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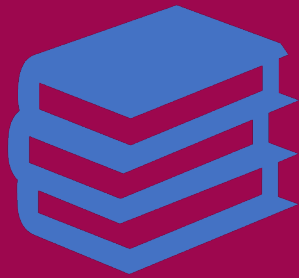
«FANTASTIC MASS AND WHERE TO FIND THEM»: First results and lesson learned

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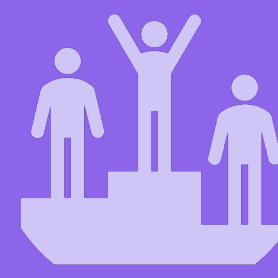
Motivation: sore points



State of the art analysis:
many papers to be searched and collected from different sources... Long and tedious, no one unique repository



V&V without bias:
Where and how can I find fastly real/large third parties MASs (or what I need)?



Empirical comparison with state of the art:
Where and how can I find the «state of the art tools» I can reuse?

If the MASs, Tools, Algorithms, Experiments etc are not shared, it is very hard!!

Common problems in the MAS community, and ideas from the SE one

How does SE community face the previous problems?

- They are strongly committed to Open Science movement
 - It requires results replicability
 - It asks for comparability
- SE community supports the previous activities with Testbeds and repositories availability
- This helps dissemination inside the community too

We are opening more and more to SE approaches related to designing and implementing MASs, but...

- The requirements of the Open Science movement are not so mandatory
- It is very hard to find the code of the proposed tools/MASs etc
- It is very hard to have access to real MASs (and to publish regarding them)

Our proposal: The “Fantastic MASs and where to find them” initiative



To promote the visibility of the results of the research by offering a repository of works



To create a repository of MASs (testbed for V&V activities)



To create a repository of Frameworks, tools, libraries etc (to be used in the comparison with previous works)



