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| ITU Logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | | FG-AI4H-F-041 |
| **ITU-T Focus Group on AI for Health** |
| **Original: English** |
| **WG(s):** | | Plenary | | Zanzibar, 3-5 September 2019 |
| **DOCUMENT** | | | | |
| **Source:** | | WG-DAISAM Chair | | |
| **Title:** | | LS/r on request for relevant AI Use Cases ([ISO/IEC JTC1/SC42-20190531](http://ifa.itu.int/t/2017/ls/isoiecjtc1sc42/sp16-iso_iecjtc1_sc42-iLS-00003r1.zip)) [to JTC 1/SC 42] | | |
| **Purpose:** | | Discussion | | |
| **LIAISON STATEMENT** | | | | |
| **For action to:** | | | ISO/IEC JTC1 SC42 WG4 | |
| **For comment to:** | | | **‑** | |
| **For information to:** | | | ITU-T SG16 | |
| **Approval:** | | | FG-AI4H meeting (Zanzibar, 5 September 2019) | |
| **Deadline:** | | | 1 November 2019 | |
| **Contact:** | | Thomas Wiegand Chair, FG-AI4H HHI Fraunhofer, Germany | | Email: [thomas.wiegand@hhi.fraunhofer.de](mailto:thomas.wiegand@hhi.fraunhofer.de) |
| **Contact:** | | Pat Baird Chair, FG-AI4H WG-DAISAM Philips | | Email: [pat.baird@Philips.com](mailto:pat.baird@Philips.com) |

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| **Abstract:** | This reply LS provides two general use cases under consideration by the FG-AI4H to JTC 1/SC42 "Artificial Intelligence" WG4 for inclusion technical report it is preparing. |

ITU-T Focus Group on AI for health thanks JTC 1/SC 42 "Artificial Intelligence" for its LS on (our FG-AI4H-F-019, your [ISO/IEC JTC1/SC42-20190531](http://ifa.itu.int/t/2017/ls/isoiecjtc1sc42/sp16-iso_iecjtc1_sc42-iLS-00003r1.zip)). We would like to offer two use cases that are an abstraction of use cases being considered by FG-AI4H (see list at <https://itu.nt/go/fgai4h>), as found annexed to this reply.

ITU-T FG-AI4H looks forward to continued collaboration with SC42.

ANNEX A ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4 Use Case Submission Form - Symptom Assessment 2

ANNEX B ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4 Use Case Submission Form - Outbreak Detection 12

# ANNEX A ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4 Use Case Submission Form - Symptom Assessment

The quality of use case submissions will be evaluated for inclusion in the Working Group’s Technical Report based the application area, relevant AI technologies, credible reference sources (see References section), and the following characteristics:

* Data Focus & Learning: Use cases for AI system which utilizes Machine Learning, and those that use a fixed *a priori* knowledge base.
* Level of Autonomy: Use cases demonstrating several degrees (dependent, autonomous, human/critic in the loop, etc.) of AI system autonomy.
* Verifiability & Transparency: Use cases demonstrating several types and levels of verifiability and transparency, including approaches for explainable AI, accountability, etc.
* Impact: Use cases demonstrating the impact of AI systems to society, environment, etc.
* Architecture: Use cases demonstrating several architectural paradigms for AI systems (e.g., cloud, distributed AI, crowdsourcing, swarm intelligence, etc.)

