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|  | Moving Picture, Audio and Data Coding by Artificial Intelligencewww.mpai.community |

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| M129 | 2021/01/08 |
| Source | Communication AC |
| Title | AI-based Data Coding Standardization |
| Target | MPAI Members |

Use of technologies based on Artificial Intelligence (AI) is extending to diverse applic­ations yielding one of the fastest-grow­ing markets in the data analysis and service sector. However, AI is developing more slowly than necessary because it lacks operational reference standards compar­able to those that have propelled digital media. Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) has identified data coding as a promising area for standardisation.

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|  | MPAI considers the “AI module” (AIM) and its inter­faces as the AI building block. The syn­tax and sem­antics of interfaces determine *what* AIMs should per­form, not *how*. AIMs can be implemented in hard­ware or software, with AI, Machine Learn­ing or legacy Data Proces­sing (DP).  |
|  | The AIM is part of the MPAI “Emotion Enhan­ced Speech” Use Case where AI is used to add the desired emotion to an em­ot­ion-less speech. The Emotion Know­ledge Base (KB) may be absent if the relevant knowledge is moved to a neural network in the Speech analysis AIM. |

So far, MPAI has collected some fifteen Use Cases spanning in the following categories: Context-based Audio Enhancement; Multi­modal Conver­sation; AI-Enhanced Video Cod­ing; Compression and Under­standing of Financial Data; Integrative Gen­omic/Sensor Analysis; and Server-based Predictive Multiplayer Gam­ing. The first two areas are about to issue Calls for Technologies.

AIMs need a proper environment to enable creation, execution, com­pos­ition and update of AIM-based work­flows. The MPAI-AI Framework (AIF) is the envir­onment for building potentially high-com­plexity sol­utions intercon­nec­ting multi-vendor AIMs trained for spec­ific tasks and exchanging data encoded in standard formats via stan­dard interfaces.

MPAI has issued a Call for Technologies to develop the MPAI-AIF standard. Called-for tech­nologies should support a set of requirements, including the following:

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| 1. ML/legacy DP life cycles (Single AIM)
	1. instantiate-configure- start-suspend-stop-renove
	2. dump/retrieve internal state | enforce resource limits
2. ML/legacy DP life cycles (Multiple AIMs)
	1. Initialise | instantiate-remove-config­ure AIMs
	2. configure interfaces in manual-automatic-dynamic-adaptive ways
	3. 1- and 2-way signal for workflow initialisation and control, communic­ation and security policies between AIMs
 | 1. Machine learning
	1. train-retrain-update AIMs
	2. auto-configure/reconfigure ML-based computational models
	3. dynamic update of ML models
	4. support supervised, unsupervised and reinfor­cement-based learning paradigms
2. Workflows
	1. hierarchical execution of work­flows
	2. computational graphs, such as Direct Acyclic Graph
	3. AIM topologies synchronised accor­ding to time base & full ML life cycles
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MPAI is mindful of Intellectual Property Rights (IPR)-related problem accompanying high-tech standardisation. Unlike standards developed by other bodies, which are based on vague and con­tention-prone Fair, Reasonable and Non-Discriminatory (FRAND) declarations, MPAI standards are based on Framework Licences that set out in advance agreed guidelines for the IPR holders.