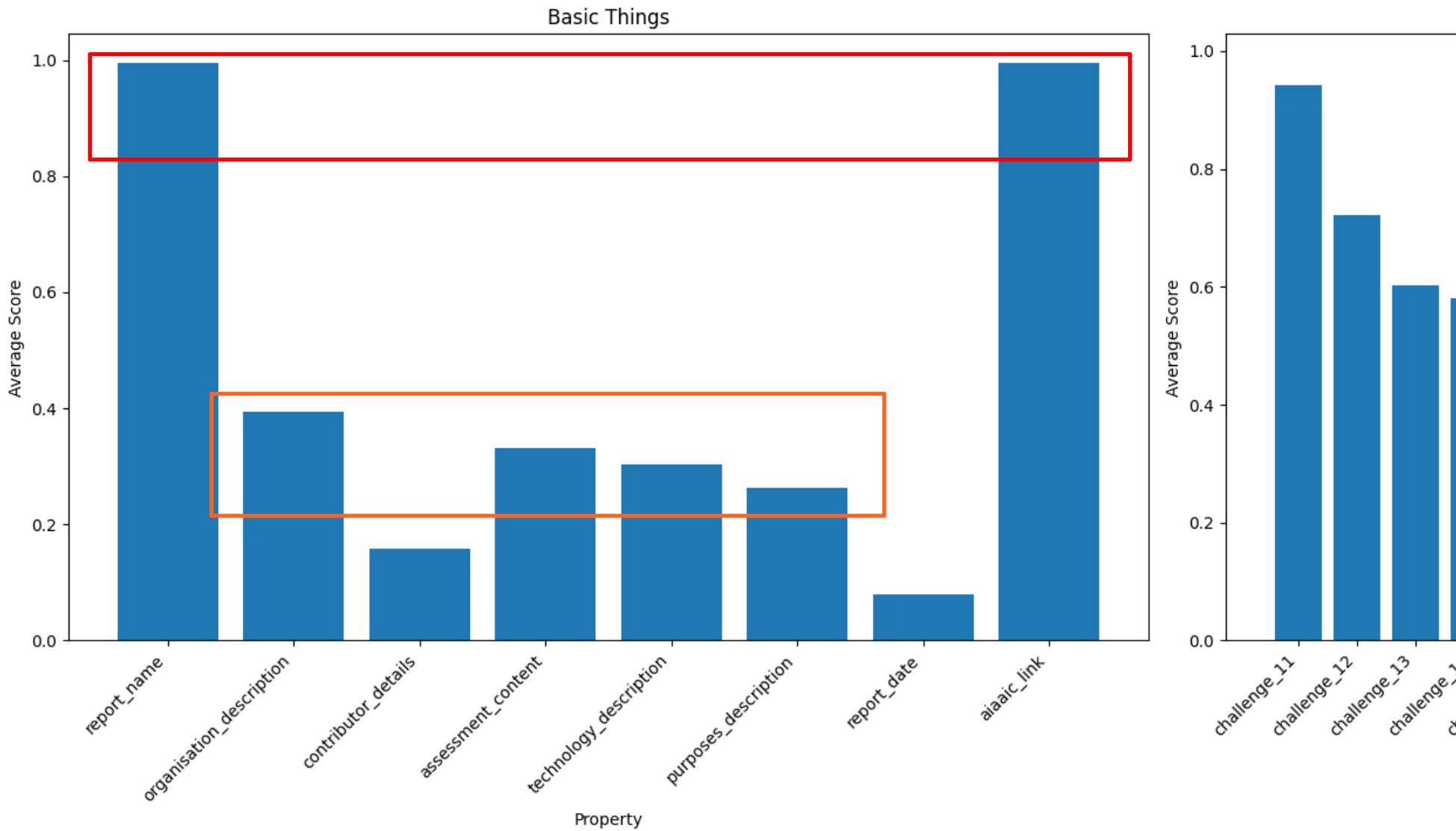
The overall similarity of the **Impact Level is the best**. But for incidents, they have different thoughts.



# Evaluation

## Performance Analysis

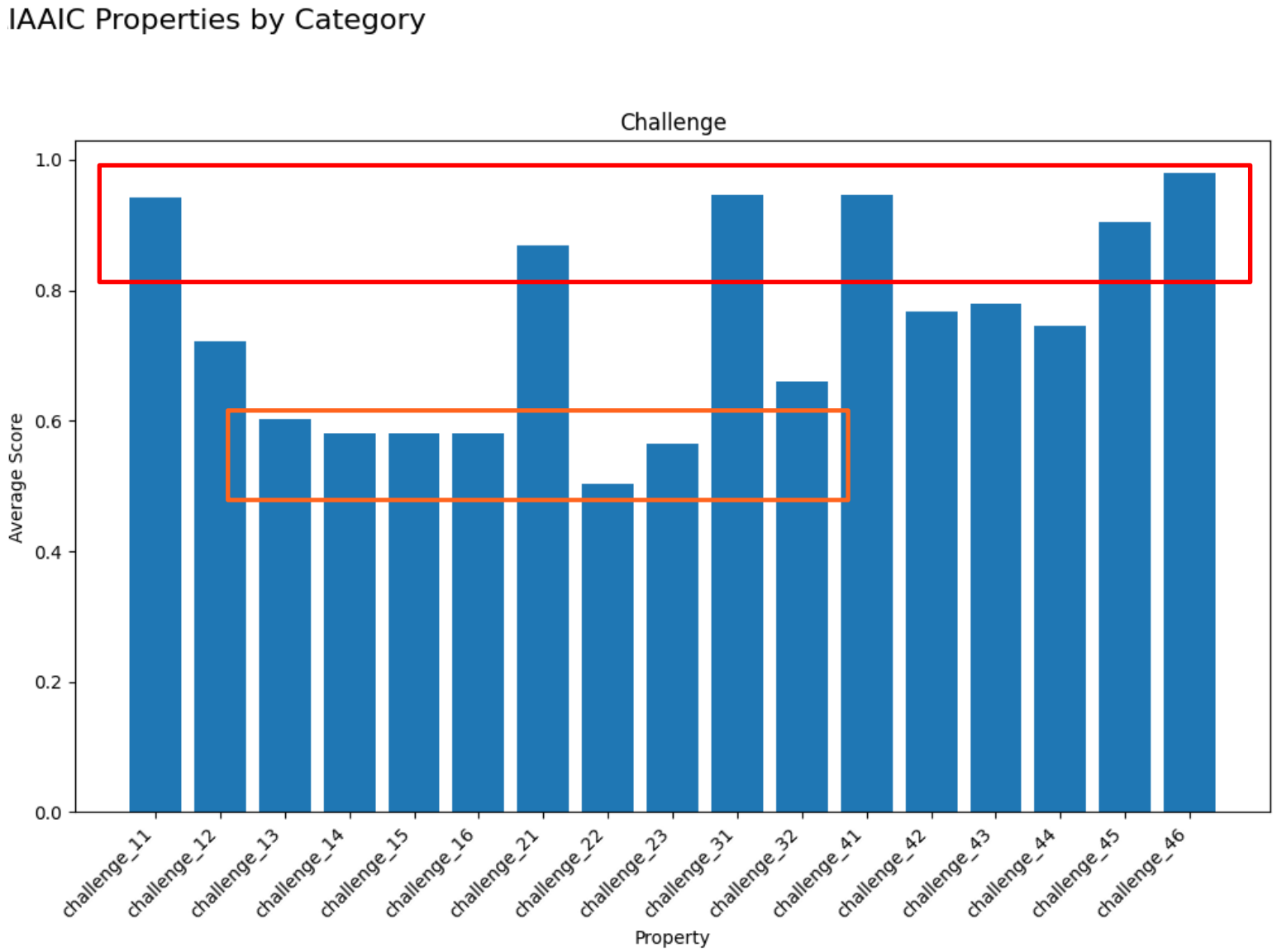
In Basic Things, LLM extracted all the basic thing successfully. Except the Report Date. This may because they don't have access to the webpage