1. **General**

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| --- | --- | --- | --- | --- |
| ID | (leave blank, for internal use) | | | |
| Use case name | Symptom Assessment (fictional) | | | |
| Application domain | Healthcare | | | |
| Deployment  model | Cloud services | | | |
| Status | Prototype | | | |
| Scope[[1]](#footnote-1) |  | | | |
| Objective(s)[[2]](#footnote-2) | Improve public health by early identification of disease outbreaks which lead to early interventions. | | | |
| Narrative | Short description (not more than 150 words) | As people are living longer and as the population is growing, there is a global shortage of caregivers. This shortage varies by region. One way to more efficiently use caregivers is to have patients use symptom assessment software that can prioritize | | |
| Complete description | Inputs: general patient information, presenting complaints, additional assumptions, findings, factors, attributes, free-text input to chatbot, etc.  Output: Pre-clinical triage (emergency vs. self-care), differential diagnosis, additional diagnostic tests to perform or treatment advice or explanations.  Data challenge is that patient information may be incomplete (negative evidence vs. missing evidence), doctor-specific, free text, reimbursement bias, low quality labels. | | |
| Stakeholders[[3]](#footnote-3) |  | | | |
| Stakeholders’ assets, values[[4]](#footnote-4) |  | | | |
| System’s threats & vulnerabilities[[5]](#footnote-5) |  | | | |
| Key performance indicators (KPIs) | ID | Name | Description | Reference to mentioned use case objectives |
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| AI features | Task(s) | Prediction | | |
| Method(s)[[6]](#footnote-6) |  | | |
| Hardware[[7]](#footnote-7) |  | | |
| Topology[[8]](#footnote-8) |  | | |
| Terms and concepts used[[9]](#footnote-9) |  | | |
| Standardization  opportunities/ requirements |  | | | |
| Challenges and issues |  | | | |
| Societal  Concerns[[10]](#footnote-10) | Description |  | | |
| SDGs[[11]](#footnote-11) to be achieved | Good health and well-being for people | | |

**Data (optional)**

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| Data characteristics | |
| Description |  |
| Source[[12]](#footnote-12) |  |
| Type[[13]](#footnote-13) |  |
| Volume (size) |  |
| Velocity[[14]](#footnote-14) |  |
| Variety[[15]](#footnote-15) |  |
| Variability  (rate of change)[[16]](#footnote-16) |  |
| Quality[[17]](#footnote-17) |  |

**Process scenario (optional)**

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| Scenario conditions | | | | | |
| No. | Scenario name | Scenario description | Triggering event | Pre-condition[[18]](#footnote-18) | Post-condition[[19]](#footnote-19) |
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**Training (optional)**

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| Scenario name | Training | | | | |
| Step No. | Event[[20]](#footnote-20) | Name of process/Activity[[21]](#footnote-21) | Primary actor | Description of process/activity | Requirement |
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| Specification of training data | |  | | | |

**Evaluation (optional)**

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| Scenario name | Evaluation | | | | |
| Step No. | Event[[22]](#footnote-22) | Name of process/Activity[[23]](#footnote-23) | Primary actor | Description of process/activity | Requirement |
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| Input of evaluation | |  | | | |
| Output of evaluation | |  | | | |

**Execution (optional)**

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| Scenario name | Execution | | | | |
| Step No. | Event[[24]](#footnote-24) | Name of process/Activity[[25]](#footnote-25) | Primary actor | Description of process/activity | Requirement |
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| Input of Execution | |  | | | |
| Output of Execution | |  | | | |

**Retraining (optional)**

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| Scenario name | Retraining | | | | |
| Step No. | Event[[26]](#footnote-26) | Name of process/Activity[[27]](#footnote-27) | Primary actor | Description of process/activity | Requirement |
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| Specification of retraining data | |  | | | |

**References**

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| References | | | | | | |
| No. | Type | Reference | Status | Impact on use case | Originator/organization | Link |
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Acceptable Reference Sources of Use Cases

* Peer-reviewed scientific/technical publications on AI applications (e.g. [1]).
* Patent documents describing AI solutions (e.g. [2], [3]).
* Technical reports or presentations by renowned AI experts (e.g. [4])
* High quality company whitepapers and presentations
* Publicly accessible sources with sufficient detail

***This list is not exhaustive. Other credible sources may be acceptable as well.***

Examples of credible sources:

* [1] B. Du Boulay. "Artificial Intelligence as an Effective Classroom Assistant". IEEE Intelligent Systems, V 31, p.76–81. 2016.
* [2] S. Hong. "Artificial intelligence audio apparatus and operation method thereof". N US 9,948,764, Available at: [https://patents.google.com/patent/US20150120618A1/en. 2018](https://patents.google.com/patent/US20150120618A1/en.%202018).
* [3] M.R. Sumner, B.J. Newendorp and R.M. Orr. "Structured dictation using intelligent automated assistants". N US 9,865,280, 2018.
* [4] J. Hendler, S. Ellis, K. McGuire, N. Negedley, A. Weinstock, M. Klawonn and D. Burns. "WATSON@RPI, Technical Project Review".

