

# AI Folk – Building a machine learning culture

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- AI Folk

## AI Folk – Building a machine learning culture

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- Describing Models

overview

- Implementation

Different use cases and different situations call for different machine learning models for the same task.

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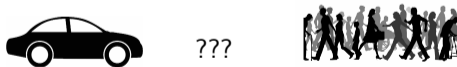
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We look into how autonomous agents can search, obtain, and use models that are adequate for their current situation in a decentralized system.

An agent controls a self-driving car driving through a large city. The agent uses several ML models in order to detect elements in the view, navigate, and control the car.

At some point the car needs to enter the campus of a large university. In the campus, there are specific rules regarding maximum speed, there are many people walking in the drivable area, etc. The models used by the car do not allow it to navigate and move efficiently in this environment.

However, the car is able to interact with other [self-driving car] agents and retrieve models which are specific to the campus area and help the car navigate more efficiently.



- **AI Folk ontology** – used to
  - **describe** the models
  - **query** the local model descriptions or the descriptions of models in the *community*

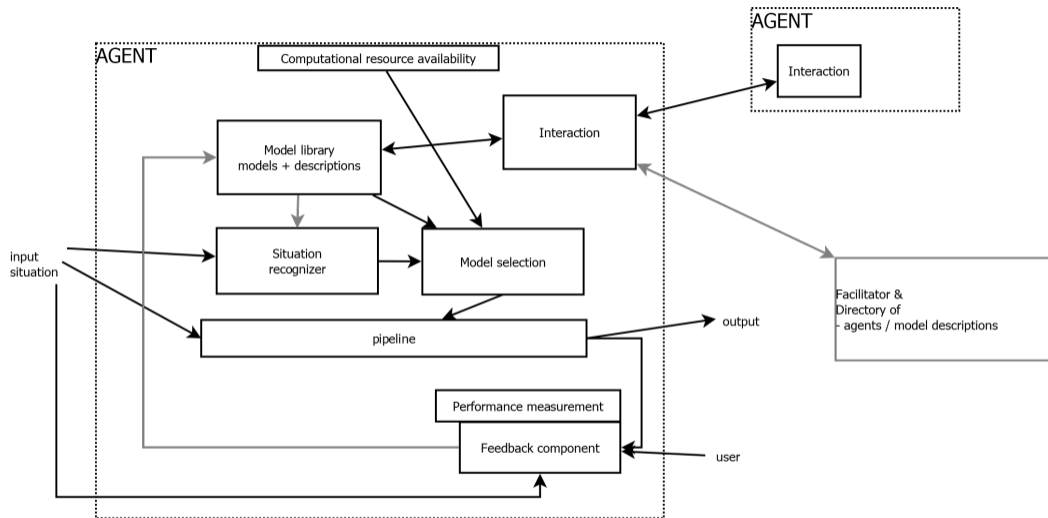
The ontology has a *common core* and *domain-specific* extensions

- **AI Folk protocol** for the interaction between agents allowing for search, exchanging and updating ML models.
- **AI Folk methodology** for adapting the system to a different application domain
- **FLASH-MAS framework** for the integration of the AI Folk methodology in a MAS.



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Validation is envisaged by means of two simulated scenarios:

- an autonomous driving scenario
  - a car gets to a situation which is not *well* covered by the models that it uses and needs to search for models which give a better result on that specific situation
- a disaster response scenario
  - autonomous robotic emergency responders adapt to new situations by querying other responders on models that were efficient in those situations



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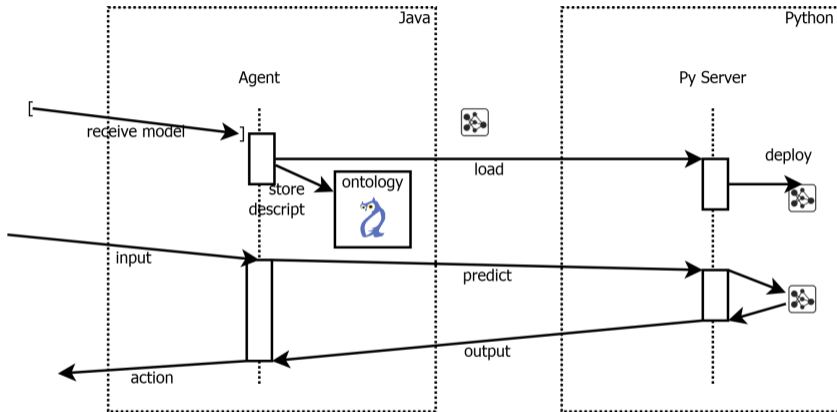
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How to recognize if the current situation is the type of situation  
the model has been trained on?

- model description – type of model, architecture generics, computational requirements
- task description, input data type, output data type
- dataset description, for instance, for images:
  - types and number of elements (cars, pedestrians)
  - environment type, geographical area
  - weather type, driving conditions

- FLASH-MAS is implemented in Java
- the link with the ontology is implemented as a Java module
- ML models are run in Python
- Java code calls a local web server in Python for loading, running, training and exporting ML models



■ Thank You!

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Questions are welcome!



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