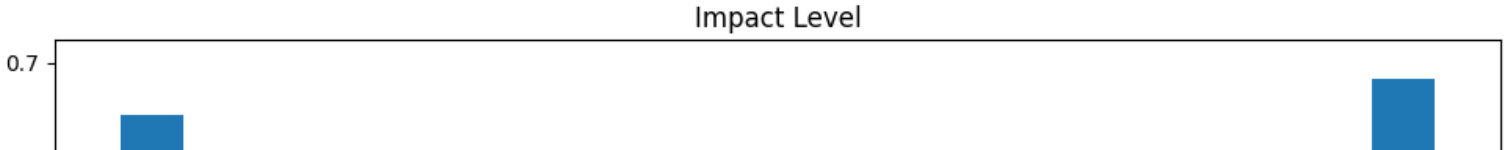


# Evaluation

## Performance Analysis

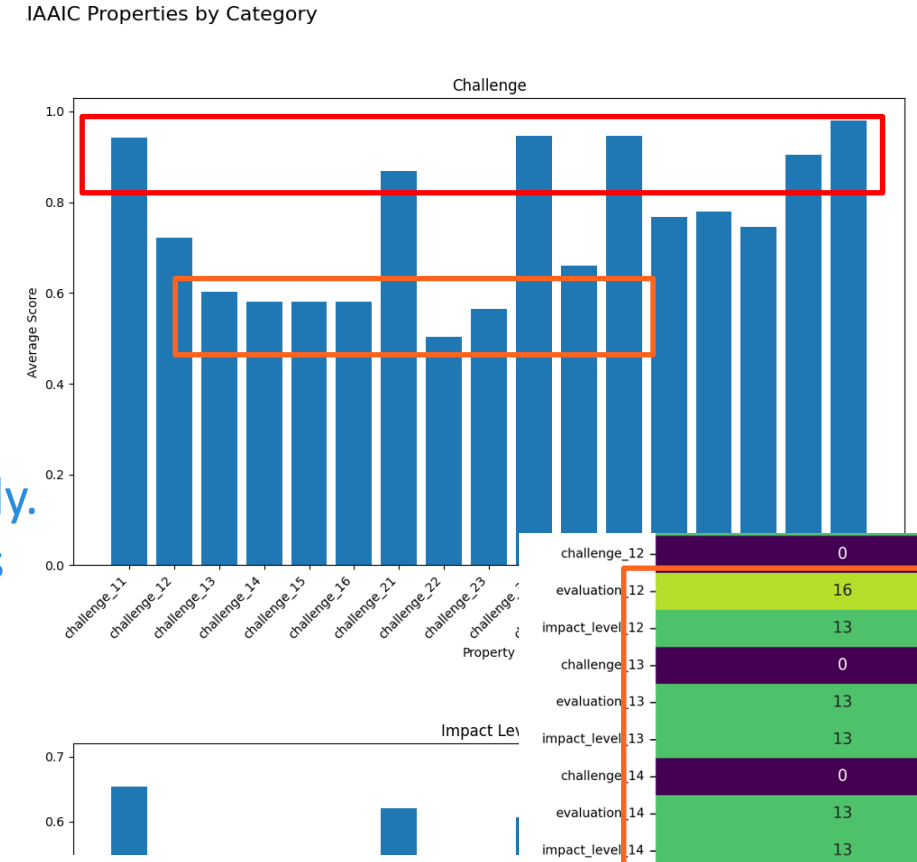
Most of the challenge are extracted successfully. The low similarity scores may because of the low performance of GPT4o. It missed these thing.

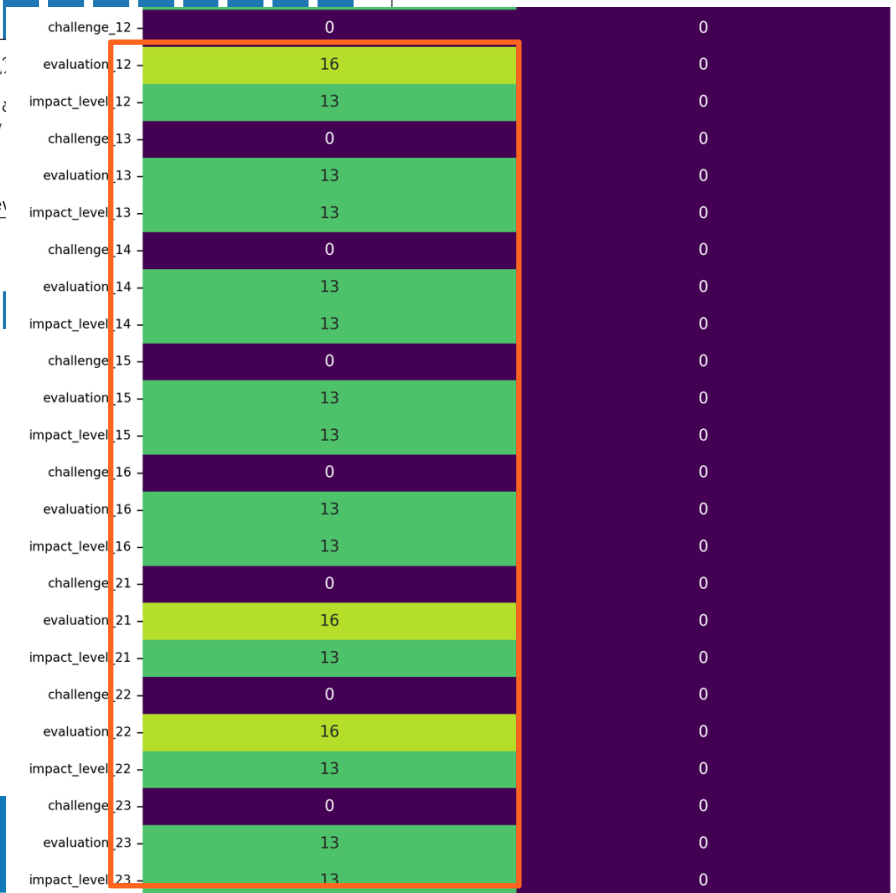


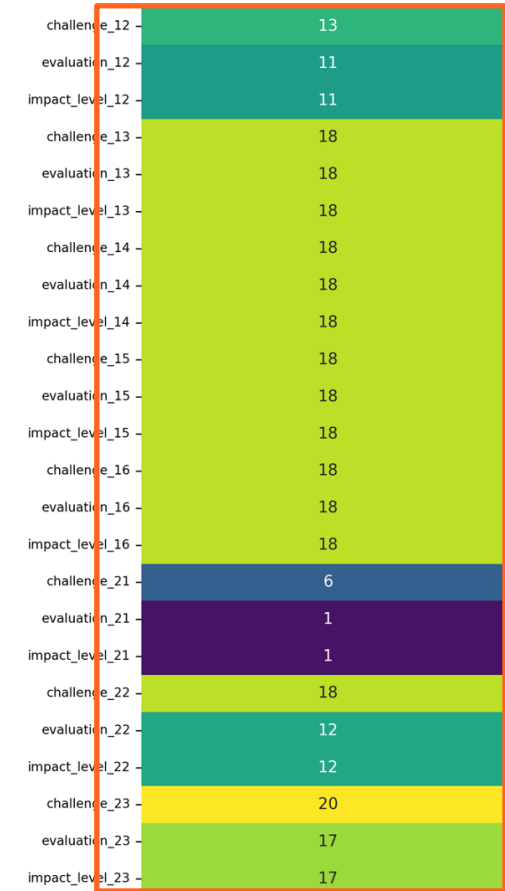



# Evaluation Performance Analysis

Most of the challenge are extracted successfully. The low similarity scores may because of the low performance of GPT4o. The low performance of GPT4o may be result of the low impact level in some challenges' impact level. The instances from GPT don't have the specific impact levels like 13.

