Doc T-20/6

REPORT OF TOPIC CHAIRMAN
PRODUCTION TOPIC AREA

Topic Chairman : **Kazim PEKTAS - TRT**
Period of Report : **March 2020 to November 2020**
Date of Report : **25 November 2020**

A total of five projects are under the Production Topic Area, as below.

1. **Radio & Television Archiving including Metadata for International Programme Exchange (P/RTA)**
2. **Ultra High Definition TV (P/UHDTV)**
3. **Systems for people with special needs (P/SN)**
4. **IT-based Production System and file-based workflows (P/ITPS)**
5. **Big Data, Personalisation and Artificial Intelligence (P/BDAI)**

For this reporting period (March 2020 to November 2020) we have received two new contributions from the project, **(P/BDAI)**. The following is the compilation of these two updates reports from the Project Manager of (P/BDAI) and some other information related to the Production Topic Area that may be helpful.

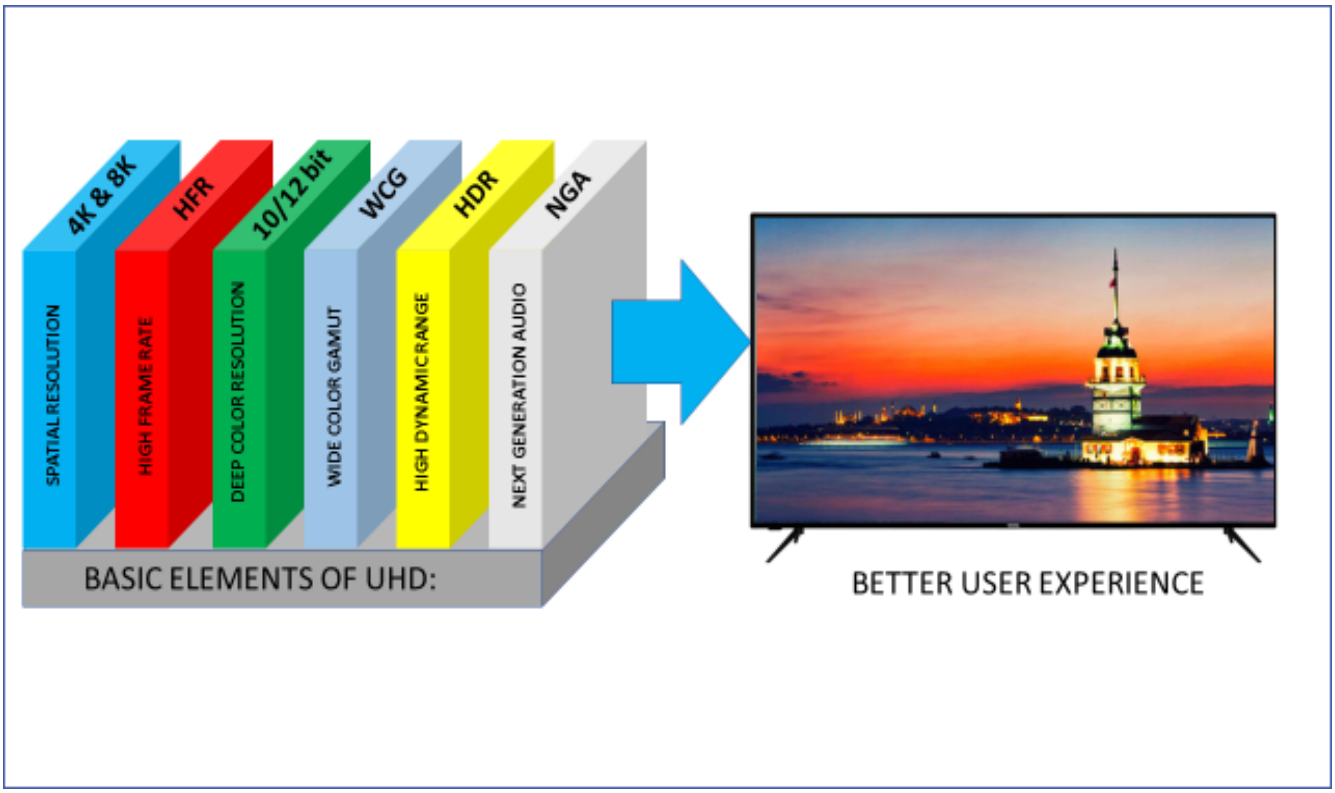
REPORTS FROM PROJECT MANAGERS IN TOPIC ON PRODUCTION:

1. Project P/UHDTV (Ultra High Definition TV)

We have not received any reports from projects and we kindly have added some updates from EBU Reports that are related to P/UHDTV project.

