ISO/IEC JTC 1 SC 42 Artificial Intelligence – Working Group 4

Use Case Submission Form

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	AI solution to help mobile phone to have better picture effect	
Application domain	Mobility	
Deployment model	Hybrid or other (please specify)	
Status	In operation	
Scope[1]	Better understanding the image and improving image effect on smartphone by using DL model which is trained in the cloud or offline.	
Objective(s)[2]	To find an efficient solution to Increase camera image quality on smartphone without Increasing too much operation and power burden for mobile phone.	
Narrative	Short description (not more than 150 words)	An AI solution was developed that could increase smartphone camera image quality. Using deep learning, smartphone can Identify more scenarios and objects than before. Based on the identified scenarios and objects, smartphone can better understand the image and improve image effect.
	Complete description	At present, there are 1.4 billion smart phone shipments in the world every year. Photography is one of the most important functions of smart phones. The industry has been trying to improve the picture quality of mobile phone photography. It hopes to reach even the quality of the professional SLR camera. The traditional image processing algorithm is currently facing the ceiling, many

[1] The scope defines the intended area of applicability, limits, and audience.

[2] The intention of the system; what is to be accomplished?; who/what will benefit?.

		scenes traditional algorithms can not be used, just because the effect is very poor. Deep learning algorithm provides a turning point for solving the above problems. By using the AI solution, smartphones can better "understand" the pictures they take. Based on the deep learning algorithm, the smart phone can analyze the shooting scene in real time and intelligently identify various scenes in the shooting process, such as blue sky, flowers, green plants, night view, snow scene, etc. And the smart phone can also intelligently detect the shooting objects in the scene. Base on scene recognition and object detection ,the smartphone can automatically adjust and set parameters for different pictures, so as to get better photo effects. Now the mobile phone can recognize 100 kinds of scenes and can reach hundreds in the future. By using the depth learning algorithm, the mobile phone can now detect the 20 types of subjects, and the future can be detected by hundreds of subjects. Object detection can be used for SmartZoom (auto focus on targets), and portrait segmentation can be used for background blur or light efficiency.		
Stakeholders[3]	mobile phone manufacturer、end users、third party testing and evaluation agency			
Stakeholders' assets, values[4]	Competitiveness			
System's threats & vulnerabilities[5]	new privacy threats (hidden patterns).			
Key performance indicators (KPIs)	ID	Name	Description	Reference to mentioned use case objectives
	1	MIoU(Mean Intersection over Union)	The intersection of prediction area and actual area divided by the union of the predicted area and the actual area. Ideal target is 100%.	Improve accuracy
	2	FAR(false acceptance rate)	Negative samples are identified as positive samples /	Improve accuracy

[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.

[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.

[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.

			Total number of negative samples.The low FAR, the more smartphone will get correct scenes and objects	
AI features	Task(s)	Recognition		
	Method(s)[6]	Deep learning		
	Hardware[7]	NPU、GPU、CPU etc.		
	Topology[8]	No Need		
	Terms and concepts used[9]	Deep learning, "Understand"		
Standardization opportunities/ requirements	The standardized content includes: 1) the format of training picture data; 2) the format of deep learning model generated offline or cloud, which will be transplanted to smart phones; 3) the platform to support the transplanted model in the smart phone; 4) API which can be used by others applications, such as: picture classification, security.			
Challenges and issues	Challenges: Achieve the same level as professional SLR camera for pictures. Issues: 1) Lack of data for certain scene; 2) Lack of computing ability on terminal side； 3）Users can feel the improvement of image quality, but may not know that it is brought by AI.			
Societal Concerns[10]	Description	For the wrong object detection, it may lead to racial prejudice or privacy protection problems.		
	SDGs[11] to be achieved	Industry, Innovation, and Infrastructure		

[6] AI method(s)/framework(s) used in development.
[7] Hardware system used in development and deployment.
[8] Topology of the deployment network architecture.
[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.
[10] To be inserted.
[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

Data (optional)

Data characteristics	
Description	Annotated pictures
Source[12]	Public picture library /Self collection picture library /Web crawling pictures /Automatic synthesis of pictures
Type[13]	Picture format supported by a training platform and smart phone
Volume (size)	
Velocity[14]	
Variety[15]	Single source
Variability (rate of change)[16]	
Quality[17]	

[12] Origin of data, which could be from customers, instruments, IoT, web, surveys, commercial activity, simulations, etc.
[13] Structured/unstructured text, images, voices, gene sequences, numbers, composite: time-series, graph-structures, etc.
[14] The rate of flow at which the data is created, stored, analysed, or visualized. Could be in real time.
[15] Domains and types of data employed including formats, logical models, timescales, and semantics. Could be from multiple databases.
[16] Changes in data rate, format/structure, semantics, and/or quality.
[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).

Process scenario (optional)

Scenario conditions					
No.	Scenario name	Scenario description	Triggering event	Pre-condition[18]	Post-condition[19]

[18] Describes which condition(s) should have been met before this scenario happens.

[19] Describes which condition(s) should prevail after this scenario happens. The post-condition may also define "success" or "failure" conditions

Training (optional)

Scenario name	Training				
Step No.	Event[20]	Name of process/Activity[21]	Primary actor	Description of process/activity	Requirement

Specification of training data	

[20] The event that triggers the step. This might be completion of the previous event.
[21] Action verbs should be used when naming activity.

Evaluation (optional)

Scenario name	Evaluation				
Step No.	Event[22]	Name of process/Activity[23]	Primary actor	Description of process/activity	Requirement

Input of evaluation	
Output of evaluation	

[22] The event that triggers the step. This might be completion of the previous event.
[23] Action verbs should be used when naming activity.

Execution (optional)

Scenario name	Execution				
Step No.	Event[24]	Name of process/Activity[25]	Primary actor	Description of process/activity	Requirement

Input of Execution	
Output of Execution	

[24] The event that triggers the step. This might be completion of the previous event.
[25] Action verbs should be used when naming activity.

Retraining (optional)

Scenario name	Retraining				
Step No.	Event[26]	Name of process/Activity[27]	Primary actor	Description of process/activity	Requirement

Specification of retraining data	

[26] The event that triggers the step. This might be completion of the previous event.
[27] Action verbs should be used when naming activity.

References

References						
No.	Type	Reference	Status	Impact on use case	Originator/organization	Link

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.
— [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.