IDTA 02058-1-0 Artificial Intelligence Dataset

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SPECIFICATION

Submodel Template of the Asset Administration Shell

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1 General

1.1 About this document

This document is a part of a specification series. Each part specifies the contents of a Submodel template for the Asset Administration Shell (AAS). The AAS is described in [1], [2], [3] and [6]. First exemplary Submodel contents were described in [4], while the actual format of this document was derived by the "Administration Shell in Practice" [5]. The format aims to be very concise, giving only minimal necessary information for applying a Submodel template, while leaving deeper descriptions and specification of concepts, structures and mapping to the respective documents [1] to [6].

The target group of the specification are developers and editors of technical documentation and manufacturer information, which are describing assets in smart manufacturing by means of the Asset Administration Shell (AAS) and therefore need to create a Submodel instance with a hierarchy of SubmodelElements. This document especially details on the question, which SubmodelElements with which semantic identification shall be used for this purpose.

1.2 Scope of the Submodel

This Submodel template aims at interoperable provision of information describing a dataset and meta information about it in regard to the asset of the respective Asset Administration Shell. Central element is the provision of properties [7], ideally interoperable by the means of dictionaries such as ECLASS and IEC CDD (Common Data Dictionary). The purpose of this document is to make selected specifications of Submodels in such manner that information about assets can be exchanged in a meaningful way between partners in a value creation network. It aims to provide detailed information about a dataset used in AI context. This includes additional service information (the person responsible for the dataset).

The intended use-case is the provision of a standardized property structure for datasets used to train AI, which enables a standardized way to describe datasets.

This concept can serve as a basis for standardizing the respective Submodel. The conception is based on existing norms, studies of common practices at enterprises, directives and standards so that a far-reaching acceptance can be achieved.

1.3 Relevant standards for the Submodel template

According to [3], interoperable properties might be defined by standards, consortium specifications or manufacturer specifications. So called property dictionaries are used identify information elements (see Terms and Definitions of [6]). Such property dictionaries include:

- ECLASS, see: https://www.eclasscontent.com/
- IEC CDD, see: https://cdd.iec.ch/cdd/iec61987/iec61987.nsf and https://cdd.iec.ch/cdd/iec62683/cdddev.nsf

In this document, properties are aimed to be described by ECLASS.

2 Information set for Submodel Dataset

2.1 Approach

While defining Submodels the following three aspects must be considered as suggested in [5]:

2.1.1 Use and economic relevance

The Submodel Artificial Intelligence (AI) Dataset is designed for every AI application that uses datasets. Its use case attends to document datasets and allows an easier reuse of existing datasets, because of standardized access to additional meta information. Meta Information is for example the environment conditions in which the data was created.

It assists with communication within a development process, because of the assignment of a person responsible for each dataset. Therefore, a Machine Learning (ML) expert can contact the dataset expert (responsible person) directly for additional information.

Further a generic example use case is introduced. The AI Dataset Submodel provides information of the dataset location. In addition to the dataset location, other additional information is stored in the AAS Submodel. On the one hand, static parameters should be stored, such as the mean value or the median. On the other hand, information on the data format (e.g. PNG for image files) should be stored. Furthermore, information on labels, if available, shall be stored. Apart from data based directly on the training data, influencing factors in the application should also be covered. In particular, environmental conditions that can affect sensors should be mentioned here. Parameters would, for example, be the air humidity or the air temperature. Alongside the direct and indirect influences, service information must be recorded when a dataset is first created. These deal with the creator of the data and assign a direct unique ID to the data. Additional the date of creation of the dataset is registered and a responsible person for the dataset is defined.

2.1.2 Possible functions and interactions

The Submodel “AI Dataset” provides information from a dataset. Data scientists, AI experts can use the Submodel to obtain information about the dataset. Data scientists can select data for AI training based on metrics provided by the Submodel. Experts may be interested in the Submodel in order to investigate cases of damage and to draw conclusions about the cause. In addition, the Submodel provides information about a contact person and thus enables an easy exchange between user and creator, assisting the work of Data scientists.