As we know UHD ecosystem is based on six fundamental subjects to offer better viewing and listening experience for our audience.

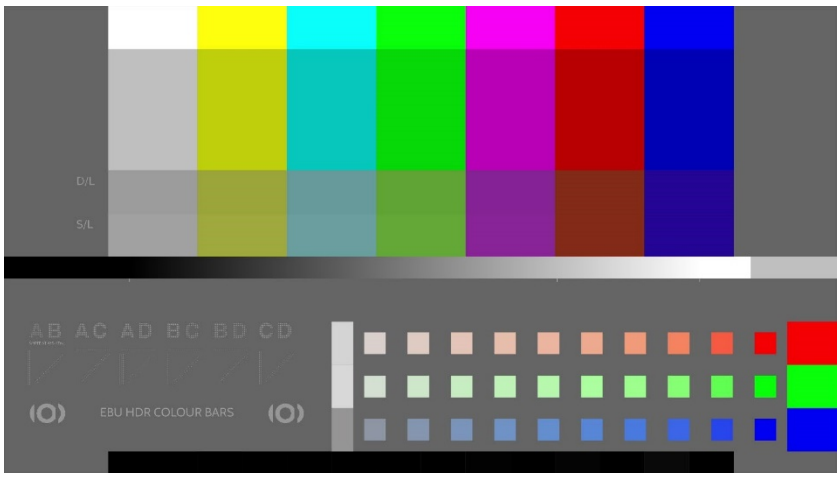
- High Pixel Number
- High Frame Rate
- High Color Resolution
- Wide Color Gamut
- High Dynamic Range
- Next Generation Audio



EBU has published a new technical document that describes color bars for use in the production of hybrid log gamma.

TECH 3373 Version 1.0
Colour bars for use in the production of hybrid log gamma (HDR) UHDTV

This document defines a test pattern for use in creating UHDTV video signals. It contains tests for UHDTV, UHDTV to HDTV conversion, measuring luminance response, visualising saturation and hue shifts caused by monitoring equipment, checking correct installation of SMPTE ST 425-5:2019 (Quad 3G-SDI 2 sample Interleaving) equipment and near-black performance. It should NOT be used for setting the brightness control of a reference monitor.

