Tutorial:
Integrating AI4Media modules into AI4EU Experiments

AI4Media Workshop on the European AI-on-Demand Platform

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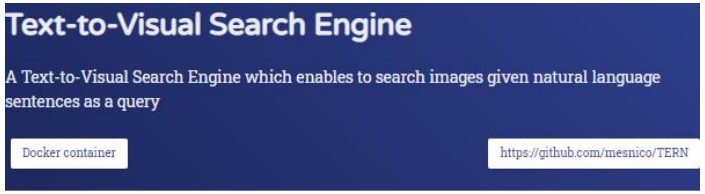
Goal of this tutorial

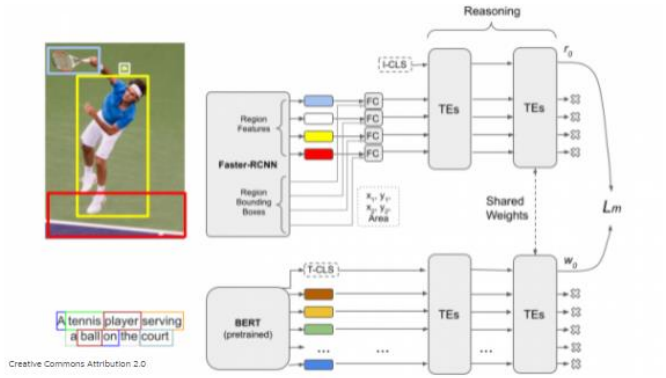
- Enabling the participants of this workshop to **integrate their own modules into AI4EU Experiments**
- With a focus on the implementation rather than the deployment

```
public NewsCategory classify(final String newsText) {
    final int categoryCode = determineCategoryCode(newsText);
    final String categoryText = getCategoryTextFor(categoryCode);

    return new NewsCategory(categoryCode, categoryText);
}
```

Overview of the integration process

1. **Defining the modules**
2. **Publication in the AI Catalogue**
   - Registration
   - Required and recommended fields
   - Process for uploading
3. **Integration into AI4EU Experiments**
   - Resources and documentation
   - Registration
   - Defining the protobuf signature
   - Implementing the API
   - Upload to the marketplace
4. **Presentation at the AI4EU Web Café**



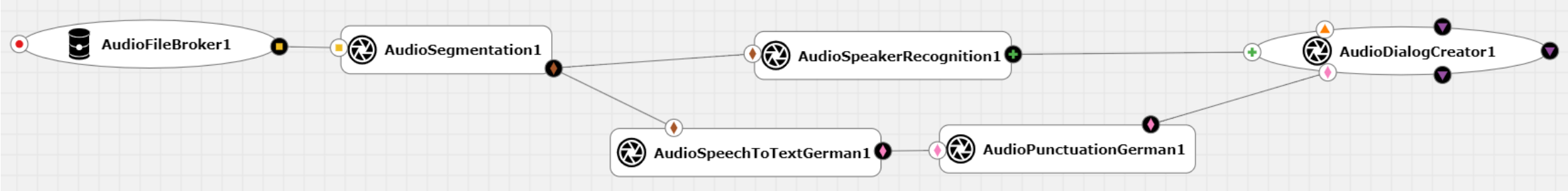


Text2ImageSearch

Nicola Messina | 05/26/2021 | New

Defining the modules

- Modules (or “models”) are the building blocks for the AI pipelines.
- The main criterion is **reusability**.
- Separate the modules!
- Define input and output!