The SMC "Labeled" contains information about the labelled data. The two children (SMC “Classification” and SMC “Regression”) of SMC “Labeled” are designed in such a way that a distinction is made between classification and regression data. This enables the characteristic mapping of the special features of both areas without reducing the freedom of the user. For example, both SMCs allow the upload of a single annotation file or multiple individual annotation files with additional meta-information.

The mandatory SMC "SizeInformation" contains information about the complete data set size. Furthermore, additional information about e.g. the training data size can be given. The SMC "MetaData" enables the user to store metadata. Depending on the type of data (image, audio,...), domain-specific meta information is stored in each case by a different child SMC. Information that cannot be assigned to a specific domain should be stored in the SMC "AdditionalInformation".

In order to be able to compare data sets with each other, there is the SMC "Metrics", which makes it possible to save various metrics of the dataset. For an overview of when the dataset has been used, there is the SMC "History". For each model trained with this dataset, a separate SMC must be created in SMC History containing the access period and the reference to the SMC "ModelNameplate".

In the creation of datasets, there are influencing factors that cannot be measured directly, but which affect the informative value of a dataset. The SMC "BoundaryConditions" has been created to take these influencing factors into account. One identified influencing factor is all data collectors (e.g. sensors). These are collected in the SMC "DataCollectors", whereby each data collector receives its own SMC and existing AAS of the data collectors are referenced. A second identified influencing factor is environmental conditions, which are stored in the SMC "EnvironmentConditions", if they are not directly measured by a sensor but represent necessary background information for the dataset.

2.1.3 Property specification

See section 3 Submodel and Collections.

3 Submodel and collections

3.1 Properties of the Submodel “AIDataset”

Table for attributes look like this. Please remember to use the table descriptions.