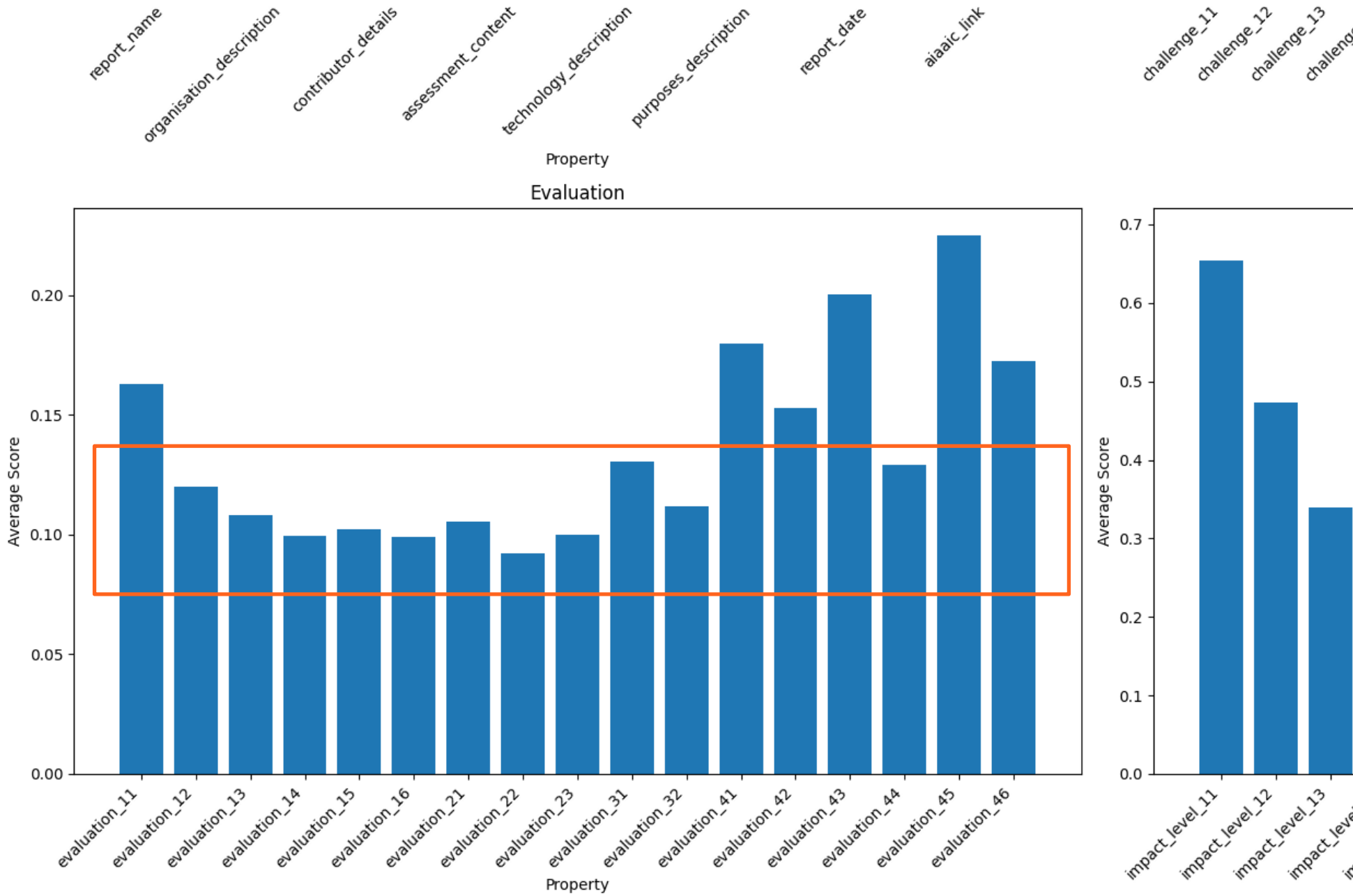


# Evaluation Performance Analysis

For the evaluation, the scores are low and this is expected.

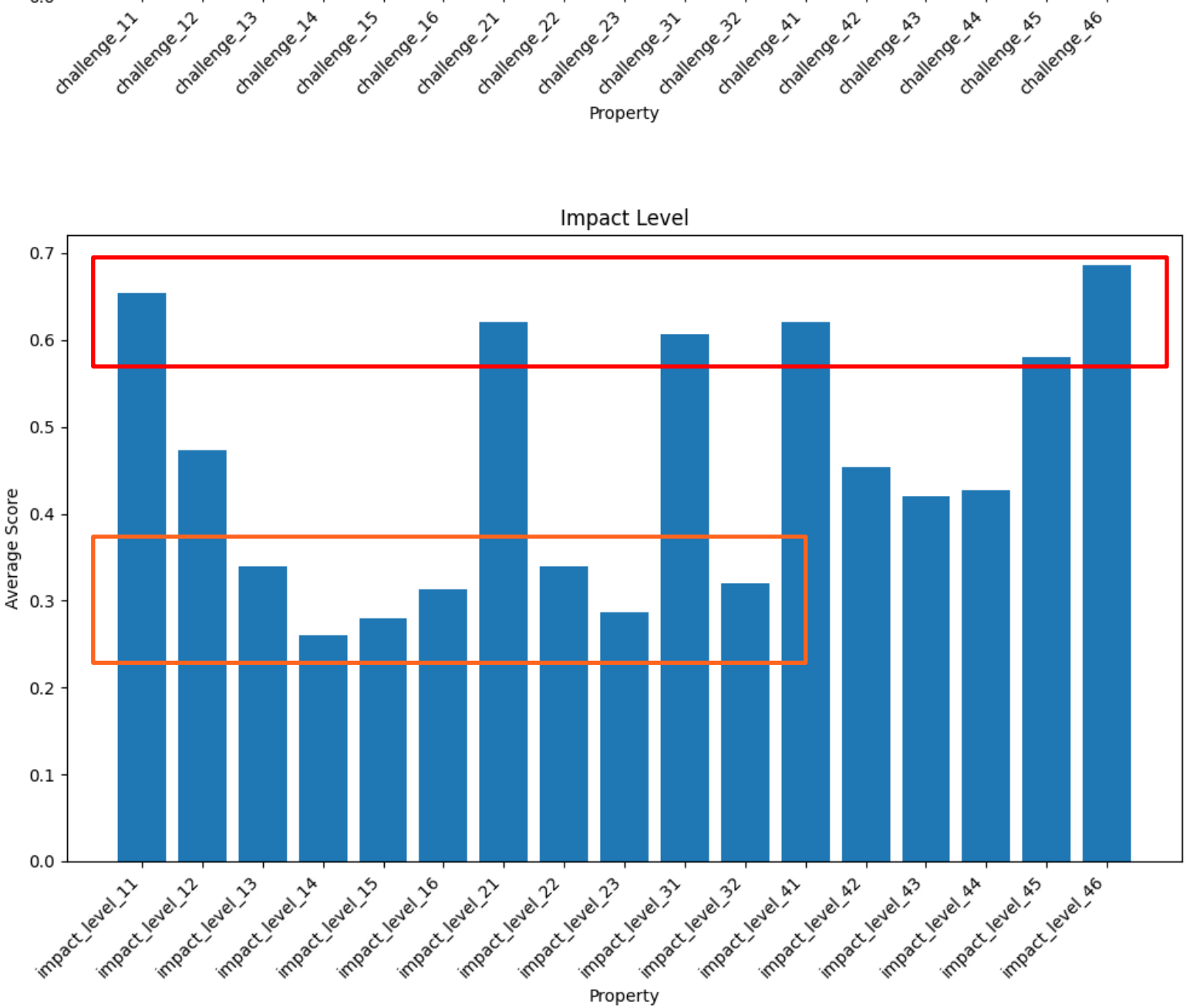


# Evaluation

## Performance Analysis

The overall similarity of the **Impact Level is the best**. Which means that in these context, different LLMs can still have similar result.

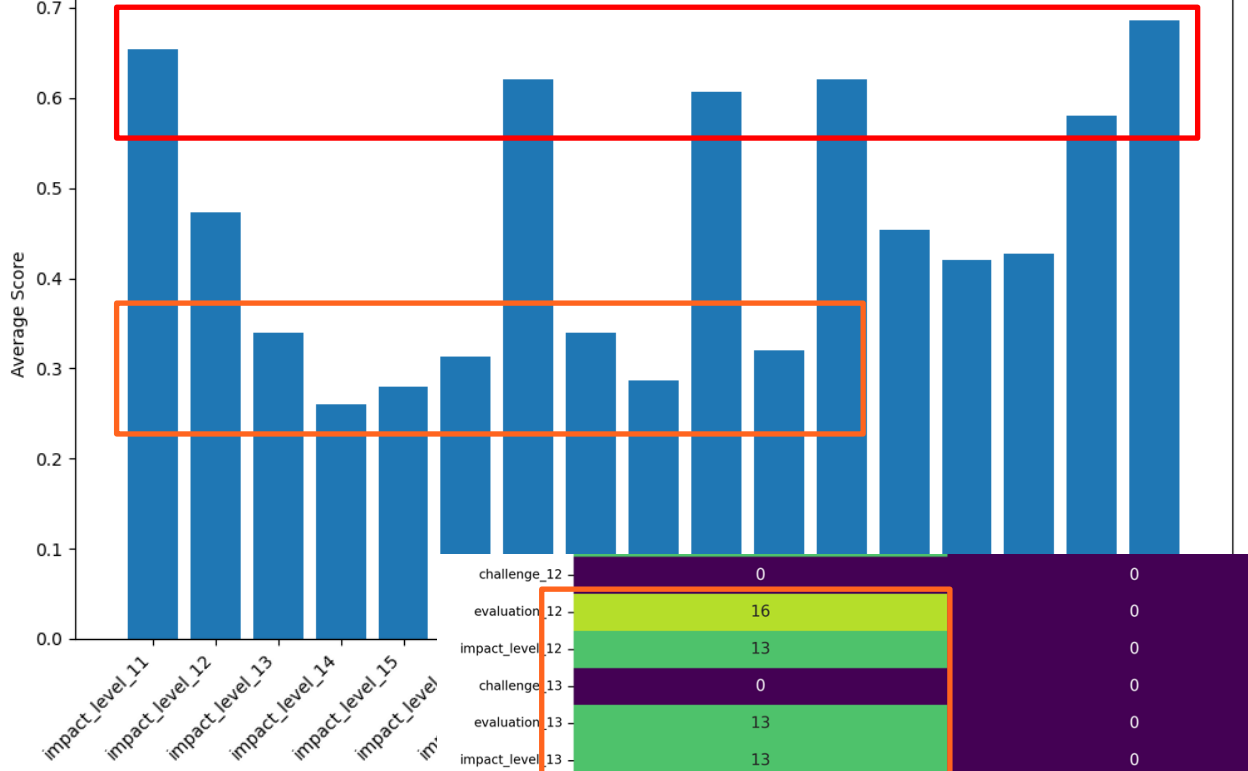
**This make usage of LLMs in AI Impact Assessment Domain and to face EU AI Act possible.**