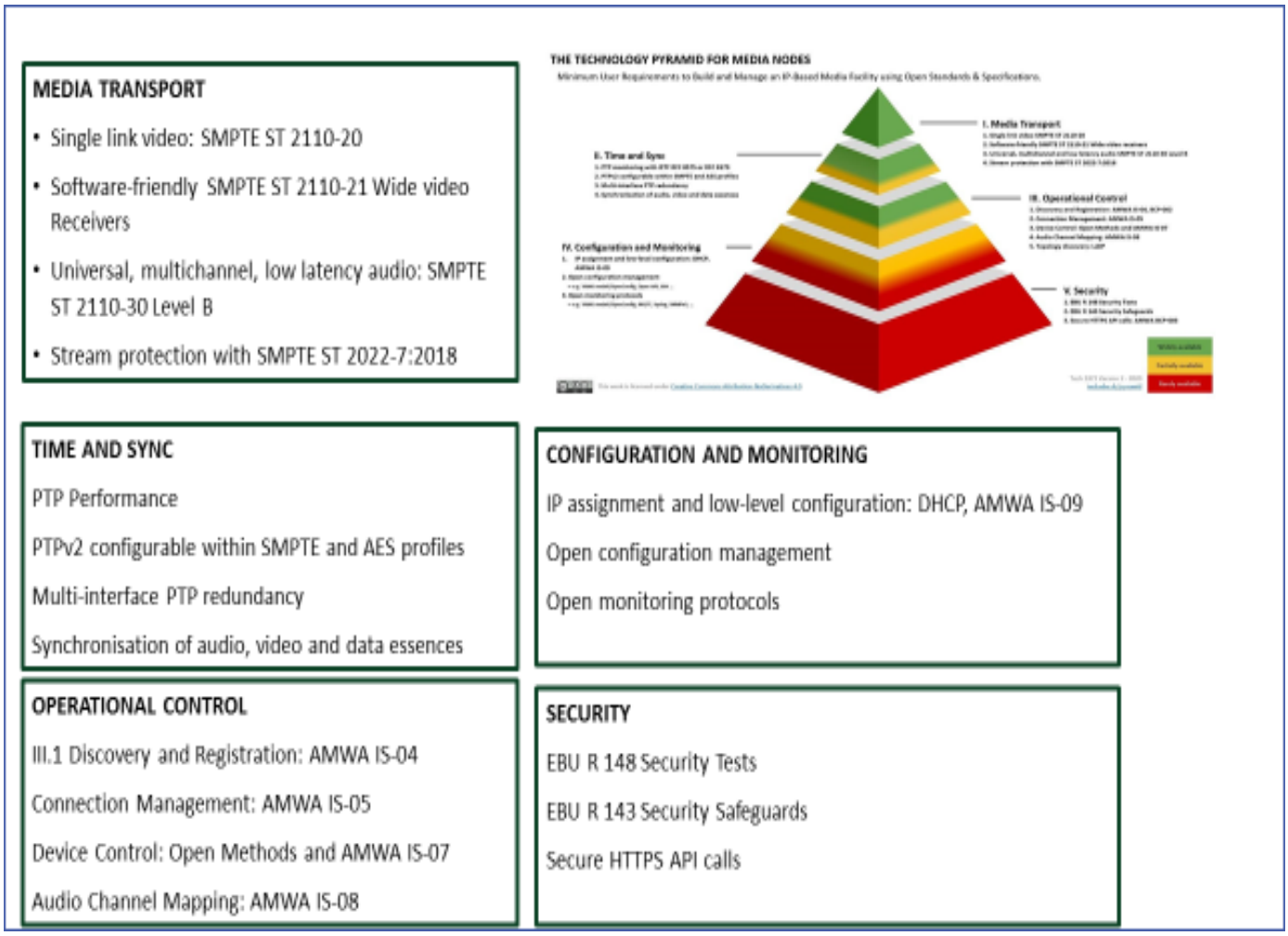


Another document from EBU is about HDR with HDTV video systems. In most cases HDR is thought as a part of UHDTV but we know HDR productions can be done with HDTV formats also. **EBU Tech 3375** describes best practice guidelines for signalling and transport of HDR and wide color gamut(WCG) video over 3G SDI interfaces. The use of HDR is not tied to the 2160p/50 image format. HDR can also be used with 1080p/50 or 1080p/25 (Mainly used for documentary or film content).

- Signalling of HDR/WCG 1080p/50 using single link 3G-SDI
- Signalling of HDR/WCG 1080p/25 using single link HD-SDI
- 10-bit transparent infrastructures
- Additional signalling in the VANC, based on SMPTE ST 2108
- General recommendations for the transport of 1080p/50 HDR signals over 3G SDI

2. IT-based Production System and file-based workflows (P/ITPS)

All of us are familiar with EBU Technology Pyramid For Media Nodes. EBU has published revised version of **EBU Tech 3371**. This document describes "Minimum user requirements to build and manage IP based media facility using open standarts and specfications.