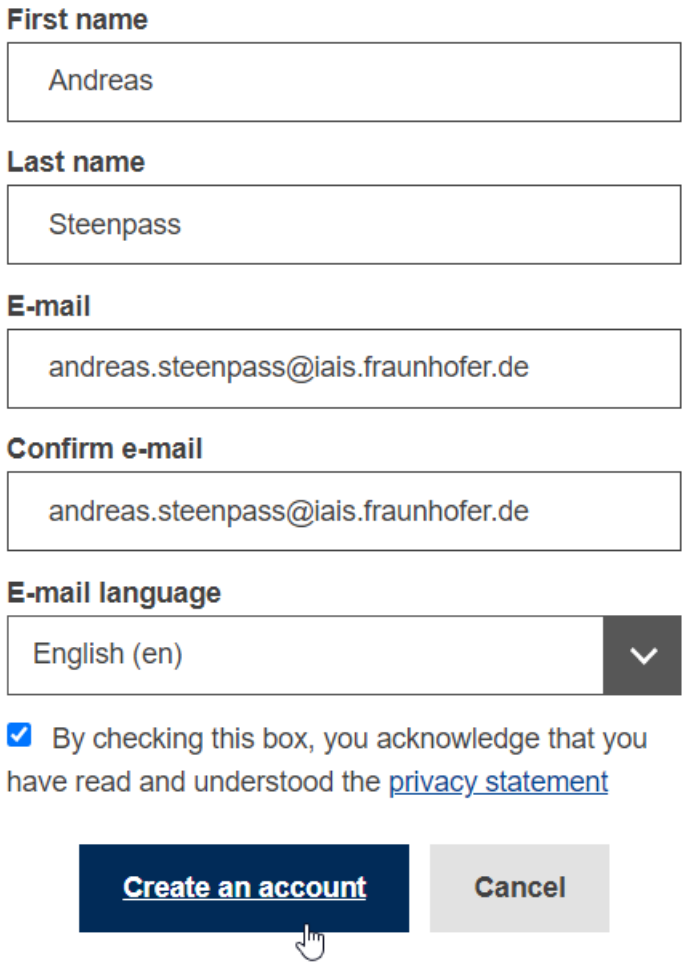
If you fail at this step, you will run into problems at the next steps!

