DESIGN ASSURANCE REQUIREMENTS

DM - DATA MANAGEMENT

REQUIREMENT	SOURCE
DM1 - Operational domain identification • **DM1.1** - Identify the input space and its distribution • **DM1.2** - Define a list of explicit and interpretable operating parameters	CoDANN 6.2.1 CoDANN 6.2.7

DM2 - Data quality characteristics
• **DM2.1 - Accuracy** - Ensure that the following errors are minimized:
  ○ **DM2.1.a** - Capture error,
  ○ **DM2.1.b** - Single source error,
  ○ **DM2.1.c** - Labeling errors.
	CoDANN 6.2.2
	CoDANN 6.2.3

• **DM2.2 - Resolution** - Based upon its intended use	CoDANN 6.2.2
• **DM2.3 - Assurance level/Digital error protection** - Ensure that the data is not corrupted while stored or in transit.	CoDANN 6.2.2 CoDANN 6.2.5

• **DM2.4 - Traceability** - Ensure ability to determine the origin of each data item during the data collection and data annotation phases:
  ○ **DM2.4.a** - Link to higher level requirements,
  ○ **DM2.4.b** - Description of collection protocols
  ○ **DM2.4.c** - Recording information (date and location…),
  ○ **DM2.4.d** - Annotation information,
  ○ **DM2.4.e** - Description of sata transformation steps.
	CoDANN 6.2.2
	CoDANN 6.2.4
	CoDANN 6.2.6

• **DM2.5 - Timeliness** - Ensure that the data is applicable to the period of intended use.	CoDANN 6.2.2

• **DM2.6 - Completeness**
  ○ **DM2.6.a** - Define an input distribution discriminator (D),
  ○ **DM2.6b** - Define an out-of-distribution dataset,
  ○ **DM2.6.c** - Demonstrate that D is close to 1 for the training, validation and test datasets and close to 0 for the out-of-distribution dataset.
	CoDANN 6.2.2
	CoDANN 6.2.7
	CoDANN 6.2.8
	CoDANN 6.2.10

• **DM2.7 - Format** - Ensure that, when loaded into the end application, the data can be interpreted in a way consistent with its intent.	CoDANN 6.2.2
DM3 - Independence • **DM3.1** - Prepare the training/validation and test datasets independently. • **DM3.2** - Ensure that the test dataset is not accessed during design phase until the Learning process verification phase.	CoDANN 6.2.9
DM4 - Bias and variance • **DM4.1** - Evaluate the bias and variance inherent to the data.	CoDANN 6.1

LPM - LEARNING PROCESS MANAGEMENT

REQUIREMENT	SOURCE

LPM1 - Training algorithm definition
• **LPM1.1** - Select/validate/justify key elements of the training algorithm:
  ○ **LPM1.1.a** - Activation function,
  ○ **LPM1.1.b** - Loss function,
  ○ **LPM1.1.c** - Initialization strategy,
  ○ **LPM1.1.d** - Training hyperparameters
	CoDANN 6.1

LPM2 - Training Environment • **LPM2.1** - Define/record training environment configuration	CoDANN 6.1
LPM3 - Validation/Verification metrics • **LPM3.1** - Select and justify metrics to be used for the validation and verification phases	CoDANN 6.1

MT - MODEL TRAINING

REQUIREMENT	SOURCE
MT1 - Model training • **MT1.1** - Execute the training algorithm in the conditions defined in **LPM1** and **LPM2**, using the training dataset.	CoDANN 6.1

MT2 - Model validation
• **MT2.1** - Validate the model using the validation dataset in terms of:
  ○ **MT2.1.a** - Performance,
  ○ **MT2.1.b** - Biais,
  ○ **MT2.1.c** - Variance.
	CoDANN 6.1

MT3 - Training phase verification • **MT3.1 - Convergence -** Demonstrate adequate converge using training curves. • **MT3.2 - Reproducibility and replicability -** Demonstrate training algorithm stability.	CoDANN 6.3 CoDANN 6.4.1

LPV - LEARNING PROCESS VERIFICATION

REQUIREMENT	SOURCE

LPV1 - Model verification
• **LPV1.1** - Verify the operation of the model using the test dataset in terms of:
  ○ **LPV1.1.a** - Performance,
  ○ **LPV1.1.b** - Bias,
  ○ **LPV1.1.c** - Variance.
	CoDANN 6.1
	CoDANN 6.4

MI - MODEL IMPLEMENTATION

REQUIREMENT	SOURCE
MI1 - Transformation/Optimization • **MI1.1** - Identify inference hardware features that could affect model behaviour/performance. • **MI1.2** - Identify any transformation/optimization requirements and assess their impact on the model properties. • **MI1.3** - Define/record transformation/optimisation environnement configuration.	CoDANN 6.1

IMV - INFERENCE MODEL VERIFICATION

REQUIREMENT	SOURCE
IMV1 - Model properties preservation • **IMV1.1** - Verify that the model properties have been preserved and explain the differences (if any).	CoDANN 6.1
IMV2 - Inference model behaviour verification • **IMV2.1** - Evaluate the inference model using the test dataset and verify that it behaves adequately. • **IMV2.2**- Compare the evaluation metrics of the trained model and of the inference model and explain the differences (if any).	CoDANN 6.1