Overview

- EMMA
  - Origin
  - Architecture and Design

- SWEMMA (SmartWeb EMMA)
  - Extensions (Proposed to MMI WG, Subgroup EMMA)
    - Results
    - Status
    - Oov
    - Turn-id
  - Use in SmartWeb
EMMA Evolution

MultiModal Markup Language

M3L

Smartkom partner Philips represents M3L Consortium at EMMA Consortium: time stamps, process number

Worldwide Web Consortium Standard (W3C)

EMMA Evolution

Extensible Multimodal Annotation Markup Language

EMMA 1.0

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EMMA Evolution

EMMA
Extensible Multimodal Annotation Markup Language

EMMA 1.0

M3L

EMMA Consortium:
- time stamps, process number
- Worldwide Web Consortium Standard (W3C)

EMMA in RDF/S

SWEMMA

EMMA X.X

DFKI: Worldwide first coding of EMMA in Semantic Web Language RDF/S

DFKI represents SmartWeb by EMMA Consortium

EMMA – Some Keywords

- EMMA (Extensible MultiModal Annotation markup language)
  W3C Working Draft 16 September 2005 (work in progress)

- produced as part of the W3C Multimodal Interaction Activity (MultiModal Interaction Working Group, subgroup EMMA)

- The general purpose of EMMA is to represent information automatically extracted from a user's input by an interpretation component, where input is to be taken in the
  - general sense of a meaningful user input
  - in any modality supported by the platform.

- Can be used for
  - Dialog Management.
  - Multimodal Interaction annotation
EMMA – Root, Interpretations, Lattices

- **emma:emma**: The root element of an EMMA document. Contains interpretations, container elements or derivations.

- **emma:interpretation**: acts as a wrapper for application instance data. It holds a single interpretation represented in application specific markup, or a single emma:lattice element.

```xml
<emma:emma version="1.0"
xmlns:emma="http://www.w3.org/2003/04/emma"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.w3.org/2003/04/emma http://www.w3.org/TR/emma/emma10.xsd"
xmlns="http://www.example.com/example">
  <emma:interpretation id="r1">
    ...
  </emma:interpretation>
</emma:emma>
```
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- **emma:lattice**: (emma:arc, emma:node) compact representation of large lists of possible recognition results or interpretations for speech, pen, or multimodal inputs.

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xsi:schemaLocation="http://www.w3.org/2003/04/emma http://www.w3.org/TR/emma/emma10.xsd"
xmlns="http://www.example.com/example">
  <emma:interpretation id="r1">
  ...
  </emma:interpretation>
</emma:emma>
```

---

**EMMA – Container Elements**

- **emma:one-of** (*disjunktion*): a container for a collection of one or more interpretation or container elements (mutually exclusive).

- **emma:group** (*conjunction*): used to indicate that the contained interpretations are from distinct user inputs that are related in some manner.

- **emma:sequence** (*enumeration*): groups of inputs in temporal order.
EMMA – Processing History

Instances of interpretations are in general derived from other instances of interpretation in a process that goes from raw data to increasingly refined representations of the input.

- **emma:derivation**: used to link any two interpretations that are related by representing the source and the outcome of an interpretation process.
- **emma:derived-from**: provides a reference to the interpretation which the element it appears on was derived from.

```xml
<emma:emma version="1.0"
  xmlns:emma="http://www.w3.org/2003/04/emma"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.w3.org/2003/04/emma
  http://www.example.com/emma10.xsd"
  xmlns="http://www.example.com/example">
  <emma:derivation>
    <emma:interpretation id="raw">
      <answer>From Boston to Denver tomorrow</answer>
    </emma:interpretation>
    <emma:interpretation id="better">
      <emma:derived-from resource="#raw" composite="false"/>
      <origin>Boston</origin>
      <destination>Denver</destination>
      <date>tomorrow</date>
    </emma:interpretation>
    <emma:interpretation id="best">
      <emma:derived-from resource="#better" composite="false"/>
      <origin>Boston</origin>
      <destination>Denver</destination>
      <date>20030315</date>
    </emma:interpretation>
  </emma:derivation>
</emma:emma>
```

EMMA - Attributes

- **Reference to processing**
  - emma:process
  - emma:no-input
  - emma:signal
  - emma:uninterpreted
  - emma:lang
  - emma:tokens

- **Multimodality**
  - emma:media-type
  - emma:medium
  - emma:mode

- **Time stamps**
  - emma:start
  - emma:end
  - emma:time-ref-uri
  - emma:time-ref-anchor-point
  - emma:offset-to-start
  - emma:duration

- **Metadata**
  - emma:endpoint-role
  - emma:endpoint-address
  - emma:port-type
  - emma:port-num
  - emma:message-id
  - emma:service-name
  - emma:endpoint-pair-ref
SWEMMA - Extensions

- **swemma:result**: acts as a wrapper for application instance data or lattices representing **results of processed interpretations**.
  - contains data for the output.
  - can also contain a **syn:speak** element, see[SSML Speech Synthesis Markup Language], to provide synthesizable content to the result for speech output.

- **swemma:status**: element provides **process monitoring** annotation.
  - The **swemma:expectedAnswerTime** and **swemma:actualAnswerTime** attributes specify the expected answer time of a component and how long the processing of an answer really took, respectively.
  - The **swemma:queryRunning** message shows if a component is yet processing a request or not.
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- **swemma:oov**: element holds annotation for out of vocabulary words by speech recognition.
  - **Optional**: annotation attribute: `swemma:class`.

- **swemma:turn-id**: an attribute of type `xs:nonNegativeInteger` that specifies the turn ID associated with an element.
Using EMMA in SmartWeb

- Information exchange based on EMMA (Extensible MultiModal Annotation markup language):
  - Framework for control information like time stamps, process number etc.
  - Generic container for content structures
  - Word lattice format
  - Speech Synthesis Markup Language (SSML) can be embedded

- Extension SmartWeb-Emma (SWEMMA). Additional tags
  - result:
    - extension for results of interpretation
  - status:
    - status of the progress at the different levels of processing
  - oov:
    - Out of vocabulary word representation

- RDF/S-Representation of EMMA on the ontological level

Managing QA Concepts

- discourse:Query
  - models the user query to the system.
  - partially filled ontology instances

- discourse:Result
  - references information the user is asking for
  - fills partially filled ontology instance

- discourse:AnswerType
  - expectation (in Query)
  - answer realized as a Smartmedia object
Grazie per l’attenzione!