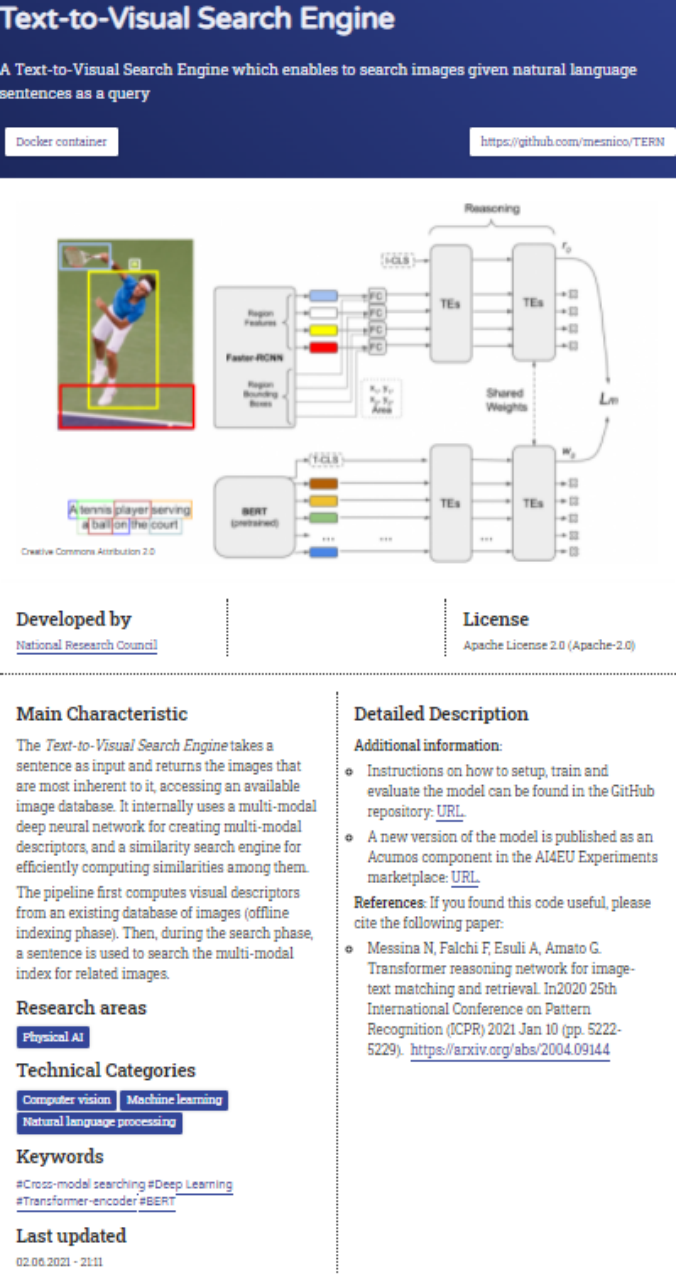
Publication in the AI Catalogue

Registration

- Go to https://www.ai4europe.eu/
- Go to login, choose EU Login

- The EU Login to the AI-on-demand platform will be functional soon!
- The beta testing phase will be announced to members of AI4Media and other ICT-48/49 projects.
- After the beta testing phase, access will be public.





Publication in the AI Catalogue

Required and recommended fields

Required:

- Title
- Summary
- Main characteristics

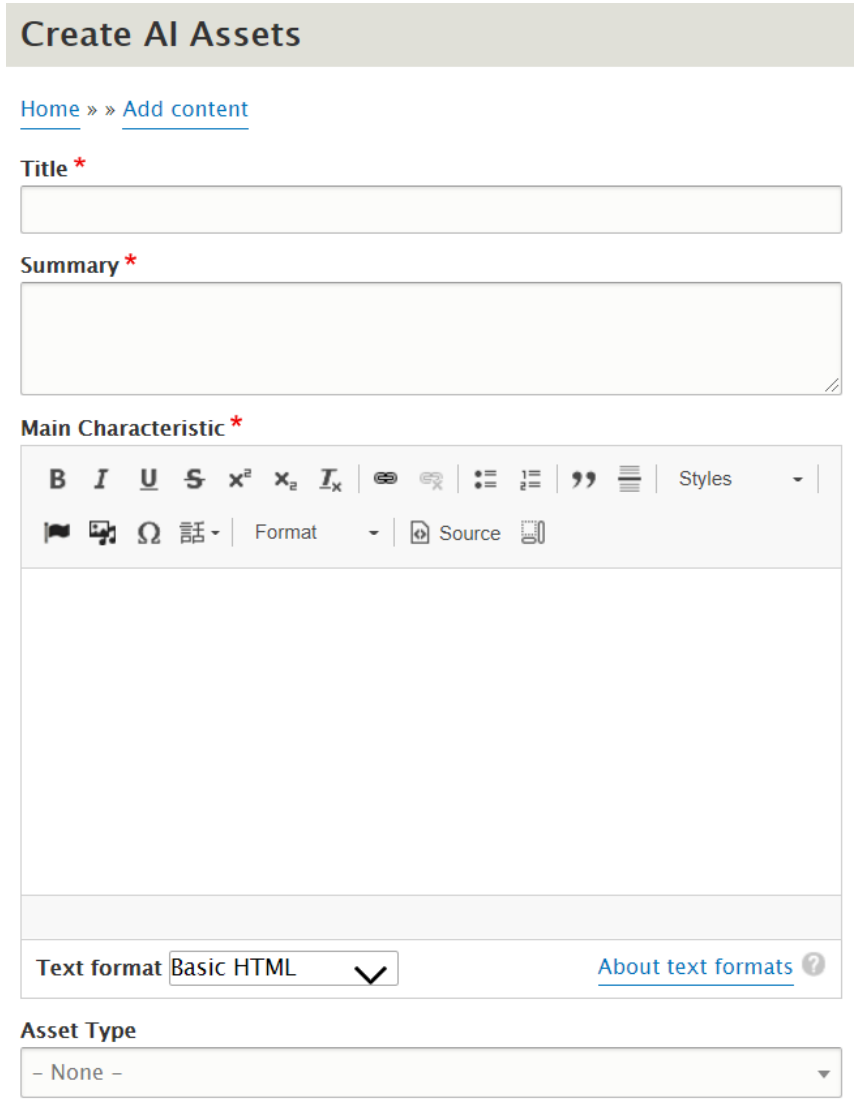
To be considered carefully:

- Image
- License
- Website
- GDPR requirements
- Relation to Trustworthy AI

Publication in the AI Catalogue

Process for uploading

- The uploading process is straightforward.
- The image should have a ratio of 16:9.
- Assets can be saved as drafts and be changed later on.
- Good examples are:
  - AI for Visual Vehicles Counting
  - Text-to-Visual Search Engine
  - LioNets
- Respect the copyright of everything you upload!
- Do not forget to link your asset to AI4Media!