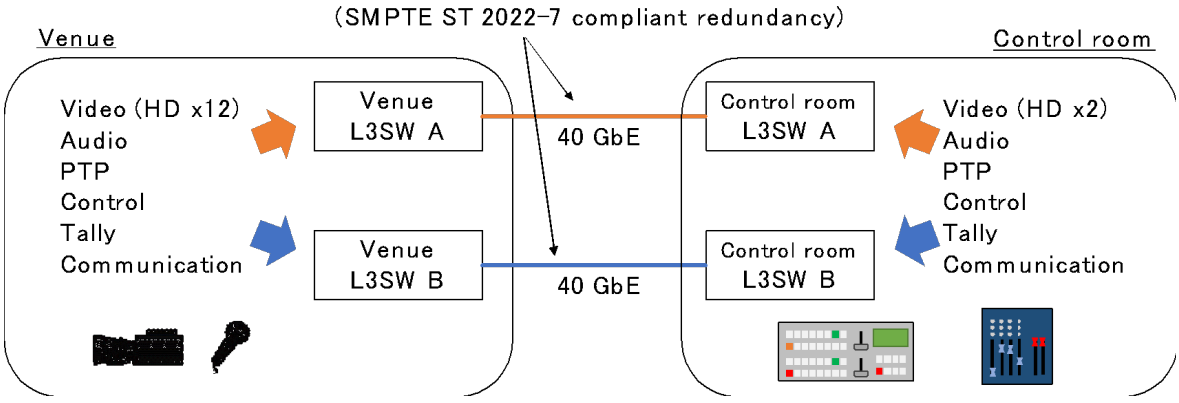
Remote production in NHK - update

NHK examined a large-scale remote production for live program of the 2020 Peace Memorial Ceremony in Hiroshima. It transmitted 12 HD videos and multichannel audio from a venue to a control room and enabled to operate video switch and audio mix in the control room. The signals were replicated and transmitted via two 40 GbE links for redundancy in a compliant manner with the SMPTE 2022-7.

In remote production, we need to pay attention to communication between the venue and the control room, therefore, we set up a camera in the control room to share a situation in the control room with the staffs in the venue. This facilitated smooth communication.

Several advantages were also obtained by remote production as follows;

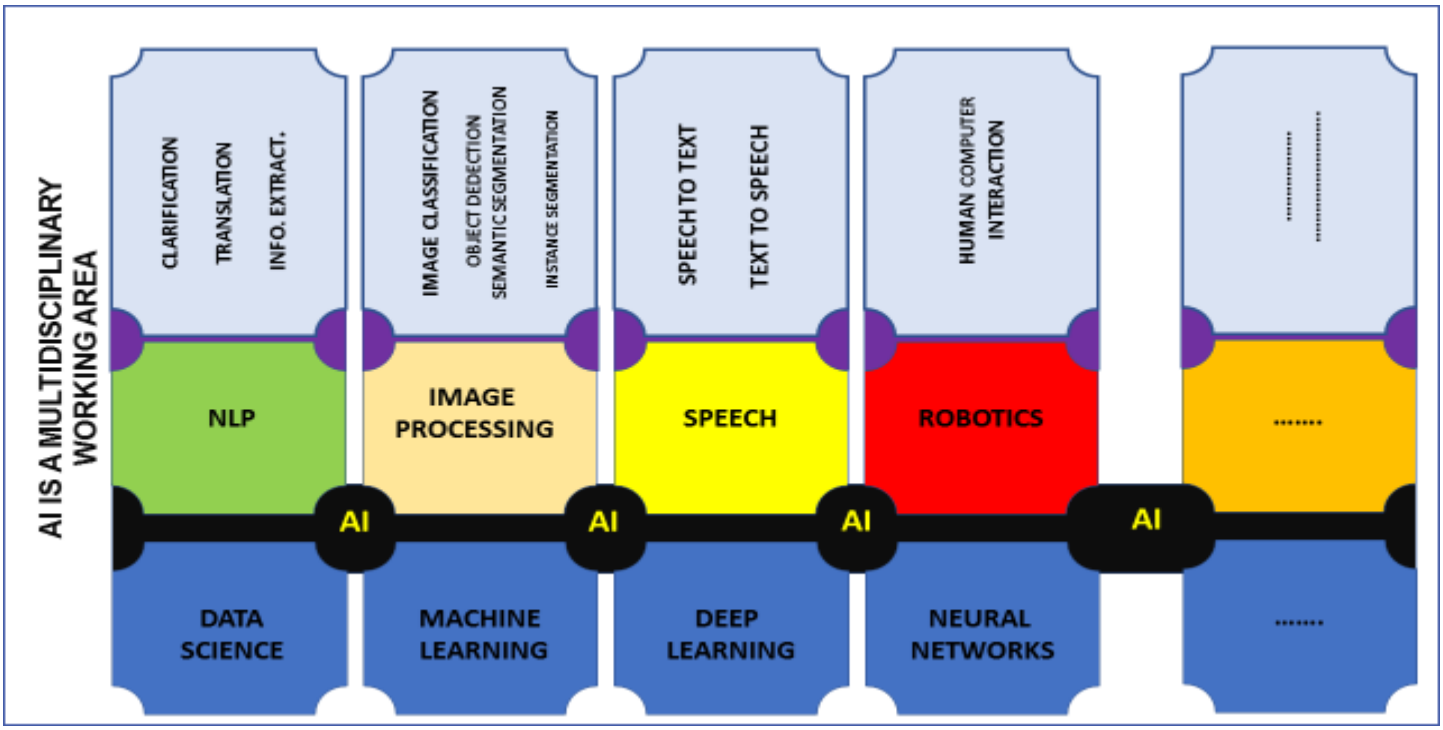
- Remote production was effective to avoid three Cs (Closed spaces, Crowded places, and Close-contact settings) to reduce the risk of COVID-19 infection.
- Remote production was able to reduce the number of the staffs in the venue from 42 to 32.
- Since existing production facilities in the control room which had higher performance than those in OB van could be used, the quality of the program was improved.