To facilitate the Software Engineering activities for our community

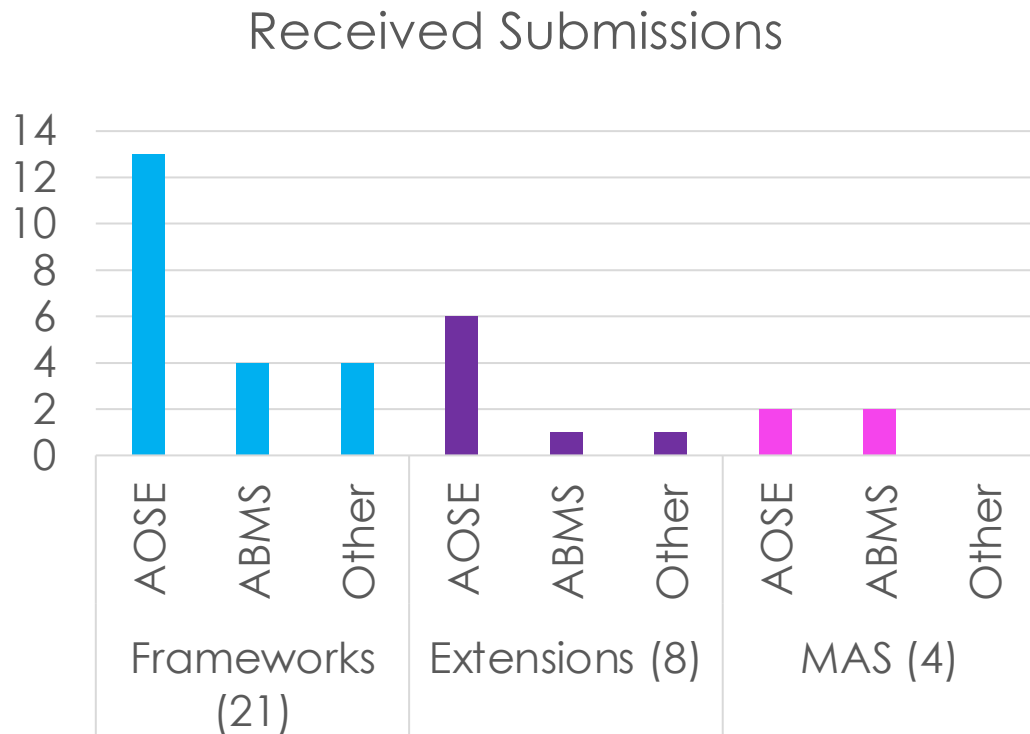


This is a “crowdsourcing of information”, a bottom-up data collection

The website and the form

- Entries of 3 different macro categories
 - “**Agent-based simulation** (you developed a MAS, or a framework/library/add-on to simulate physical and natural phenomena)”
 - “**Agent-oriented software engineering** (you developed a MAS that is the “real” system, for example for implementing decision support systems/ solving industrial problems/implementing smart systems, or a framework/library/add-on to develop such real MASs)”
 - “**Others**” (entries that do not specifically fall in the two previous categories)
- Of 3 types:
 - **MAS**
 - **New Framework/standalone tool**
 - **Extension of an already available tool** (add-on, library, integration of functionalities etc)

Collected Entries and discussion



- All research results have a double value:
 - **Intrinsic one** (what is proposed, the contribution to the state of the art)
 - **Extrinsic one** (how this research result can be reused by others for research activities)
- The proposed analysis pays attention on the extrinsic value (re-usability as subjects for future research, in particular for SE activities)
- We analyse only frameworks and extensions (27 over 29)
- 2 entries could not be analysed wrt the next aspects

Which info did we asked for?



Previous Versions: are there previous versions and/or commits on the tool's repository?



Documentation: is some documentation supporting the tool?



Issue and Bug tracker: are there in the tool's repository well-documented issues and bugs, possibly with information regarding if, and how, they were fixed?



Test: are there tests available, or at least information regarding the testing approach used to validate the tool?



Original Link: was a link to the code (source or compiled) already present in the principal papers (as indicated by the authors)?



Source Code: apart from the downloadable version of the tool, is the source code available too?

Source availability, documentation, versioning

There is a general positive propensity to share the source code

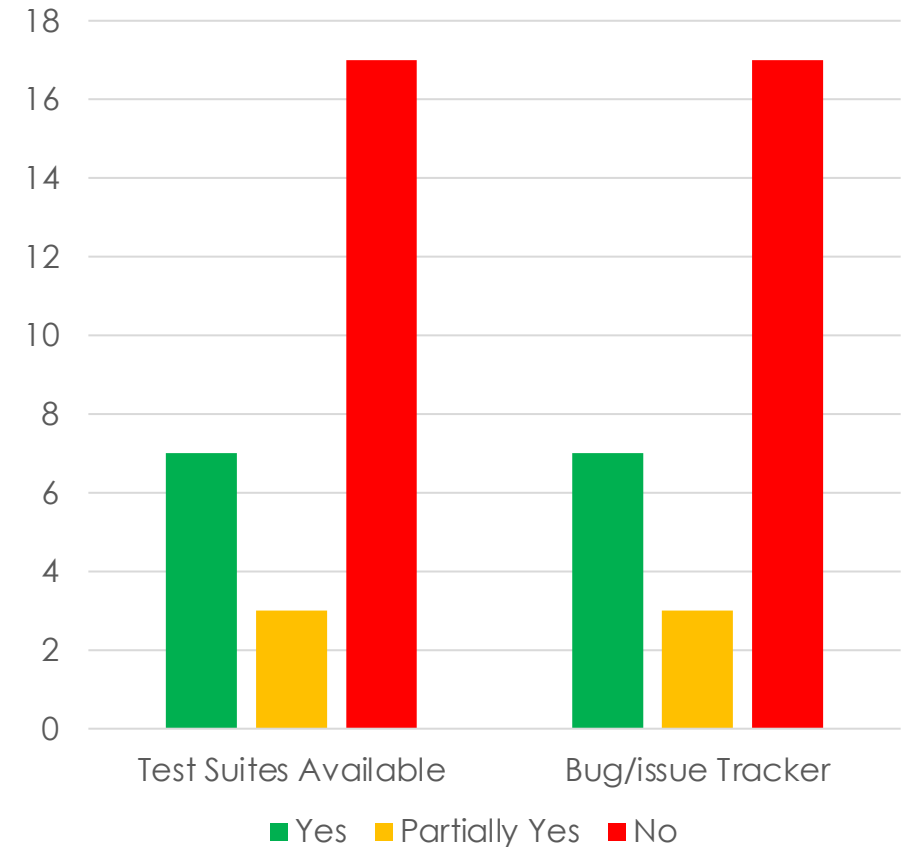
Anyway, the source code was not always originally shared with the paper presenting the work, but was made public in a second moment