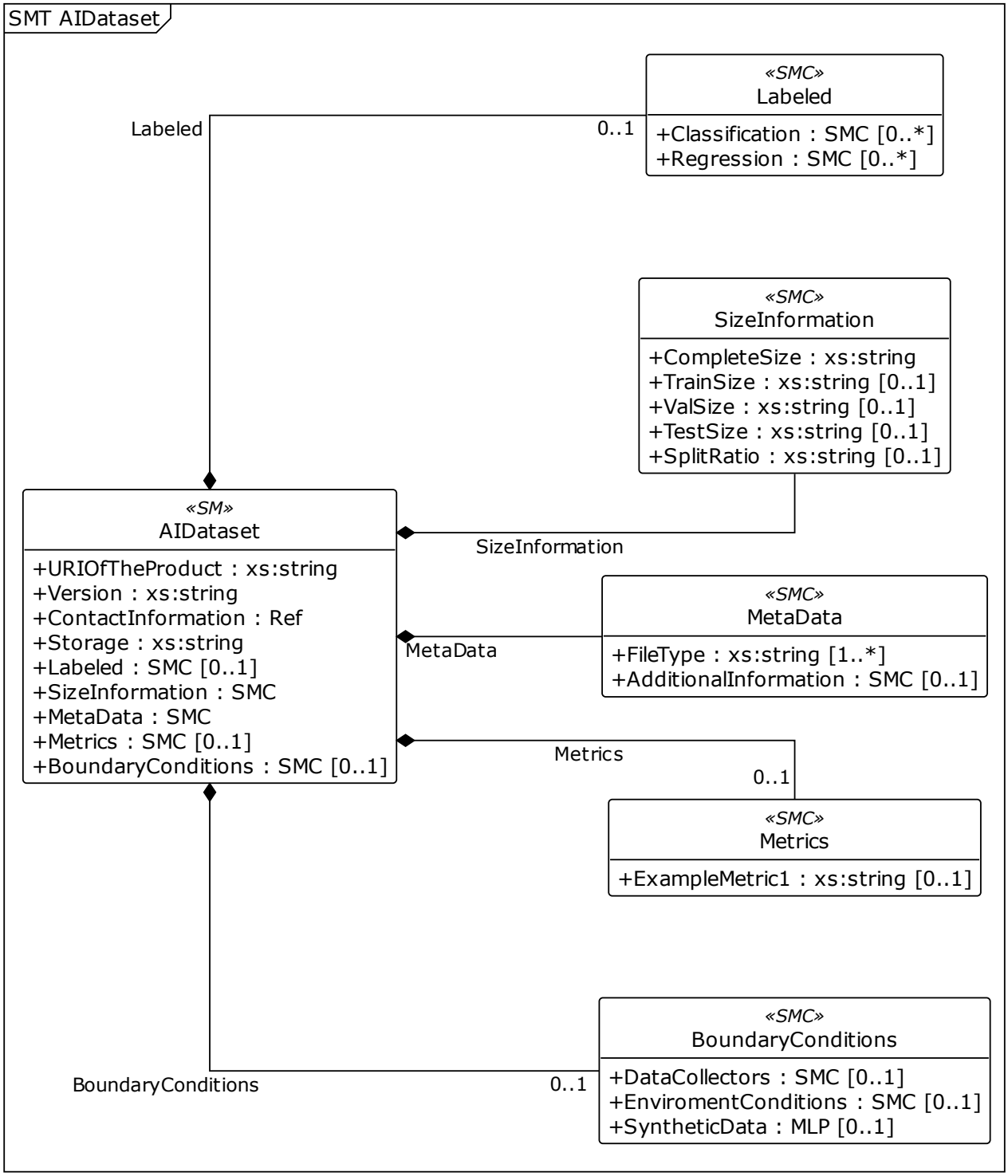

Figure 1: UML Diagram for Submodel "AIDataset"

Table 1: Properties of Submodel "AIDataset"

idShort:	AIDataset		
Class:	Submodel		
semanticId:	[IRI] https://admin-shell.io/idta/SubmodelTemplate/AIDataset/1/0		
Parent:	AAS		
Explanation:	Categories and Information of the aidataset@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] URIOfTheProduct	[IRDI] 0112/2///61987#ABN590#002 unique global identification of the product instance using an universal resource identifier (URI)	[String] https://www.example.com/search?q=AIDataset	[1]
[Prop] Version	[IRDI] 0173-1#02-AAS354#002 Version of the dataset	[String] 1.0	[1]
[Ref] ContactInformation	[IRI] https://admin-shell.io/idta/AIDataset/ContactInformation/1/0 Reference to the Contact Information IDTA Submodel to describe the responsible person for the submodel	[-]	[1]
[Prop] Storage	[IRI] https://admin-shell.io/idta/AIDataset/Storage/1/0 Path to the dataset (e.g. local path, serverpath,...)	[String] C:\Users\user\Desktop\Data\Images	[1]
[SMC] Labeled	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/1/0 Additional Information for labeled Datasets	[-] 2 elements	[0..1]
[SMC] SizeInformation	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformation/1/0 Collection about the number of dataset elements in the dataset and subsets	[-] 5 elements	[1]
[SMC] MetaData	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/1/0 Collection of meta data information about the dataset	[-] 2 elements	[1]
[SMC] Metrics	[IRI] https://admin-shell.io/idta/AIDataset/Metrics/1/0 Collection of different metrics	[-] 1 elements	[0..1]
[SMC] BoundaryConditions	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/1/0 Boundary conditions in which the dataset was created	[-] 3 elements	[0..1]

3.2 Properties of the SMC “Labeled”

Table 2: Properties of SMC "Labeled"

idShort:	Labeled		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/1/0		
Parent:	SM AIDataset		
Explanation:	Additional Information for labeled datasets@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Classification	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/1/0 Information about labeled data for classification	[-] 5 elements	[0..*]
[SMC] Regression	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/1/0 Information about labeled data for regression	[-] 3 elements	[0..*]