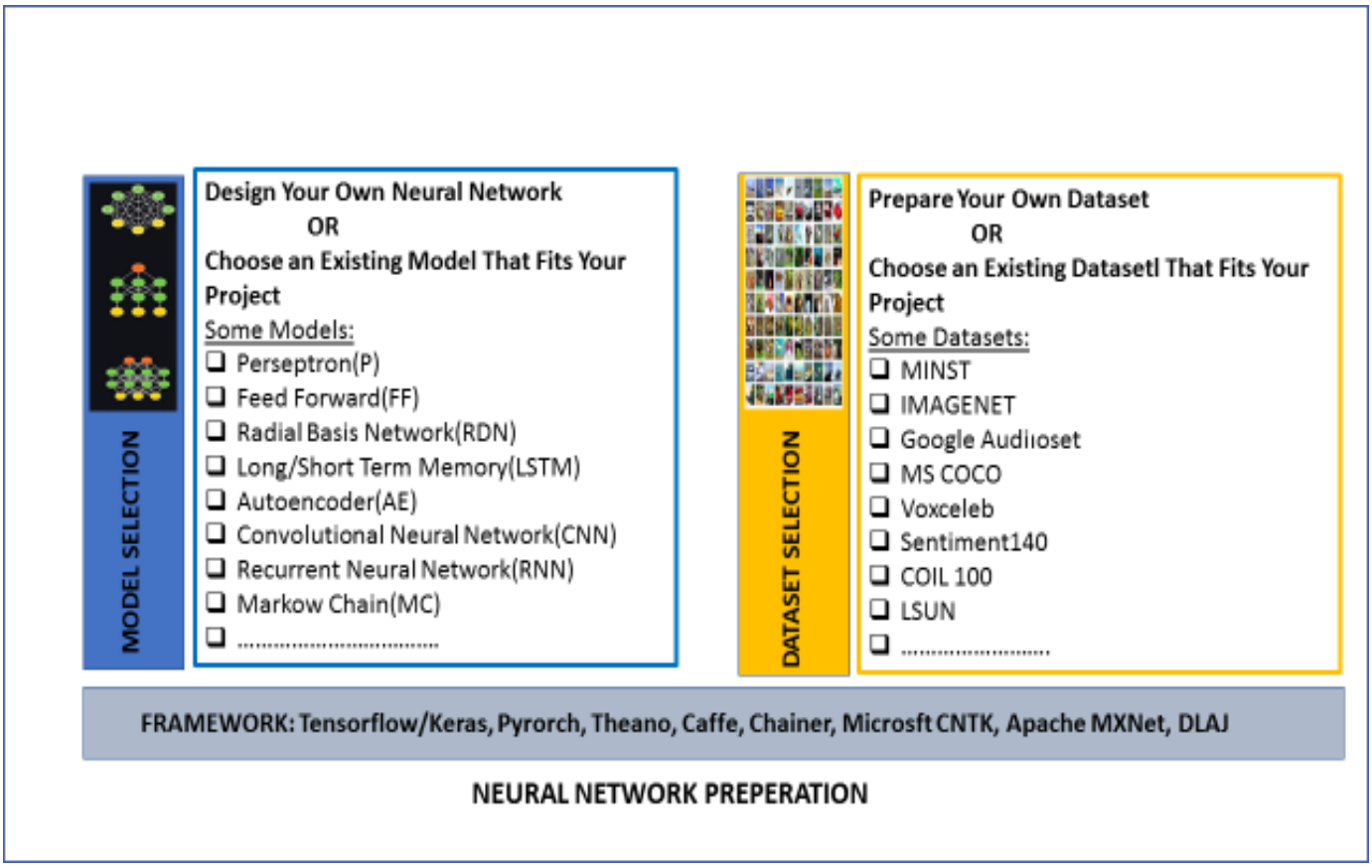
System configuration of remote production
for 2020 Peace Memorial Ceremony in Hiroshima

