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	Improving conversion rates and RoI (Return on Investment) with AI technologies	
Application domain	Digital marketing	
Deployment model	On-premise systems	
Status	In operation	
Scope[1]	Utilizing AI technologies in digital marketing	
Objective(s)[2]	1) help the operation team identify new business scenarios and seize more market opportunities, 2) increase conversion rate and marketing effectiveness, 3) improve user experience by providing individually customized services	
Narrative	Short description (not more than 150 words)	Personalized digital marketing has become increasingly important in response to the needs of providing different services to different consumers. The combination of big data and AI algorithms is the core of personalized digital marketing. By modeling user preferences, we can predict the services that users may be interested in, improve marketing effectiveness and enhance user experience.
	Complete description	With the economic development, consumers are more emphatic about self-personality. Digital Marketing has also begun to focus more on the consumer's personality instead of the commonality. Personalized digital marketing has become increasingly important in response

[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?.

<table>
<tr><td></td><td></td><td colspan="4">to the needs of providing different services to different consumers.

The combination of big data and AI algorithms is the core of personalized digital marketing. By modeling user preferences, we can predict the services that users may be interested in, improve marketing effectiveness and enhance user experience. There are three main parts of personalized marketing technology: 1) Audience Targeting: Forecasting people who may be interested in the marketing activities, focusing on high-conversion probability populations to increase conversion rates; 2) Smart subsidy: Different marketing subsidies for different users to achieve higher conversion rates at lower cost ;3. Personalized Recommendation: Predict user preferences for services or items, and recommend to users what they are most likely to be interested in, to increase conversion rates.

Through the application of AI technology, personalized digital marketing has achieved very significant results: the predicted population's conversion rates has achieved more than 30% improvement; in subsidy scenario it has achieved a cost reduction of more than 10% while the 2% increase in conversion rate; in the coupon recommendation scenario, the conversion rate has been improved by more than 70%.</td></tr>
<tr><td>Stakeholders[3]</td><td colspan="5">Third-party payment companies, end users, merchants</td></tr>
<tr><td>Stakeholders' assets, values[4]</td><td colspan="5">User experience, digital marketing RoI, conversion rate, marketing cost</td></tr>
<tr><td>System's threats & vulnerabilities[5]</td><td colspan="5">Abuse of personal information, Falsified or dirty data</td></tr>
<tr><td rowspan="3">Key performance indicators (KPIs)</td><td>ID</td><td>Name</td><td colspan="2">Description</td><td>Reference to mentioned use case objectives</td></tr>
<tr><td></td><td>Conversion rate</td><td colspan="2">the percentage of users who accept the marketing (e.g., clicks) out of the total number of visitors</td><td>To increase the conversion rate</td></tr>
<tr><td></td><td>RoI</td><td colspan="2">RoI=conversion_rate*(1-k*cost)
k is the cost impact factor and</td><td>To increase the marketing effectiveness</td></tr>
</table>

[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.

			it can be adjusted to get higher conversion rate or lower cost	
AI features	Task(s)	Audience Targeting, Smart Pricing, Personalized Recommendation		
	Method(s)[6]	Machine learning, Deep learning		
	Hardware[7]			
	Topology[8]			
	Terms and concepts used[9]	Attribution Analysis, Fatigue control, Smart Pricing, Off-line Batch Computation, OLAP Analysis		
Standardization opportunities/ requirements	• Technical framework of AI-enabled digital marketing system • Guidelines for collecting, storing and handling of digital marketing data • Guidelines for applying AI technology to digital marketing			
Challenges and issues	• How to collect, utilize and protect user information within the scope of what is permitted by relevant national and regional legislation and regulations • How to let the system evolve and improve continuously with applying new AI models and algorithms ……			
Societal Concerns[10]	Description	For Users: enjoy better service at a lower cost For Merchants: Increase profits and decrease costs For Cities and communities: Promote economic prosperity and develop green economy		
	SDGs[11] to be achieved	Sustainable cities and communities		

[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	sample and feature data of marketing campaign
Source[12]	Customers
Type[13]	Log Text
Volume (size)	~500GB/day
Velocity[14]	Stream and batch
Variety[15]	Device information, location information, conversion information (clicks, transactions), active level
Variability (rate of change)[16]	Subject to digital marketing effort (Festival, on sale)
Quality[17]	Vary (depending on position of data collection and data reflow mechanism)

[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]
1	Training				
2	Evaluation				
3	Execution				
4	Retraining				

[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
1	Journal		Published online	implementation	Ant Financial Services Group	https://martech.alipay.com

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.