3.2.1 Properties of SMC "Classification"

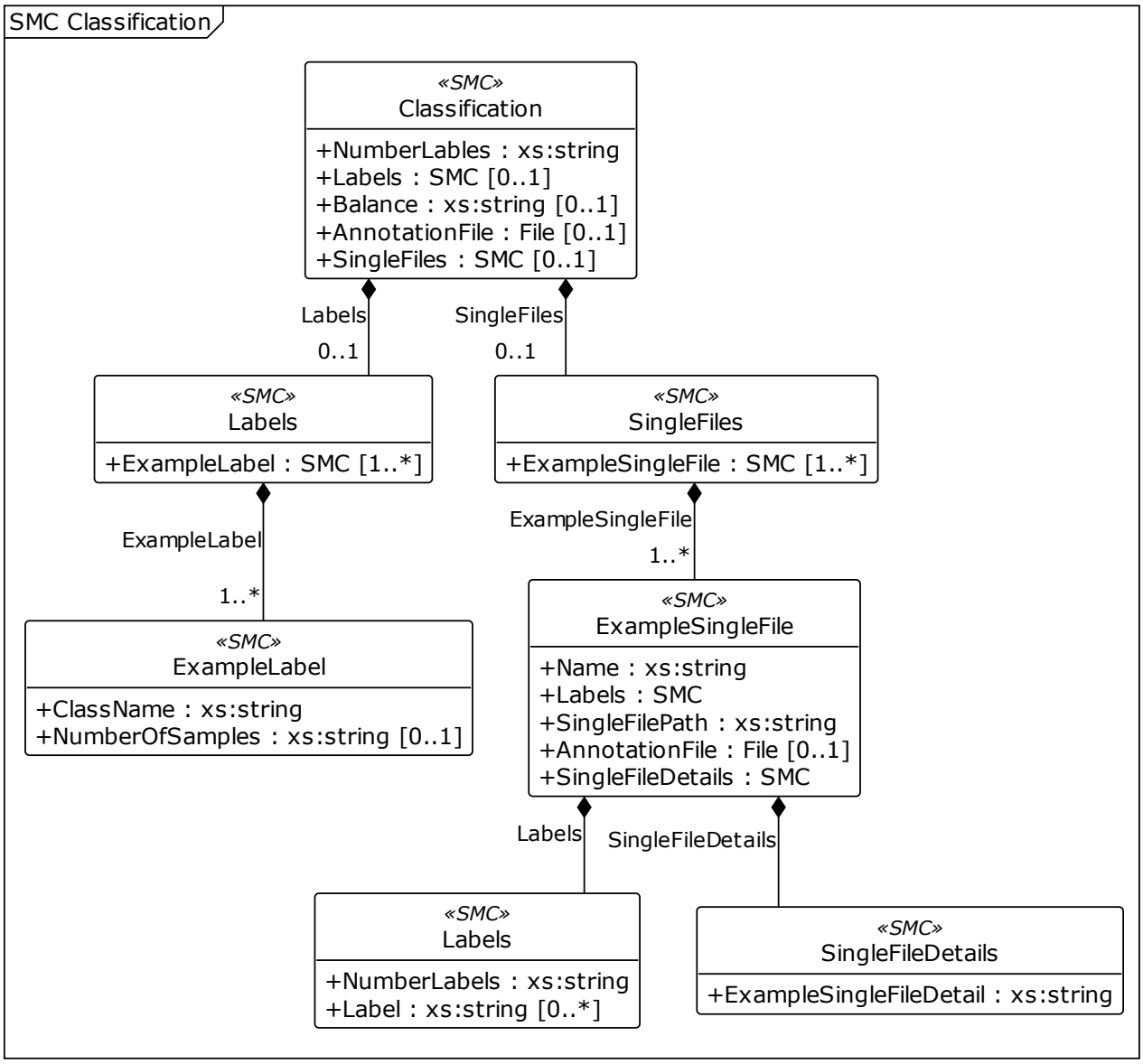

Figure 2: UML Diagram of SMC "Classification"

Table 3: Properties of SMC "Classification"

idShort:	Classification		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/1/0		
Parent:	SMC Labeled		
Explanation:	Information about labeled data for classification@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] NumberLables	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/NumberLabels/1/0 Number of the different labels in the dataset	[String] 2	[1]
[SMC] Labels	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/1/0 Every label as a property and the number of samples	[-] 1 elements	[0..1]

[Prop] Balance	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Balance/1/0 Balance between the classes	[String] 2.95:1	[0..1]
[File] AnnotationFile	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/AnnotationFile/1/0 Annotation file of the dataset (e.g. CSV,JSON,Path...)	[-]	[0..1]
[SMC] SingleFiles	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/1/0 Collection containing every dataset element individuallly	[-] 1 elements	[0..1]