Integration into AI4EU Experiments

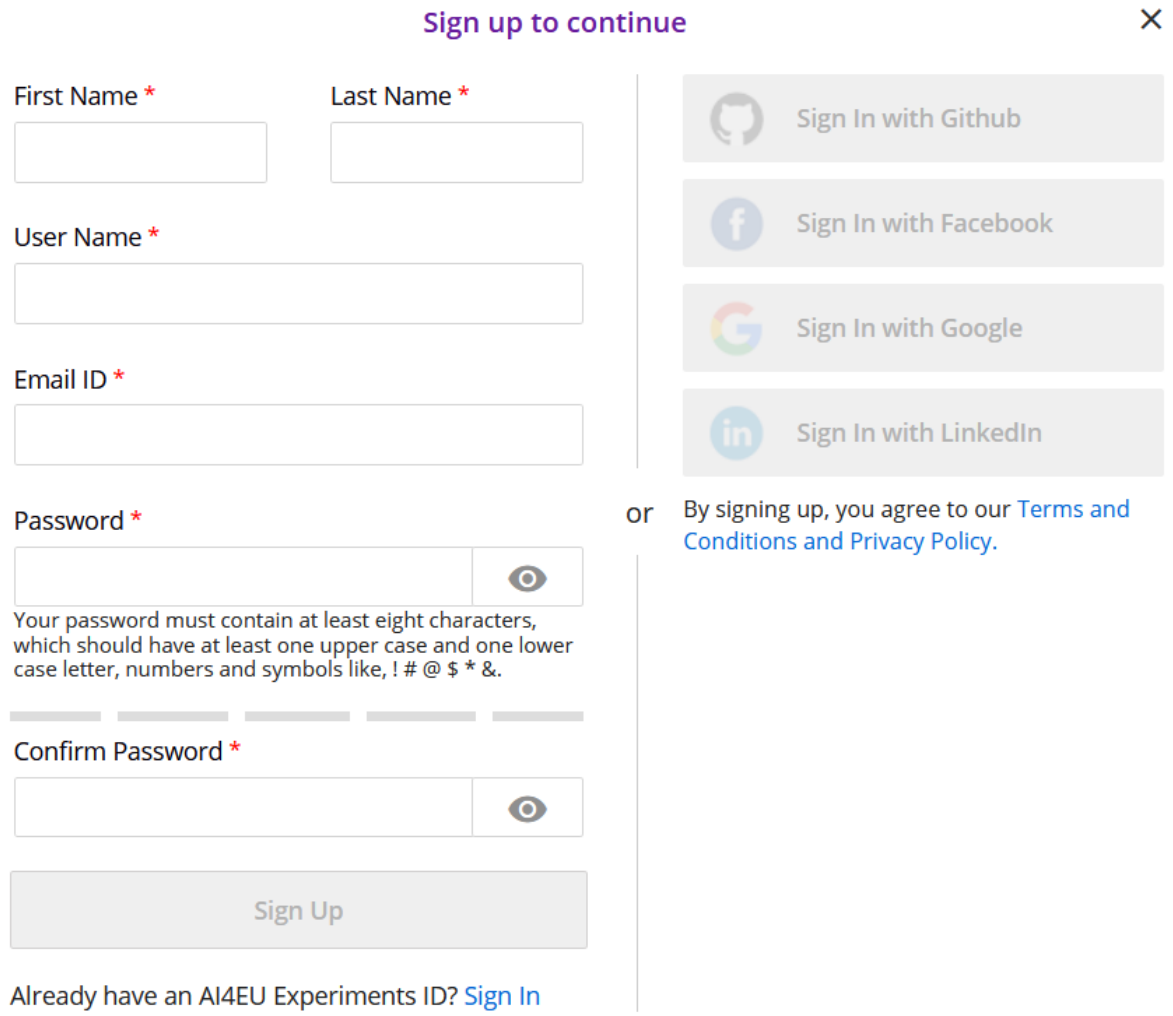
Resources and documentation

- Homepage: https://aiexp.ai4europe.eu/
- Acumos Wiki: https://wiki.acumos.org/
- Examples and container specification: https://github.com/ai4eu/tutorials
- AI4EU Experiments playlist in the AI4EU Youtube Channel
- Protocol Buffers: https://developers.google.com/protocol-buffers
- gRPC: https://grpc.io/
- Direct support: ai4eu-experiments-support@iais.fraunhofer.de

Integration into AI4EU Experiments

Registration

- For now, an **extra account** is needed for AI4EU Experiments.
- Martin is working on the integration of the **EU Login** into the AI4EU Experiments homepage.



Integration into AI4EU Experiments

Example: Keyword counting

As a toy example, we want to integrate the following functionality into AI4EU Experiments:

```java
public int countOccurrences(final String document, final String keyword) {
    return StringUtils.countMatches(document, keyword);
}
```

Integration into AI4EU Experiments

Defining the protobuf signature

```
syntax = "proto3";

message KeywordCountingRequest {
  string document = 1;
  string keyword = 2;
}

message KeywordCountingResult {
  int32 numberOfOccurrences = 1;
}

service KeywordCounter {
  rpc count(KeywordCountingRequest) returns (KeywordCountingResult);
}
```

- Save as src/main/proto/keyword_counter.proto.
- Generate classes using protoc, see gRPC Documentation.
- Works similarly for other languages such as Python, Go, C++, Ruby and many more.