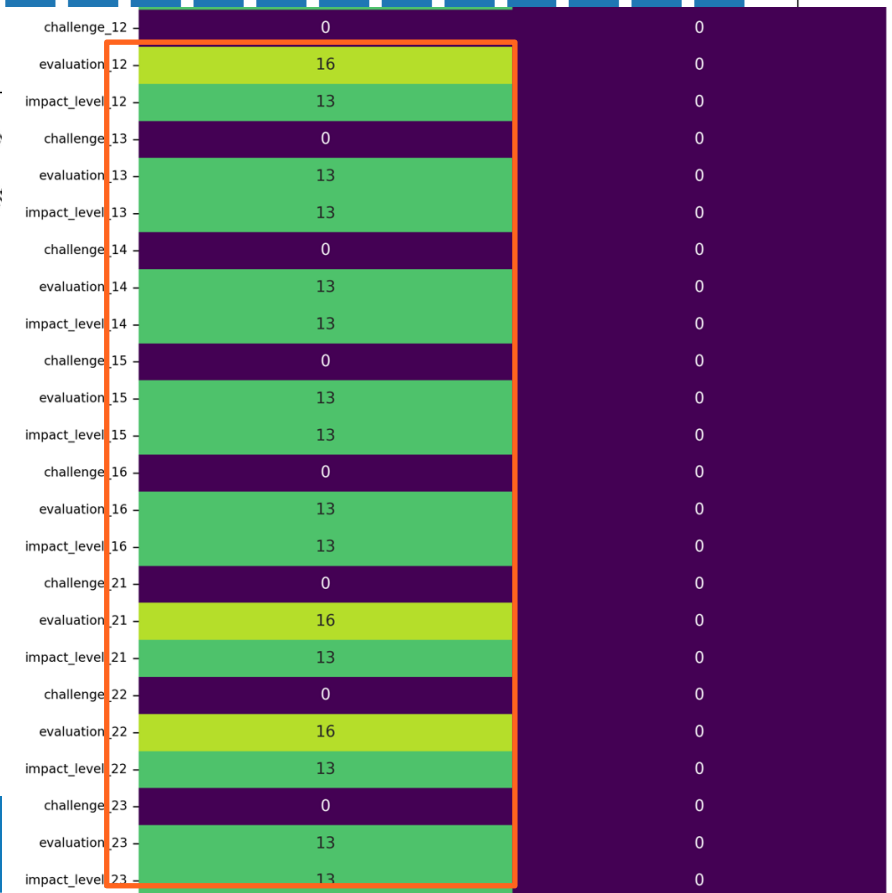


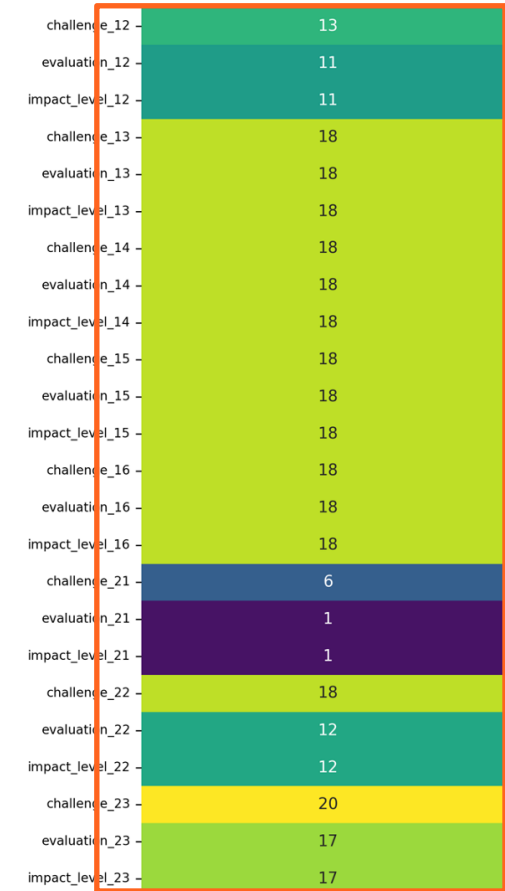
# Evaluation

## Performance Analysis

The low performance of GPT4o may be result of the low impact level in some challenges' impact level. The instances from GPT don't have the specific impact levels like 13.