Table 4: Properties of SMC "Labels"

idShort:	Labels		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/1/0		
Parent:	SMC Classification		
Explanation:	Every label as a property and the number of samples@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] ExampleLabel	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/Label/1/0 Additional information about one label	[-] 2 elements	[1..*]

Table 5: Properties of SMC "ExampleLabel"

idShort:	ExampleLabel		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/Label/1/0		
Parent:	SMC Labels		
Explanation:	Additional information about one label@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] ClassName	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/Label/ClassName/1/0 Name of the class	[String] Human	[1]
[Prop] NumberOfSamples	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/Labels/Label/NumberOfSamples/1/0 Number of occurrences of the label in the dataset	[String] 1586	[0..1]

Table 6: Properties of SMC "SingleFiles"

idShort:	SingleFiles		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/1/0		
Parent:	SMC Classification		
Explanation:	Collection containing every dataset element individuallly@en		
[SME type]	**semanticId**	**[valueType]**	**card.**

idShort	Description@en	example	
[SMC] ExampleSingleFile	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/1/0 Collection for features and the annotatin file for a single dataset element	[-] 6 elements	[1..*]

Table 7: Properties of SMC "ExampleSingleFile"

idShort:	ExampleSingleFile		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/1/0		
Parent:	SMC SingleFiles		
Explanation:	Collection for features and the annotatin file for a single dataset element.@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] Name	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/Name/1/0 Name of the file	[String]	[1]
[SMC] Labels	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/Labels/1/0 Collection containing all the labels within the dataset element	[-] 2 elements	[1]
[Prop] SingleFilePath	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/SingleFilePath/1/0 Path to the dataset element	[String]	[1]
[File] AnnotationFile	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/AnnotationFile/1/0 Annotation file with labeling information about the dataset element	[-]	[0..1]
[SMC] SingleFileDetails	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/SingleFileDetails/1/0 Collection to add addtional information about the dataset element (e.g. speaker information for audio data)	[-] 1 elements	[0..1]

Table 8: Properties of SMC "Labels"

idShort:	Labels		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/Labels/1/0		
Parent:	SMC ExampleSingleFile		
Explanation:	Collection containing all the labels within the dataset element@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] NumberLabels	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/Labels/NumberLabels/1/0	[String]	[1]

	Number of labels in this dataset element		
[Prop] Label	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/Labels/Label/1/0 Example label, this property should be existing for every label with the labelname as value	[String]	[0..*]

Table 9: Properties of SMC "SingleFileDetails"

idShort:	SingleFileDetails		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/SingleFileDetails/1/0		
Parent:	SMC ExampleSingleFile		
Explanation:	Collection to add addtional information about the dataset element (e.g. speaker information for audio data)@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] ExampleSingleFileDetail	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Classification/SingleFiles/SingleFile/SingleFileDetails/SingleFileDetail/1/0 additional information about the dataset element	[String]	[1]