URL: [https://www.slideshare.net/jahendler/watson-summer-review82013final. 2013](https://www.slideshare.net/jahendler/watson-summer-review82013final.%202013).

# ANNEX B ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4 Use Case Submission Form - Outbreak Detection

The quality of use case submissions will be evaluated for inclusion in the Working Group’s Technical Report based the application area, relevant AI technologies, credible reference sources (see References section), and the following characteristics:

* Data Focus & Learning: Use cases for AI system which utilizes Machine Learning, and those that use a fixed *a priori* knowledge base.
* Level of Autonomy: Use cases demonstrating several degrees (dependent, autonomous, human/critic in the loop, etc.) of AI system autonomy.
* Verifiability & Transparency: Use cases demonstrating several types and levels of verifiability and transparency, including approaches for explainable AI, accountability, etc.
* Impact: Use cases demonstrating the impact of AI systems to society, environment, etc.
* Architecture: Use cases demonstrating several architectural paradigms for AI systems (e.g., cloud, distributed AI, crowdsourcing, swarm intelligence, etc.)

1. **General**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | (leave blank, for internal use) | | | |
| Use case name | Outbreak Detection (fictional) | | | |
| Application domain | Healthcare | | | |
| Deployment  model | Cloud services | | | |
| Status | Prototype | | | |
| Scope[[28]](#footnote-28) |  | | | |
| Objective(s)[[29]](#footnote-29) | Improve public health by early identification of disease outbreaks which lead to early interventions. | | | |
| Narrative | Short description (not more than 150 words) | Infectious disease outbreaks pose a major risk to public health; early detection of outbreaks can prompt fast interventions.   * Case data are collected by diverse surveillance systems * AI algorithms can be applied to detect aberrant case numbers based on these data collections * AI algorithms have the potential to increase the timeliness and accuracy of outbreak detection | | |
| Complete description | Use different surveillance systems for outbreak detection. Example: weekly case data of Salmonella (Germany)  S:\OE\MF1\projects\QuAI4Health\02_QuAI4Health\01_Konsortium_Meetings\03_QuAI4Health 201908xx Abschlussmeeting\Bilder\Screenshot_Signale-Bericht_Salmonellen_groß.png | | |
| Stakeholders[[30]](#footnote-30) |  | | | |
| Stakeholders’ assets, values[[31]](#footnote-31) |  | | | |
| System’s threats & vulnerabilities[[32]](#footnote-32) |  | | | |
| Key performance indicators (KPIs) | ID | Name | Description | Reference to mentioned use case objectives |
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| AI features | Task(s) | Prediction | | |
| Method(s)[[33]](#footnote-33) |  | | |
| Hardware[[34]](#footnote-34) |  | | |
| Topology[[35]](#footnote-35) |  | | |
| Terms and concepts used[[36]](#footnote-36) |  | | |
| Standardization  opportunities/ requirements |  | | | |
| Challenges and issues |  | | | |
| Societal  Concerns[[37]](#footnote-37) | Description |  | | |
| SDGs[[38]](#footnote-38) to be achieved | Good health and well-being for people | | |

**Data (optional)**

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| --- | --- |
| Data characteristics | |
| Description |  |
| Source[[39]](#footnote-39) |  |
| Type[[40]](#footnote-40) |  |
| Volume (size) |  |
| Velocity[[41]](#footnote-41) |  |
| Variety[[42]](#footnote-42) |  |
| Variability  (rate of change)[[43]](#footnote-43) |  |
| Quality[[44]](#footnote-44) |  |

**Process scenario (optional)**

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| Scenario conditions | | | | | |
| No. | Scenario name | Scenario description | Triggering event | Pre-condition[[45]](#footnote-45) | Post-condition[[46]](#footnote-46) |
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**Training (optional)**

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| Scenario name | Training | | | | |
| Step No. | Event[[47]](#footnote-47) | Name of process/Activity[[48]](#footnote-48) | Primary actor | Description of process/activity | Requirement |
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| Specification of training data | |  | | | |