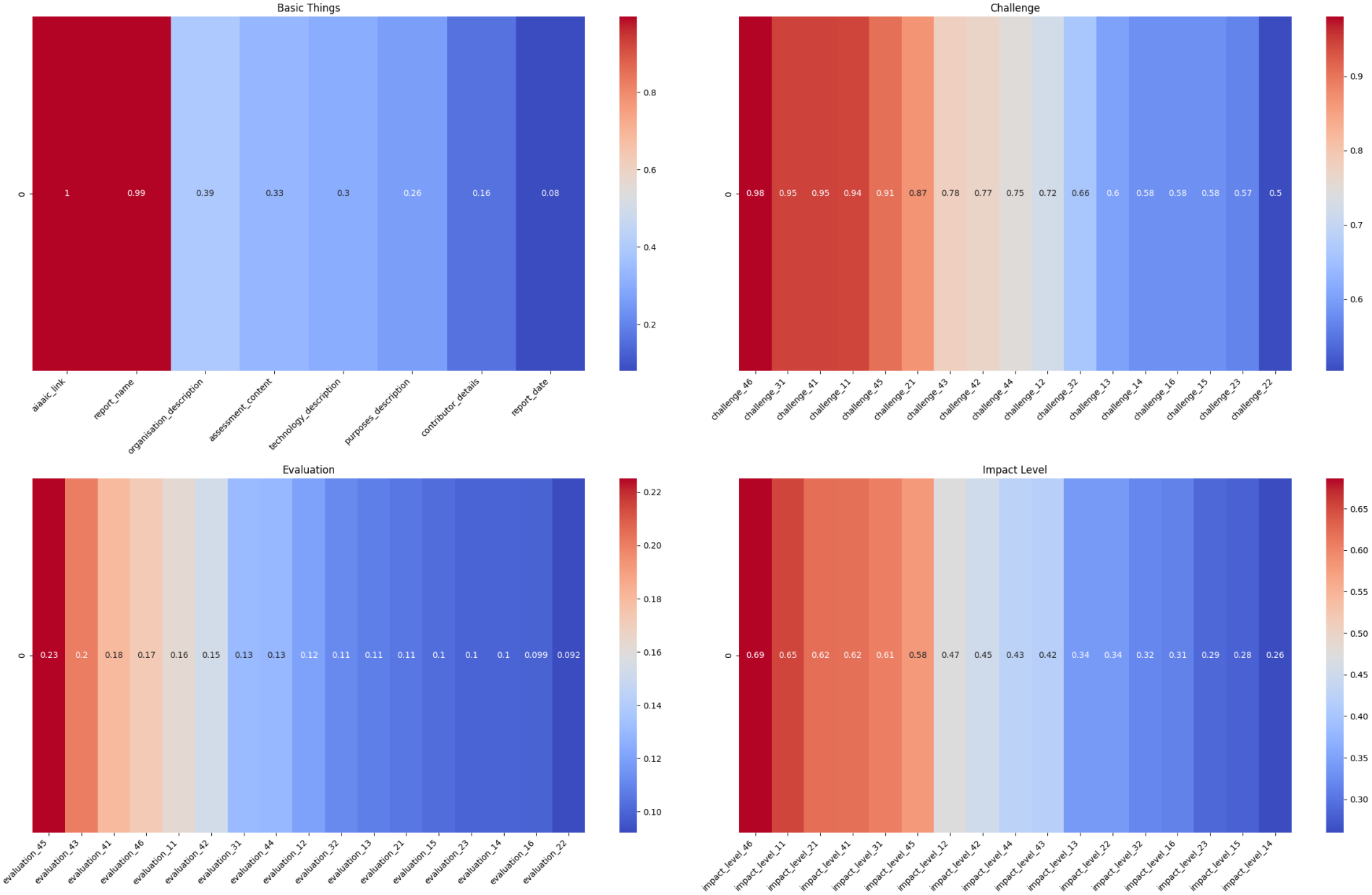


# Evaluation Performance Analysis

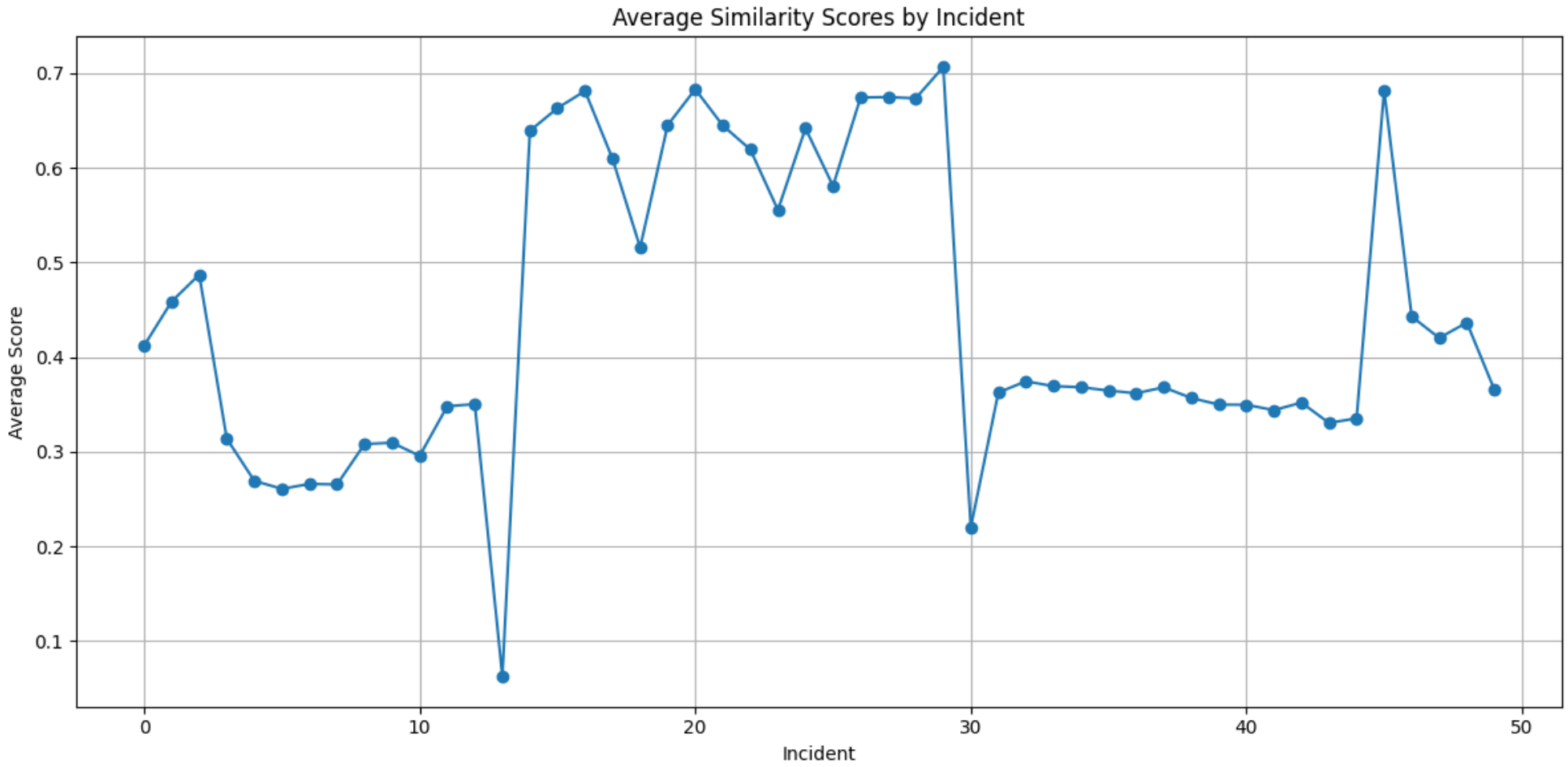
Average Similarity Scores Heatmaps for AIAAIC Properties by Category




The overall similarity of the **Impact Level is the best.**

# Evaluation

## Performance Analysis



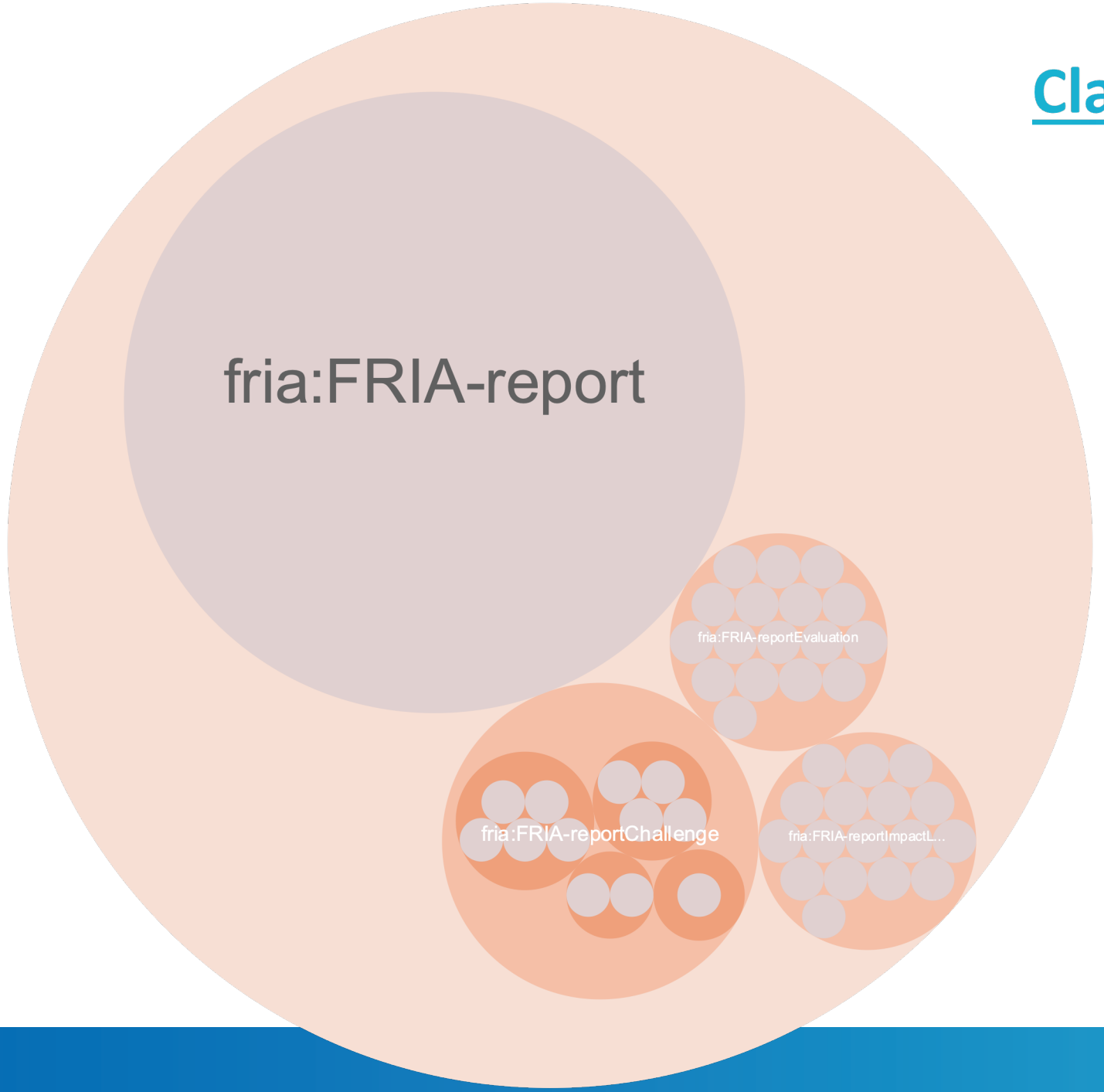

We can see that some incident have very high scores. In these case, the LLM is not lazy.

# Research Questions

1. How can we integrate **Fundamental Rights Impact Assessment (FRIA)** into existing ontological frameworks such as **AI Risk Ontology (AIRO)**, **Vocabulary of AI Risks (VAIR)**, and **Common Impact Data Standard (CIDS)** to create a more comprehensive **ontological** structure for impact assessment?
2. To what extent can **Large Language Models (LLMs)** be effectively utilized to populate Fundamental Rights Impact Assessment (FRIA) reports and related ontologies, thereby assisting in the completion of AI impact assessments?