The shared software is usually well documented

Quite all the shared tools (all but two) present a form of versioning, that allow users to access previous versions and commits

Bugs, Issues and Tests

- A clear problematic aspect
 - only 10 tools has some information related to test suites
 - only 10 tools has a bug/issue tracker
 - only 6 reports both
- This is somehow not surprising:
 - The management of bugs and issues is a complex task
 - It usually requests the support of specific tools, some dedicated resource (tester) or at least time
 - In research projects, these are demanding aspects not resulting in an immediate ROI



Real world adoption



For each tool, we asked about existing real-world uses



We observed that the majority of frameworks do not have (to the best of their creators' knowledge) any real-world application



Indeed, the majority of the collected tools are mainly used in academia

We only received 4 submissions regarding real MASs... Why?

- A coincidence? maybe with more time for submitting, or a better sharing of the call, it could improve, but...
- The initial feeling is that the community prefers sharing frameworks and extensions instead of MASs
- Often a MAS itself is seen not as a research result, but more as only a way to exemplify some new tool/approach etc
- This mindset could have some true aspects in the academic area
 - but this leads to not giving sometime the correct importance to the produced software itself
 - and this is related to the often missing link to the code too, as discussed before

Conclusions

- Rewrite/explain better the categories and types, and the questions regarding test availability and issue/bug tracker
- Improve the awareness of the “extrinsic value” of any software (MAS or other)
- Support the sharing of tools, MASs and artefacts
- **Please continue submitting to our “Fantastic MAS” repository!**
A MAS should not be a “rare fantastic animal” ... 😊
https://mas-unige.github.io/fantastic_mas/frameworks.html

Fantastic MASs and where to find them									
ABOUT	FRAMEWORKS	MAS	EXTENSIONS						
Filters: None									
Search: Agent-based simulation									
Project name	Description	Project type	Mas URL	Mas community availability	Mas previous versions availability	Mas previous versions URL	Mas license	Mas list of bugs	Framework used
Affective Agents	Pedestrian Simulation with Affective State Modeling	Agent-based simulation	https://gitlab.com/daniela.briola/affectiveagents	Yes, the source code is available	No		Creative Commons Attribution-NonCommercial 4.0 Licence	No	NetLogo

Thank you!!

Submissions till today (thanks!!)

Type of Submission	Submitted entries
Frameworks	ASC2, ASTRA, BSPL, CellNet, DALI, Deserv, EVE, Hercule, JaCaMo, Jade, Jadescript, JS-son, MCAPL, PADE, Piaf, SLAPP, SMASTA+, StreamB, STV
Extensions	2COMM, JaCamo + Accountability, JaCaMo + Exceptions, P2P JADE (LEARN), MAMS, ROS-A, RV4JaCa, SUMO-RL
MASs	AdaptSchedule, Affective Agents, Deep Q-Learning Agent for Traffic Signal Control, MAPS-HOLO (HOLONic MultiAgent Parking System)