3.2.2 Properties of SMC "Regression"

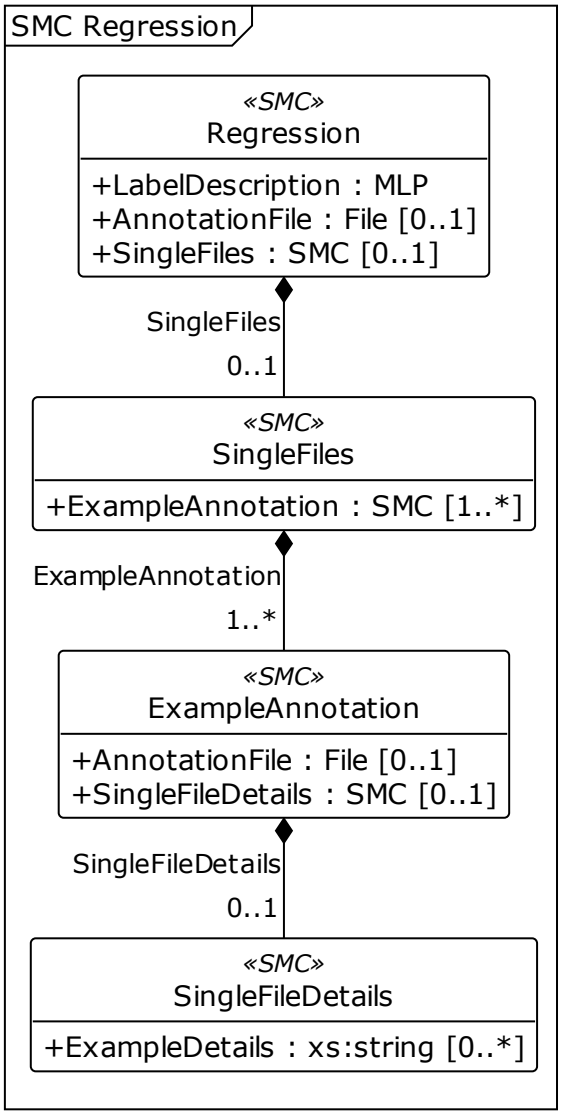

Figure 3: UML Diagram of SMC "Regression"

Table 10: Properties of SMC "Regression"

idShort:	Regression		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/1/0		
Parent:	SMC Labeled		
Explanation:	Information about labeled data for regression@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[MLP] Labeledescription	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/Labeledescription/1/0 The meaning of the label	[-] @en	[1]
[File] AnnotationFile	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/AnnotationFile/1/0 Annotation file of the labeled data	[-]	[0..1]
[SMC] SingleFiles	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/1/0 Collection containing every dataset element individually	[-] 1 elements	[0..1]

Table 11: Properties of SMC "SingleFiles"

idShort:	SingleFiles		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/1/0		
Parent:	SMC Regression		
Explanation:	Collection containing every dataset element individually@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] ExampleAnnotation	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/1/0 Collection for a single annotation of a dataset element	[-] 2 elements	[1..*]

Table 12: Properties of SMC "ExampleAnnotation"

idShort:	ExampleAnnotation		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/1/0		
Parent:	SMC SingleFiles		
Explanation:	Collection for a single annotation of a dataset element@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[File] AnnotationFile	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/AnnotationFile/1/0 Annotation file with labeling information about the dataset element	[-]	[0..1]
[SMC] SingleFileDetails	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/SingleFileDetails/1/0 Collection to add addtional information about the dataset element	[-] 1 elements	[0..1]

Table 13: Properties of SMC "SingleFileDetails"

idShort:	SingleFileDetails		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/SingleFileDetails/1/0		
Parent:	SMC ExampleAnnotation		
Explanation:	Collection to add addtional information about the dataset element@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] ExampleSingleFileDetail	[IRI] https://admin-shell.io/idta/AIDataset/Labeled/Regression/SingleFiles/Annotation/SingleFileDetails/Detail/1/0 This is a property for a specific metainformation for single regressionfiles	[String]	[0..*]

3.3 Properties of SMC “SizeInformation”

Table 14: Properties of SMC " SizeInformation"

idShort:	SizeInformation		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformation/1/0		
Parent:	SMC AIDataset		
Explanation:	Collection about the number of dataset elements in the dataset and subsets@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] CompleteSize	[IRI] https://admin-shell.io/idta/AIDataset//SizeInformation/CompleteSize/1/0 Number of all dataset elements in the dataset	[String] 4647	[1]
[Prop] TrainSize	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformation/TrainSize/1/0 Number of all dataset elements in the training subset	[String] 3138	[0..1]
[Prop] ValSize	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformationValSize/1/0 Number of all dataset elements in the validation subset	[String] 348	[0..1]
[Prop] TestSize	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformation/TestSize/1/0 Number of all dataset elements in the test subset	[String] 1161	[0..1]
[Prop] SplitRatio	[IRI] https://admin-shell.io/idta/AIDataset/SizeInformation/SplitRatio/1/0 Splitratio between the sets, notate as value1:value2:value3 if all three exist, else value1:value2	[String] 68:7:25	[0..1]

3.4 Properties of SMC “MetaData”

Table 15: Properties of SMC "MetaData"

idShort:	MetaData		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/1/0		
Parent:	SMC AIDataset		
Explanation:	Collection of meta data information about the dataset@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] FileType	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/FileType/1/0 File type of the dataset elements (e.g. .WAV, .JPEG, ...)	[String] JPEG	[1]
[SMC] AdditionalInformation	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/AdditionalInformation/1/0 Collection of additional meta information of the dataset	[-] 1 elements	[0..1]