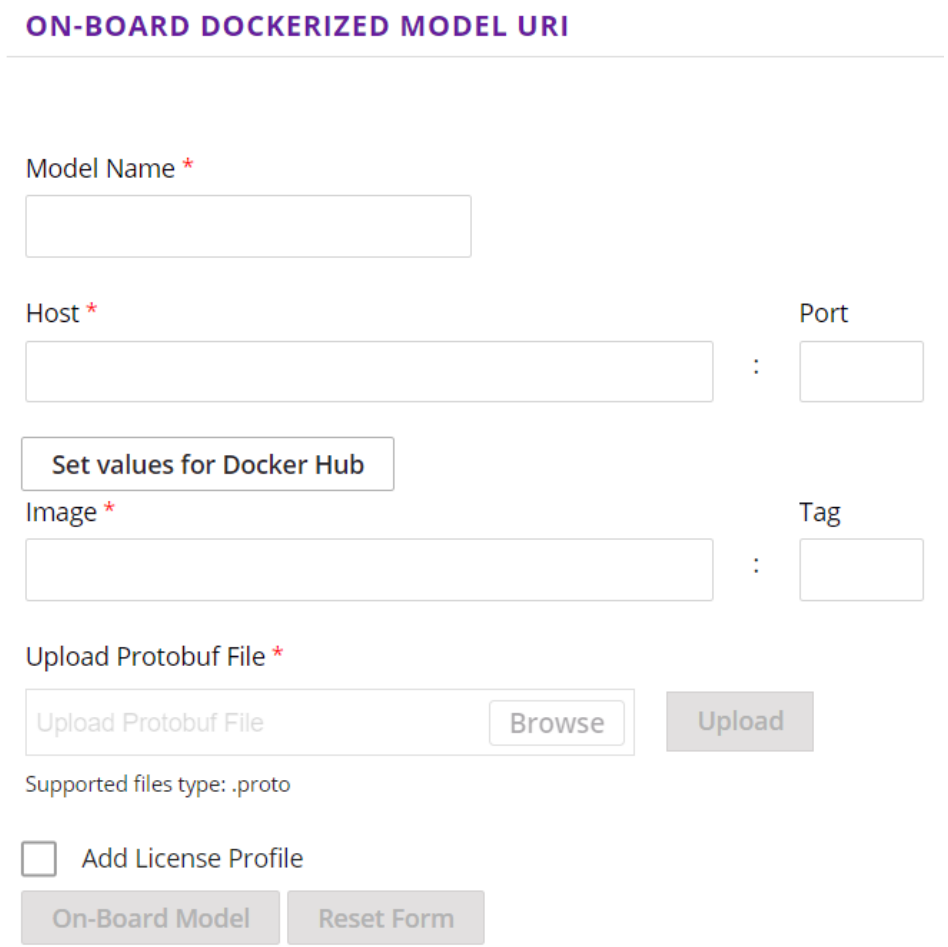
Integration into AI4EU Experiments

Implementing the API

```
public class KeywordCounter extends KeywordCounterGrpc.KeywordCounterImplBase {

    @Override
    public void count(final KeywordCountingRequest request,
            final StreamObserver<KeywordCountingResult> responseObserver) {
        final int numberOfOccurrences = countOccurrences(request.getDocument(), request.getKeyword());

        final KeywordCountingResult result = KeywordCountingResult.newBuilder()
                .setNumberOfOccurrences(numberOfOccurrences).build();

        responseObserver.onNext(result);
        responseObserver.onCompleted();
    }
```

