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|  | Moving Picture, Audio and Data Coding by Artificial Intelligence  www.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 |

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.