3. *Project P/BDAI (Big Data, Personalization and Artificial Intelligence)*

We see that artificial intelligence will touch every aspect of business in every industry. In broadcasting, AI is already an integral part of day to day operation. When we want to build an AI bases audio/video project we integrate AI science with NLP, speech, image processing and many other related fields. Data science, machine learning, deep learning, artificial neural networks are all subset of AI. We have not written what we can do with AI, because if we know the tools, opportunities which AI offers/provides, we can build what we dream. It just depends on our imaginations.



We want to give a little bit about artificial neural networks(ANN). When we start a deep learning project with ANN we may create/design our own ANN model or we choose an existing model that fits our goal. Every model has its own processing approach. For instance, if we want to make a image classification AI application, convolutional neural networks may be powerful. After model selection we need a dataset to train and test our ANN. We may create a dataset or choose from existing datasets. Here we have put some of the ANN models, datasets we can choose and available frameworks that we can work on.



We prepare our dataset, we ingest it to our model and we train the model with the data from the dataset that we choose and we use some part of dataset to test our model. If the test outs are satisfactory we can now use our ANN with real world data.

We have received two contributions, one from NHK and the other from KBS.

NHK has been developing a commentary generation system using live sports data. They introduced the method of generating sports commentary in 2019 IEEE International Symposium on Broadband Multimedia Systems and Broadcasting.
Conference: 2019 IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)

Title: Generation of Automated Sports Commentary from Live Sports Data
Summary:
They have developed a method of generating “automated sports commentary” that conveys an objective situation with synthesized speech based on live sports data. Their method can be applied to a wide variety of sports events by preparing “commentary templates” for each of them. The results of a subjective assessment demonstrated that the automated sports commentary generated with our method is effective for helping listeners understand the game situation. In addition, a public live streaming with the automated commentary showed that our proposed method can provide practical service for live sports broadcasting.

KBS has been implementing a celebrity face recognition AI for video metadata generation. They introduced the process of implementation and performance enhancement in 2020 IBC Conference.
Conference: 2020 IBC(International Broadcasting Convention)
Title: Implementation of a Celebrity Face Recognition AI for Video Metadata Generation

Summary:
Face recognition performance has shown significant improvement thanks to deep learning. They implemented a face recognition AI using our customized dataset composed of mostly Korean celebrity faces designed for the content analysis of KBS. Bothersome dataset labeling process was enhanced by using MTCNN face detection and face clustering. Inception-ResNet v1 model was used and test set accuracy was measured with

respect to iterations. They compared the model with a commercial cloud-based celebrity recognition AI with which our celebrity database is thought to have about 26% in common. In the experiment, their model showed better performance in the precision.
Information: https://www.ibc.org/technical-papers/implementation-of-a-celebrity-face-recognition-ai-for-video-metadata-generation/6765.article