Integration into AI4EU Experiments

Upload to marketplace

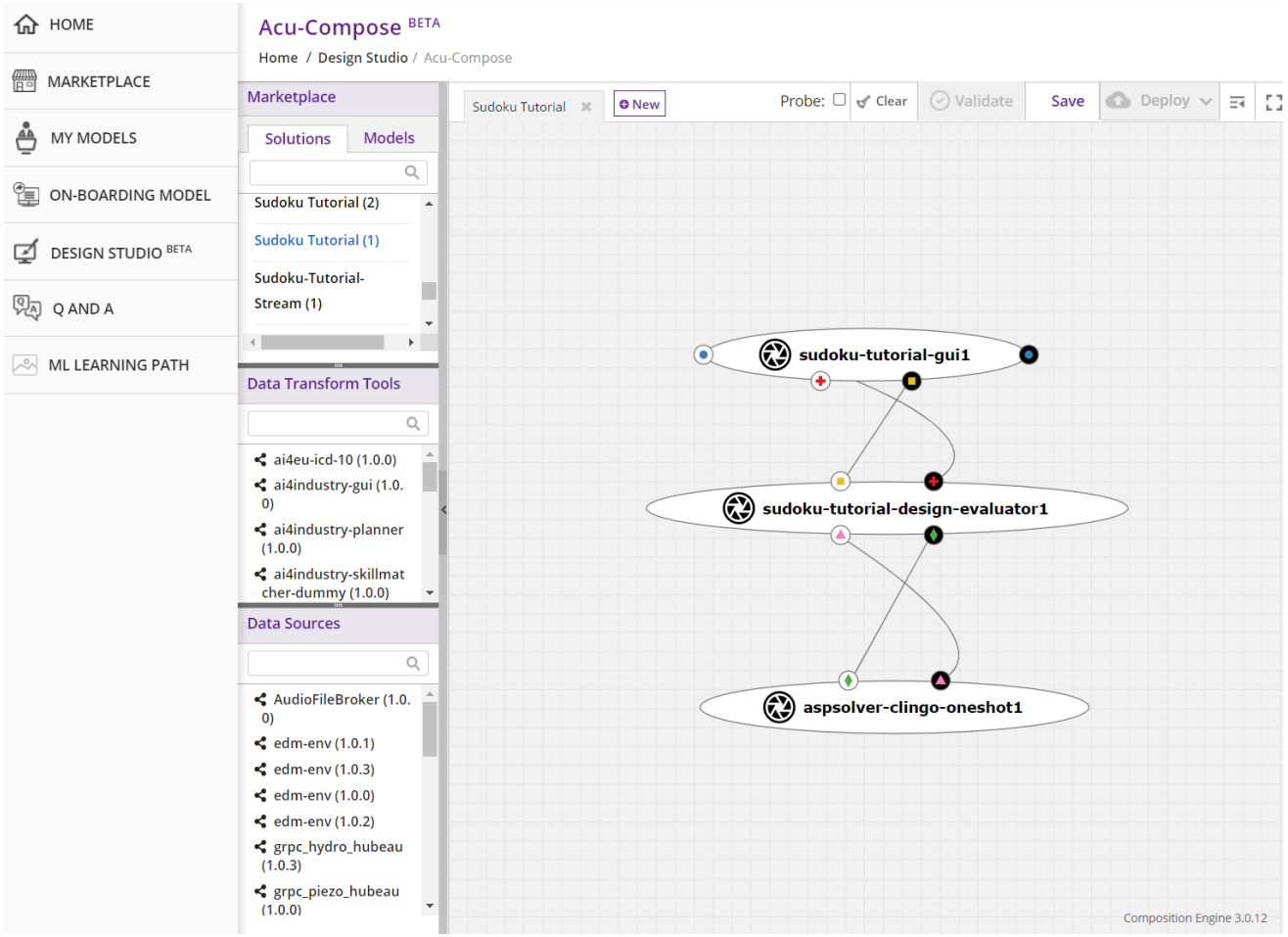


- Dockerize your model following the container specification
- Fill in the form available at “On-boarding model”
- Access the uploaded model in the section “My models”
- Publish the model to the marketplace

Integration into AI4EU Experiments

Designing and deploying pipelines

- Go to “Design Studio” > “Acu-Compose”
- Drag your modules to the canvas
- Connect input and output ports
- Choose “Deploy”



AI4EU Web Café

Presenting your module

- Community building using the AI-on-demand platform
- Offering a series of live web sessions on AI
  - Insights into the international AI scene
  - Sharing knowledge and experiences
  - Meeting stakeholders from various areas of AI research and application
- Recordings of past web cafés available on GoToStage
- Resources:
  - www.ai4europe.eu/news-and-events/events/webcafes
  - www.gotostage.com/channel/ai4eucafe
  - carmen@grassroots-arts.eu


AI4EU AI4media

Welcome to the public AI4Media@AI4EU Café on May 25th, at 3 pm (CET)

The Speaker is:

Nicu Sebe (Professor in the University of Trento, Italy)

with his talk on:
" Image and Video Generation: A deep Learning Approach"

The Moderator & Café Manager is Carmen Mac Williams (Grassroots Arts),
Contact: carmen@grassroots-arts.eu

Please take notice that this session will be recorded.
The link for the recording you may find on the AI4EU youtube and gotostage channel, if the Speaker gives the permission afterwards.
No confidential information shall be shared in this Café session.
All Speakers express their personal views and opinions, this is not the official AI4EU project opinion.

Integrating AI4Media modules into AI4EU Experiments

Summary

1. Defining the modules
2. Publication in the AI Catalogue
3. Integration into AI4EU Experiments
4. Presentation at the AI4EU Web Café

Integrating AI4Media modules into AI4EU Experiments

Views on AI4EU Experiments

- “Integrating my module into AI4EU Experiments means to implement yet another API.”
  There is no fixed API to be implemented. You actually expose the existing API of your module to this platform via gRPC.
- “Integration into AI4EU Experiments is a lot of work.”
  The integration is pretty easy. If your module is well prepared, it will take less than one day.

Integrating AI4Media modules into AI4EU Experiments

Outlook for AI4Media partners

- **There will soon be a playground available where you can deploy your pipelines for testing.**
  - The playground will use the EU login.
  - The plan is to open the playground in March 2022.

- **Please go ahead:**
  - Get a EU login
  - Publish your assets in the AI Catalogue
  - Design AI pipelines and integrate the relevant modules into AI4EU Experiments

- **How can we further support you with this?**