**Evaluation (optional)**

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| Scenario name | Evaluation | | | | |
| Step No. | Event[[49]](#footnote-49) | Name of process/Activity[[50]](#footnote-50) | Primary actor | Description of process/activity | Requirement |
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| Input of evaluation | |  | | | |
| Output of evaluation | |  | | | |

**Execution (optional)**

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| Scenario name | Execution | | | | |
| Step No. | Event[[51]](#footnote-51) | Name of process/Activity[[52]](#footnote-52) | Primary actor | Description of process/activity | Requirement |
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| Input of Execution | |  | | | |
| Output of Execution | |  | | | |

**Retraining (optional)**

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| Scenario name | Retraining | | | | |
| Step No. | Event[[53]](#footnote-53) | Name of process/Activity[[54]](#footnote-54) | Primary actor | Description of process/activity | Requirement |
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| Specification of retraining data | |  | | | |

**References**

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| References | | | | | | |
| No. | Type | Reference | Status | Impact on use case | Originator/organization | Link |
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Acceptable Reference Sources of Use Cases

* Peer-reviewed scientific/technical publications on AI applications (e.g. [1]).
* Patent documents describing AI solutions (e.g. [2], [3]).
* Technical reports or presentations by renowned AI experts (e.g. [4])
* High quality company whitepapers and presentations
* Publicly accessible sources with sufficient detail

***This list is not exhaustive. Other credible sources may be acceptable as well.***

Examples of credible sources:

* [1] B. Du Boulay. "Artificial Intelligence as an Effective Classroom Assistant". IEEE Intelligent Systems, V 31, p.76–81. 2016.
* [2] S. Hong. "Artificial intelligence audio apparatus and operation method thereof". N US 9,948,764, Available at: [https://patents.google.com/patent/US20150120618A1/en. 2018](https://patents.google.com/patent/US20150120618A1/en.%202018).
* [3] M.R. Sumner, B.J. Newendorp and R.M. Orr. "Structured dictation using intelligent automated assistants". N US 9,865,280, 2018.
* [4] J. Hendler, S. Ellis, K. McGuire, N. Negedley, A. Weinstock, M. Klawonn and D. Burns. "WATSON@RPI, Technical Project Review".

URL: [https://www.slideshare.net/jahendler/watson-summer-review82013final. 2013](https://www.slideshare.net/jahendler/watson-summer-review82013final.%202013).

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1. The scope defines the intended area of applicability, limits, and audience. [↑](#footnote-ref-1)
2. The intention of the system; what is to be accomplished?; who/what will benefit?. [↑](#footnote-ref-2)
3. Stakeholder are those that can affect or be affected by the AI system in the scenario; e.g., organizations, customers, 3rd parties, end users, community, environment, negative influencers, bad actors, etc. [↑](#footnote-ref-3)
4. Stakeholders’ assets and values that are at stake with potential risk of being compromised by the AI system deployment – e.g., competitiveness, reputation, trustworthiness, fair treatment, safety, privacy, stability, etc. [↑](#footnote-ref-4)
5. Threats and vulnerabilities can compromise the assets and values above - e.g., different sources of bias, incorrect AI system use, new security threats, challenges to accountability, new privacy threats (hidden patterns), etc. [↑](#footnote-ref-5)
6. AI method(s)/framework(s) used in development. [↑](#footnote-ref-6)
7. Hardware system used in development and deployment. [↑](#footnote-ref-7)
8. Topology of the deployment network architecture. [↑](#footnote-ref-8)
9. Terms and concepts used here should be consistent with those defined by Working Group 1 (AWI 22989 and AWI 23053) or to be recommended for inclusion. [↑](#footnote-ref-9)
10. To be inserted. [↑](#footnote-ref-10)
11. The Sustainable Development Goals (SDGs), also known as the Global Goals, are a collection of 17 global goals set by the United Nations General Assembly. SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