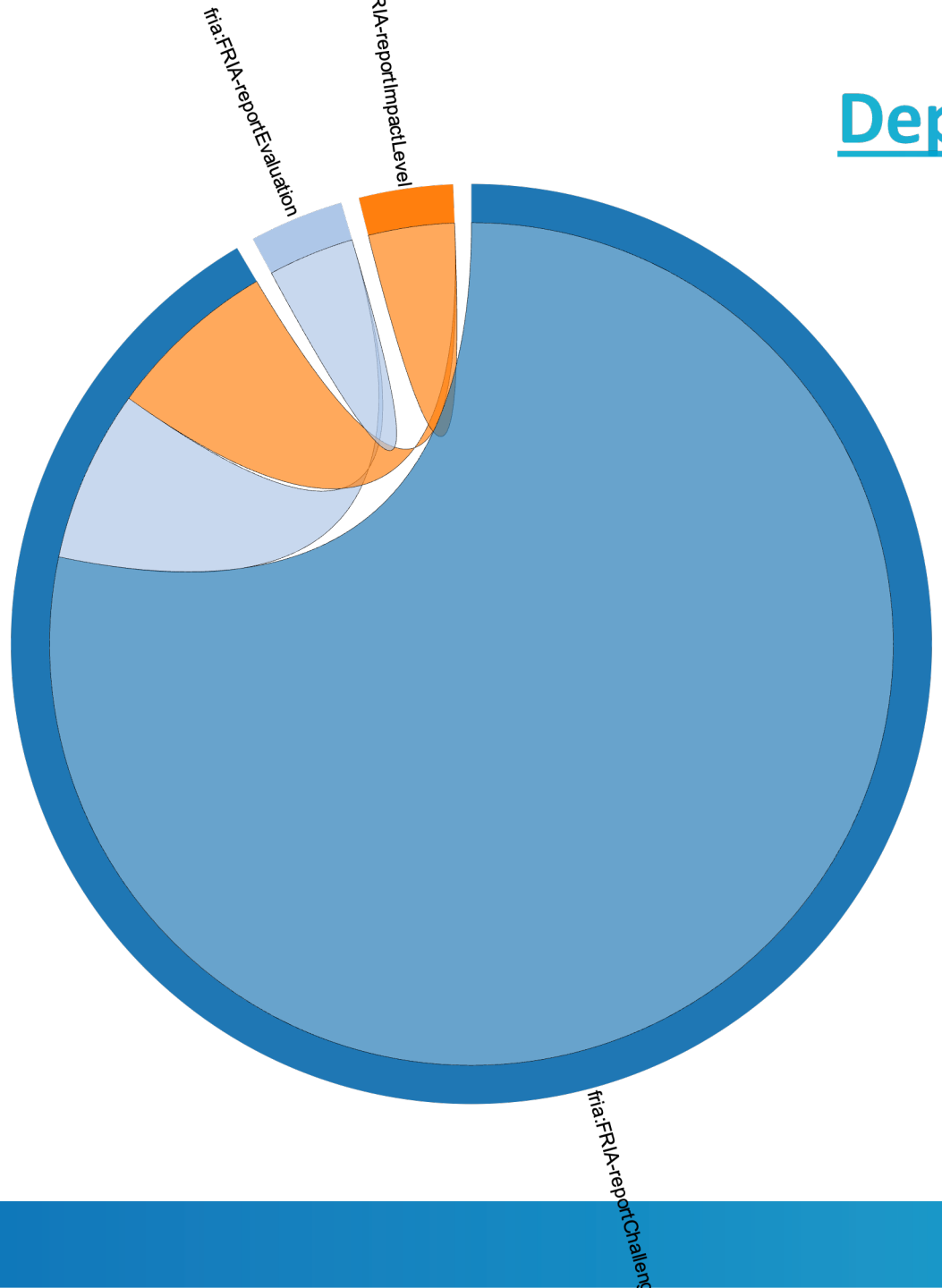
# GraphDB Visualizations

## Class Hierarchy

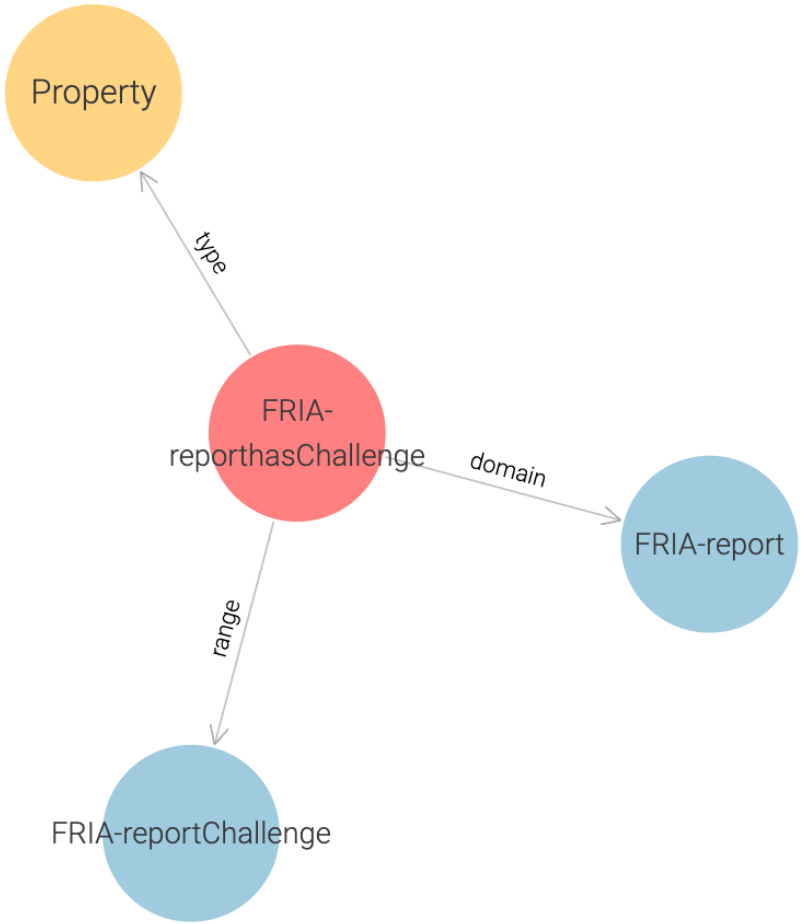


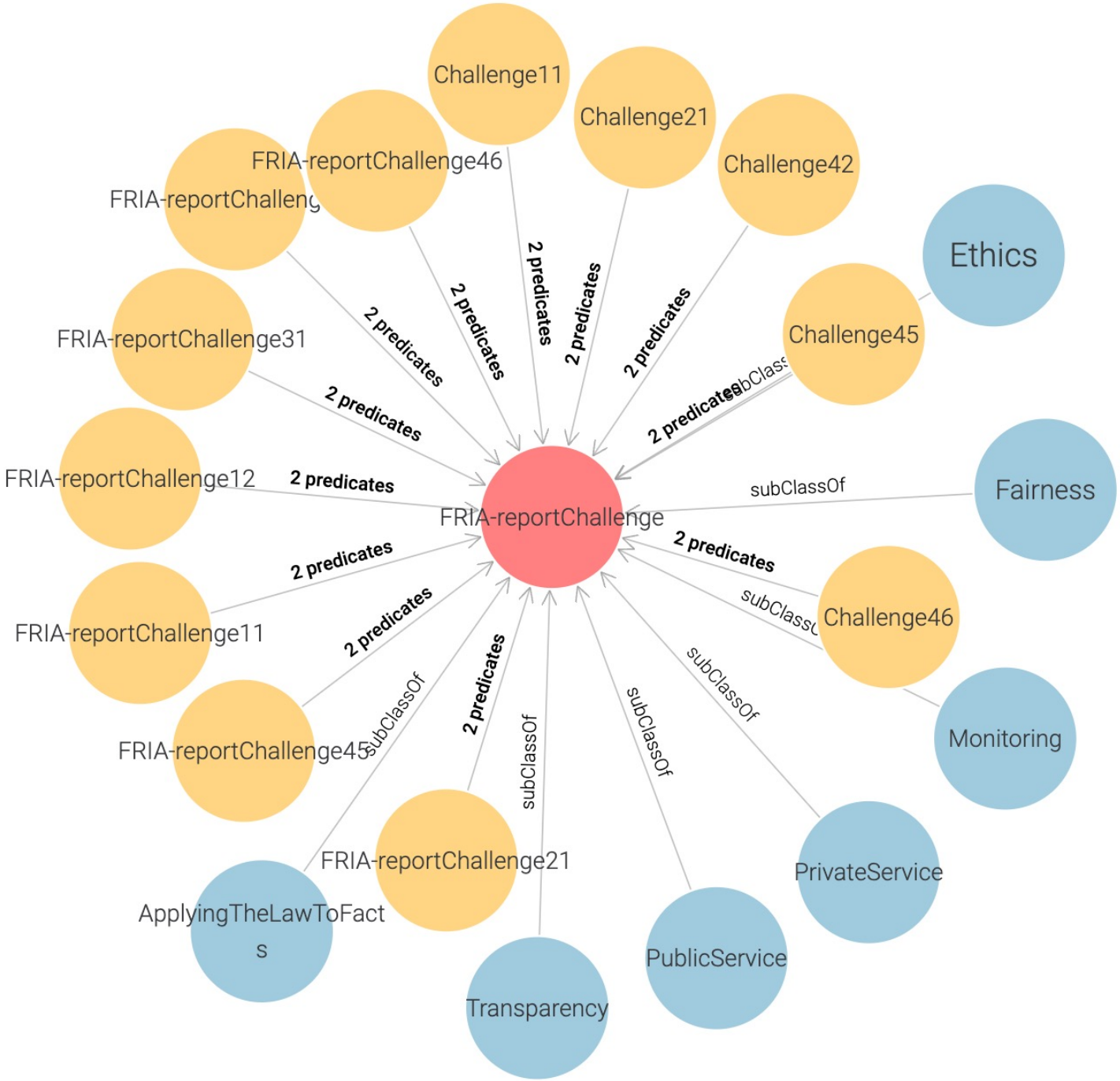
# GraphDB Visualizations

## Dependencies

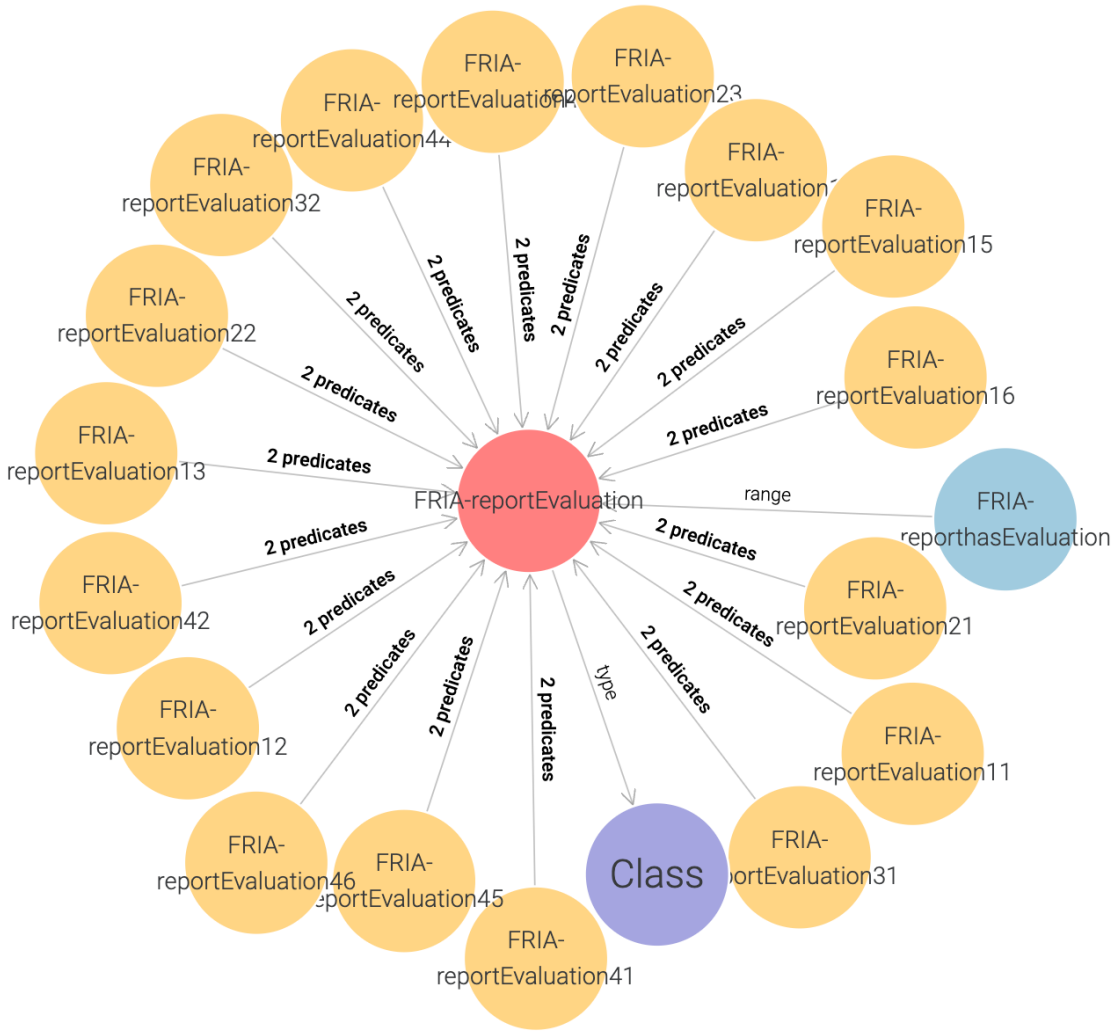


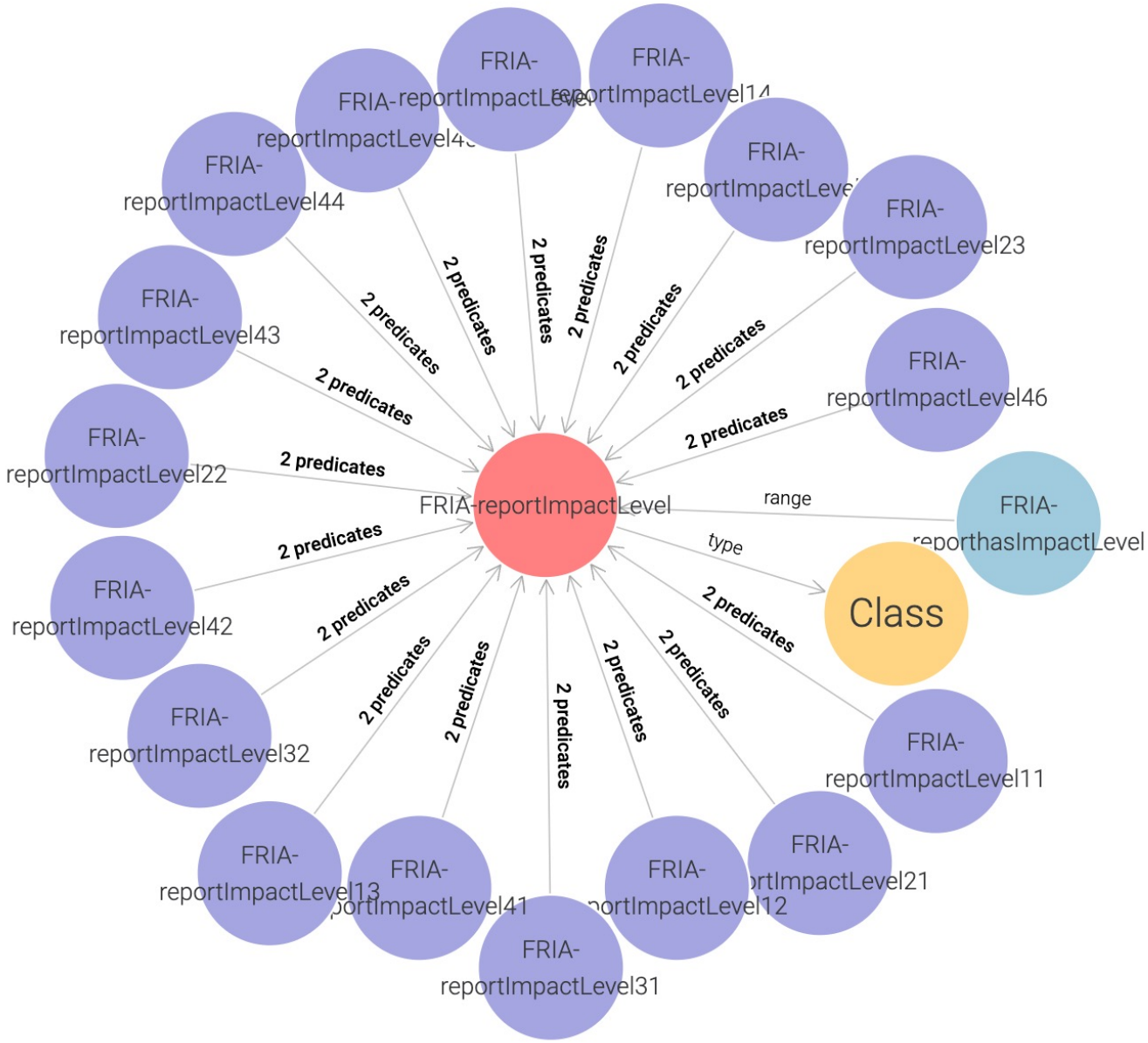
# GraphDB Visualizations



# GraphDB Visualizations



# GraphDB

## SPARQL

# SPARQL Query & Update

Editor only | Editor and results | Results only

Unnamed | fria:FRIA-reportChallenge | fria:FRIA-reportImpactLevel | fria:FRIA-reportChallenge | fria:FRIA-reportEvaluation | Unnamed

```
1  PREFIX onto: <http://www.ontotext.com/>
2  SELECT ?s ?p ?o
3  WHERE {
4      ?s a <http://www.example.org/fria-report#FRIA-reportEvaluation> .
5      ?s ?p ?o .
6  }
7
```