Table 16: Properties of SMC AdditionalInformation"

idShort:	AdditionalInformation		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/AdditionalInformation/1/0		
Parent:	SMC Metadata		

Explanation:	Collection of additional meta information of the dataset@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[MLP] ExampleInfo	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/AdditionalInformation/Info/1/0 Meta data information of the dataset	[-] @en	[1..*]

3.5 Properties of SMC “Metrics”

Table 17: Properties of SMC "Metrics"

idShort:	Metrics		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/Metrics/Metric/1/0		
Parent:	SMC AIDataset		
Explanation:	Collection of different metrics@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] ExampleMetric	[IRI] https://admin-shell.io/idta/AIDataset/MetaData/Metrics/Metric/1/0 metric of the dataset	[String] 109.51215518	[0..1]

3.6 Properties of SMC “BoundaryCondtitions”

Table 18: Properties of SMC "BoundaryConditions"

idShort:	BoundaryConditions		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/1/0		
Parent:	SMC AIDataset		
Explanation:	Boundary conditions in which the dataset was created@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] DataCollectors	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/DataCollectors/1/0 Information about the datacollector (e.g. a sensor)	[-] 1 elements	[0..1]
[SMC] EnvironmentConditions	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/EnviromentConditions/1/0 Collection about environmental conditions the dataset was created with	[-] 1 elements	[0..1]
[MLP] SyntheticData	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/SyntheticData/1/0 Information, if the dataset is synthetic, real or mixed	[-] real@en	[0..1]

Table 19: Properties of SMC "DataCollectors"

idShort:	DataCollectors
Class:	SubmodelElementCollection
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/DataCollectors/1/0
Parent:	SMC BoundaryConditions

Explanation:	Information about the Datacollector (e.g. a sensor)@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Ref] Collector	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/DataCollectors/CollectorDescription/1/0 Reference to the data collector	[-]	[0..*]

Table 20: Properties of SMC "EnviromentConditions"

idShort:	EnvironmentConditions		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/EnviromentConditions/1/0		
Parent:	SMC BoundaryConditions		
Explanation:	Collection about environmental conditions the dataset was created with@en		
[SME type]	**semanticId**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Prop] ExampleCondition	[IRI] https://admin-shell.io/idta/AIDataset/BoundaryConditions/EnviromentConditions/Condition/1/0 Condition about the environment	[String]	[0..1]

Annex A. Explanations on used table formats

1. General

The used tables in this document try to outline information as concise as possible. They do not convey all information on Submodels and SubmodelElements. For this purpose, the definitive definitions are given by a separate file in form of an AASX file of the Submodel template and its elements.

2. Tables on Submodels and SubmodelElements

For clarity and brevity, a set of rules is used for the tables for describing Submodels and SubmodelElements.

- The tables follow in principle the same conventions as in [5].
- The table heads abbreviate 'cardinality' with 'card'.
- The tables often place two informations in different rows of the same table cell. In this case, the first information is marked out by sharp brackets [] form the second information. A special case are the semanticIds, which are marked out by the format: (type)(local)[idType]value.
- The types of SubmodelElements are abbreviated:

SME type	SubmodelElement type
Property	Property
MLP	MultiLanguageProperty
Range	Range
File	File
Blob	Blob
Ref	ReferenceElement
Rel	RelationshipElement
SMC	SubmodelElementCollection

- If an idShort ends with '__00__', this indicates a suffix of the respective length (here: 2) of decimal digits, in order to make the idShort unique. A different idShort might be choosen, as long as it is unique in the parent's context.
- The Keys of semanticId in the main section feature only idType and value, such as: [IRI]https://admin-shell.io/vdi/2770/1/0/DocumentId/Id. The attributes "type" and "local" (typically "ConceptDescription" and "(local)" or "GlobalReference" and (no-local)") need to be set accordingly; see [6].
- If a table does not contain a column with "parent" heading, all represented attributes share the same parent. This parent is denoted in the head of the table.
- Multi-language strings are represented by the text value, followed by '@'-character and the ISO 639 language code: example@EN.
- The [valueType] is only given for Properties.

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