    URL: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html> [↑](#footnote-ref-11)
12. Origin of data, which could be from customers, instruments, IoT, web, surveys, commercial activity, simulations, etc. [↑](#footnote-ref-12)
13. Structured/unstructured text, images, voices, gene sequences, numbers, composite: time-series, graph-structures, etc. [↑](#footnote-ref-13)
14. The rate of flow at which the data is created, stored, analysed, or visualized. Could be in real time. [↑](#footnote-ref-14)
15. Domains and types of data employed including formats, logical models, timescales, and semantics. Could be from multiple databases. [↑](#footnote-ref-15)
16. Changes in data rate, format/structure, semantics, and/or quality. [↑](#footnote-ref-16)
17. Completeness and accuracy of the data with respect to semantic content as well as syntax of the data (such as presence of missing fields or incorrect values). [↑](#footnote-ref-17)
18. Describes which condition(s) should have been met before this scenario happens. [↑](#footnote-ref-18)
19. Describes which condition(s) should prevail after this scenario happens. The post-condition may also define "success" or "failure" conditions [↑](#footnote-ref-19)
20. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-20)
21. Action verbs should be used when naming activity. [↑](#footnote-ref-21)
22. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-22)
23. Action verbs should be used when naming activity. [↑](#footnote-ref-23)
24. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-24)
25. Action verbs should be used when naming activity. [↑](#footnote-ref-25)
26. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-26)
27. Action verbs should be used when naming activity. [↑](#footnote-ref-27)
28. The scope defines the intended area of applicability, limits, and audience. [↑](#footnote-ref-28)
29. The intention of the system; what is to be accomplished?; who/what will benefit?. [↑](#footnote-ref-29)
30. Stakeholder are those that can affect or be affected by the AI system in the scenario; e.g., organizations, customers, 3rd parties, end users, community, environment, negative influencers, bad actors, etc. [↑](#footnote-ref-30)
31. Stakeholders’ assets and values that are at stake with potential risk of being compromised by the AI system deployment – e.g., competitiveness, reputation, trustworthiness, fair treatment, safety, privacy, stability, etc. [↑](#footnote-ref-31)
32. Threats and vulnerabilities can compromise the assets and values above - e.g., different sources of bias, incorrect AI system use, new security threats, challenges to accountability, new privacy threats (hidden patterns), etc. [↑](#footnote-ref-32)
33. AI method(s)/framework(s) used in development. [↑](#footnote-ref-33)
34. Hardware system used in development and deployment. [↑](#footnote-ref-34)
35. Topology of the deployment network architecture. [↑](#footnote-ref-35)
36. Terms and concepts used here should be consistent with those defined by Working Group 1 (AWI 22989 and AWI 23053) or to be recommended for inclusion. [↑](#footnote-ref-36)
37. To be inserted. [↑](#footnote-ref-37)
38. The Sustainable Development Goals (SDGs), also known as the Global Goals, are a collection of 17 global goals set by the United Nations General Assembly. SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

    URL: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html> [↑](#footnote-ref-38)
39. Origin of data, which could be from customers, instruments, IoT, web, surveys, commercial activity, simulations, etc. [↑](#footnote-ref-39)
40. Structured/unstructured text, images, voices, gene sequences, numbers, composite: time-series, graph-structures, etc. [↑](#footnote-ref-40)
41. The rate of flow at which the data is created, stored, analysed, or visualized. Could be in real time. [↑](#footnote-ref-41)
42. Domains and types of data employed including formats, logical models, timescales, and semantics. Could be from multiple databases. [↑](#footnote-ref-42)
43. Changes in data rate, format/structure, semantics, and/or quality. [↑](#footnote-ref-43)
44. Completeness and accuracy of the data with respect to semantic content as well as syntax of the data (such as presence of missing fields or incorrect values). [↑](#footnote-ref-44)
45. Describes which condition(s) should have been met before this scenario happens. [↑](#footnote-ref-45)
46. Describes which condition(s) should prevail after this scenario happens. The post-condition may also define "success" or "failure" conditions [↑](#footnote-ref-46)
47. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-47)
48. Action verbs should be used when naming activity. [↑](#footnote-ref-48)
49. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-49)
50. Action verbs should be used when naming activity. [↑](#footnote-ref-50)
51. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-51)
52. Action verbs should be used when naming activity. [↑](#footnote-ref-52)
53. The event that triggers the step. This might be completion of the previous event. [↑](#footnote-ref-53)
54. Action verbs should be used when naming activity. [↑](#footnote-ref-54)