Run

keyboard shortcuts

Table | Raw Response | Pivot Table | Google Chart

Download as

‹ 1 2 ›

Filter query results

Showing results from 1 to 1,000 of 1,059. Query took 0.1s, moments ago.

| | s | p | o |
|---|---|---|---|
| 1 | fria:FRIA-reportEvaluation11 | rdf:type | rdfs:Class |
| 2 | fria:FRIA-reportEvaluation11 | rdf:type | fria:FRIA-reportEvaluation |
| 3 | fria:FRIA-reportEvaluation11 | rdfs:subClassOf | fria:FRIA-reportEvaluation |
| 4 | fria:FRIA-reportEvaluation11 | rdfs:subClassOf | fria:FRIA-reportEvaluation11 |
| 5 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "This is the evaluation content for FRIA-reportEvaluation11." |
| 6 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "The AI system does not communicate that a decision/ advice or outcome is the result of an algorithmic decision." |
| 7 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "The AI-generated songs do not explicitly communicate that they are artificial creations, potentially misleading listeners into believing they are authentic works by Stefanie Sun." |

# GraphDB

# SPARQL

## SPARQL Query & Update

Editor only | Editor and results | Results only

Unnamed | fria:FRIA-reportChallenge | fria:FRIA-reportImpactLevel | fria:FRIA-reportChallenge | fria:FRIA-reportEvaluation | Unnamed

fria:FRIA-reportImpactLevel | Unnamed

```
1  PREFIX onto: <http://www.ontotext.com/>
2  PREFIX fria: <http://www.example.org/fria-report#>
3  SELECT ?s ?p ?o
4  WHERE {
5      ?s a fria:FRIA-reportImpactLevel .
6      ?s ?p ?o .
7      FILTER(?s IN (fria:FRIA-reportImpactLevel46, fria:ImpactLevel46))
8  }
9
```

Run

keyboard shortcuts

Table | Raw Response | Pivot Table | Google Chart

Download as

Filter query results

Showing results from 1 to 14 of 14. Query took 0.2s, moments ago.

| | s | p | o |
|---|---|---|---|
| 1 | fria:FRIA-reportImpactLevel46 | rdf:type | rdfs:Class |
| 2 | fria:FRIA-reportImpactLevel46 | rdf:type | fria:FRIA-reportImpactLevel |
| 3 | fria:FRIA-reportImpactLevel46 | rdfs:subClassOf | fria:FRIA-reportImpactLevel |
| 4 | fria:FRIA-reportImpactLevel46 | rdfs:subClassOf | fria:FRIA-reportImpactLevel46 |
| 5 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "This is the impact level content for FRIA-reportImpactLevel46." |
| 6 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "High" |
| 7 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "Very High" |
| 8 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "Medium" |
| 9 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "High impact due to lack of impact assessment procedures." |
| 10 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "The impact level content for FRIA-reportImpactLevel46." |
| 11 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "Without impact assessments, potential risks to data protection are not proactively addressed." |
| 12 | fria:FRIA-reportImpactLevel46 | fria:hasImpactLevelContent | "High impact as it risks non-compliance with data protection regulations." |
| 13 | fria:ImpactLevel46 | rdf:type | fria:FRIA-reportImpactLevel |
| 14 | fria:ImpactLevel46 | fria:hasImpactLevelContent | "This is the impact level content for FRIA-reportImpactLevel46." |

# GraphDB

## SPARQL

SPARQL Query & Update

Editor only | Editor and results | Results only

Unnamed | fria:FRIA-reportChallenge | fria:FRIA-reportImpactLevel | fria:FRIA-reportChallenge | fria:FRIA-reportEvaluation | Unnamed

fria:FRIA-reportImpactLevel | Unnamed | fria:FRIA-report | Unnamed

```
1  PREFIX onto: <http://www.ontotext.com/>
2  PREFIX fria: <http://www.example.org/fria-report#>
3  SELECT ?s ?p ?o
4  WHERE {
5      ?s a fria:FRIA-report .
6      ?s ?p ?o .
7      FILTER(?s IN (fria:Report21, fria:FRIA-report-021))
8  }
9
```

Run

keyboard shortcuts

Table | Raw Response | Pivot Table | Google Chart

Download as

Filter query results

Showing results from 1 to 18 of 18. Query took 0.1s, moments ago.

| | s | p | o |
|---|---|---|---|
| 1 | fria:Report21 | rdf:type | fria:FRIA-report |
| 2 | fria:Report21 | fria:hasReportName | "AI Stefanie Sun (AI孙燕姿)" |
| 3 | fria:Report21 | fria:hasOrganisationPositionDescription | "" |
| 4 | fria:Report21 | fria:hasContributorDetails | "Bilibili" |
| 5 | fria:Report21 | fria:hasAssessmentContent | "AI-cloned songs in the name and voice of Singapore-based Mandopop singer Stefanie Sun have gone viral on China's most popular video platform Bilibili, raising questions about copyright and jobs in the music industry. The videos were generated by so-vits-svc fork, an open source software that enables anyone to train their own AI model to speak in any |

GraphDB

SPARQL

# FRIA-reportEvaluation11

Source: http://www.example.org/fria-report#FRIA-reportEvaluation11

subject | predicate | object | context | all

Explicit only | Show Blank Nodes | Download as | Visual graph

| | subject | predicate | object | context |
|---|---|---|---|---|
| 1 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "4 Little Trees does not explicitly communicate to students that their emotions and performance are being analyzed by an AI system." | http://www.ontotext.com/explicit |
| 2 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "7-Eleven did not adequately inform customers that their facial images were being captured and processed by an AI system for survey validation and demographic profiling." | http://www.ontotext.com/explicit |
| 3 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "7-Eleven did not provide adequate notice to customers that their facial images were being used to validate survey responses. This lack of transparency means that customers were unaware of the AI system's role in the process." | http://www.ontotext.com/explicit |
| 4 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "AWS Panorama does not explicitly communicate to employees that their actions are being monitored and analyzed by an AI system." | http://www.ontotext.com/explicit |
| 5 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "AccessiBe does not clearly communicate to users that the website's accessibility features are being provided by an AI-powered overlay, which may lead to confusion when issues arise." | http://www.ontotext.com/explicit |
| 6 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "Adobe did not clearly communicate to Adobe Stock contributors that their content was being used to train the Firefly AI model, leading to surprise and concern when the practice was discovered." | http://www.ontotext.com/explicit |
| 7 | fria:FRIA-reportEvaluation11 | fria:hasEvaluationContent | "Adobe did not clearly communicate to | http://www.ontotext.com/explicit |

# Conclusion

- Successfully find a possible way to face the need of EU AI Act.
- Developed the FRIA ontology based on the FRIA report template.
- Established the relationship with FIRA and CIDS, AIRO, VAIR.
- Explored a new way to do the Impact Assessment by using the prompt engineering with the latest LLMs.
- Discovered a way to evaluate the performance of different LLMs when facing the same context.
- **Claude 3.5 Sonnet** has better performance than the ChatGPT 4o.
- Successfully answer both the Research Question 1 and 2.

# Future Works

- Develop more relationships than now.
- Update the prompt to prevent the “lazy LLM”.
- Have some general way to automatically grab the data and update the ontology instances in server.
- Make everyone can see the result from internet.
- Make the evaluation and impact level more accurate.

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Supervisor:
Dr. David Lewis
Dr. Subrahmanyam Murala

# Thank You!

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