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MAS4AI

D7.1 – Public Web Portal

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Contributors:	I. Anagiannis, G. Siaterlis, X. Bampoula, N. Nikolakis
Reviewers:	N. Nikolakis, K. Alexopoulos
Approved by:	Executive Board
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Executive Summary

The purpose of this document is to report the development of the MAS4AI public web portal and of its main functionalities up to the time of the compiling of this document. The portal's primary objective is the dissemination of the MAS4AI solutions and of the generated knowledge during the project to the public, as well as to create awareness on the MAS4AI Multi-agent system.

In the context of the MAS4AI project, a public web portal, based on WordPress, has been implemented for disseminating the MAS4AI vision as well as the project's generated knowledge and solutions to the public.

The portal is hosted on the servers of LMS at its premises in the University of Patras, in Greece. LMS will be responsible for maintaining and updating the portal throughout the duration of the project and after when it comes to an end.

The purpose of this document is to describe the basic aspects and content available in the MAS4AI public portal and to provide a manual of its main functionalities. The manual is separated into four distinct parts:

- A brief introduction to the purpose of the public portal alongside to the user's manual
- The requirements of the MAS4AI website
- Information about the structure of the portal's Menu and Welcome page
- Information regarding the dissemination of the MAS4AI through social media

All information is presented with the support of illustrated figures to make it easier for the reader to understand.

Document History			
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0.9	04.11.2020	I.Anagiannis G.Siaterlis X.Bampoula N.Nikolakis	Full draft
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1 Introduction

1.1 What does the Public Web Portal do?

The MAS4AI Public Web Portal has been primarily developed for any user who would be interested in the content and the achievements of the MAS4AI project in the research field of predictive maintenance. The portal mainly aims to promote the MAS4AI project via the Internet and achieve worldwide dissemination of the knowledge of the project. Moreover, through the portal news and information, related to the project, will be published and communication between the project coordinator and everyone who is interested in the project will be facilitated.

1.2 About the Public Web Portal

At the moment of writing this document, access to the public web portal is provided through the official project domain: <https://mas4ai.eu/>

The MAS4AI public web portal is based on the WordPress platform [1]. WordPress is a flexible content management/portal solution that is easy to install, use, extend and maintain. It fosters the creation and maintenance of sophisticated content without requiring extensive technical knowledge requiring only a web browser. It is mainly used for websites or intranets and provides superior security without sacrificing extensibility or ease of use.

MAS4AI Public Web Portal has been developed and maintained by the Laboratory for Manufacturing Systems & Automation (LMS) of University of Patras in Greece.

1.3 About this manual

This manual's objective is to provide help to everyone who wants to use the Public Web Portal for MAS4AI. Initially, an introduction takes place so that the users understand what exactly this web portal is and its usefulness.

Next, the requirements for using the MAS4AI public portal are described. Finally, a guide on the portal homepage's tabs is provided as well as some brief description on them accompanied with figures from the portal. The later part targets in informing the users of the portal's dissemination via social media.

2 Getting Started

This manual is a step-by-step guide to know the Public Web Portal for MAS4AI and its functionalities.

2.1 Requirements

In order to access the functionalities provided by the portal, only a web-browser is required that can support the requirements of WordPress. At the moment of writing, most browsers can successfully visualize the content of all sites created by WordPress. Nevertheless, it must be noted that the portal has been tested and works efficiently with the browsers listed in the following table (Table 1).

Browser	Logo	Trademark
Microsoft Edge 86.0.622.63 [2]		Copyright © Microsoft 2020
Mozilla Firefox v82.0.3 [3]		Mozilla Public License 2.0 (MPL)
Google Chrome v86.0.4240.183 [4]		Copyright © 2020 Google LLC.

Table 1: MAS4AI public web portal supported browsers

Other known browsers such as Safari, Opera, and Tor are also supported.

3 Use of the public web portal for MAS4AI

The public space of the portal can be used for disseminating of the future knowledge of the project. Also, news and information about the project as well as information about the project's events can be published. Additionally, communication between the coordinator and everyone who is interested in the project can be facilitated through the public portal's contact form.

3.1 Menu and Welcome page

When a user connects to the MAS4AI portal the Homepage appears with a short introduction of the MAS4AI's approach (Figure 1).

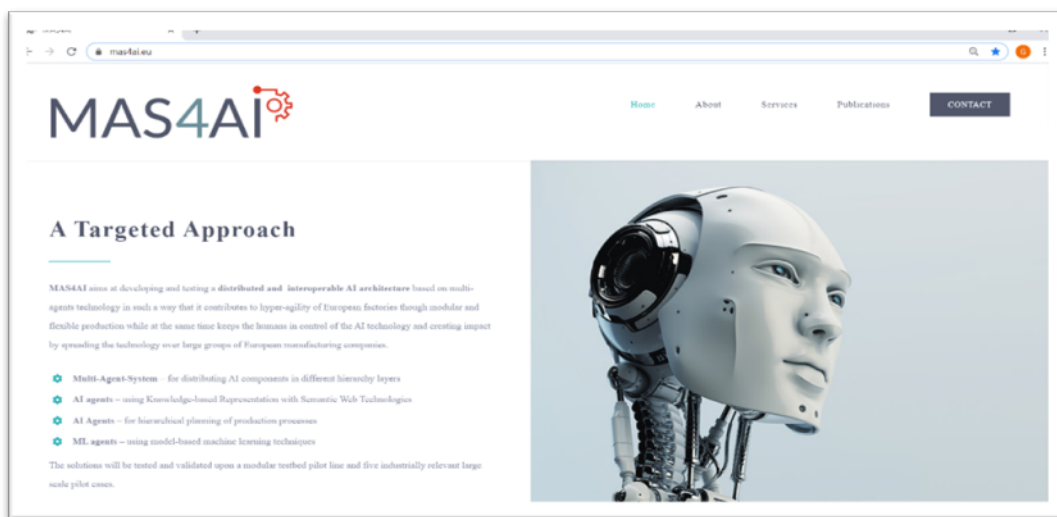


Figure 1: Homepage of the portal

3.1.1 Homepage

This page presents the Homepage of the portal (Figure 1). In the homepage, there is a number of tabs which correspond to the fields of Research, Discovery, Analysis and Communication of the MAS4AI project (Figure 2).

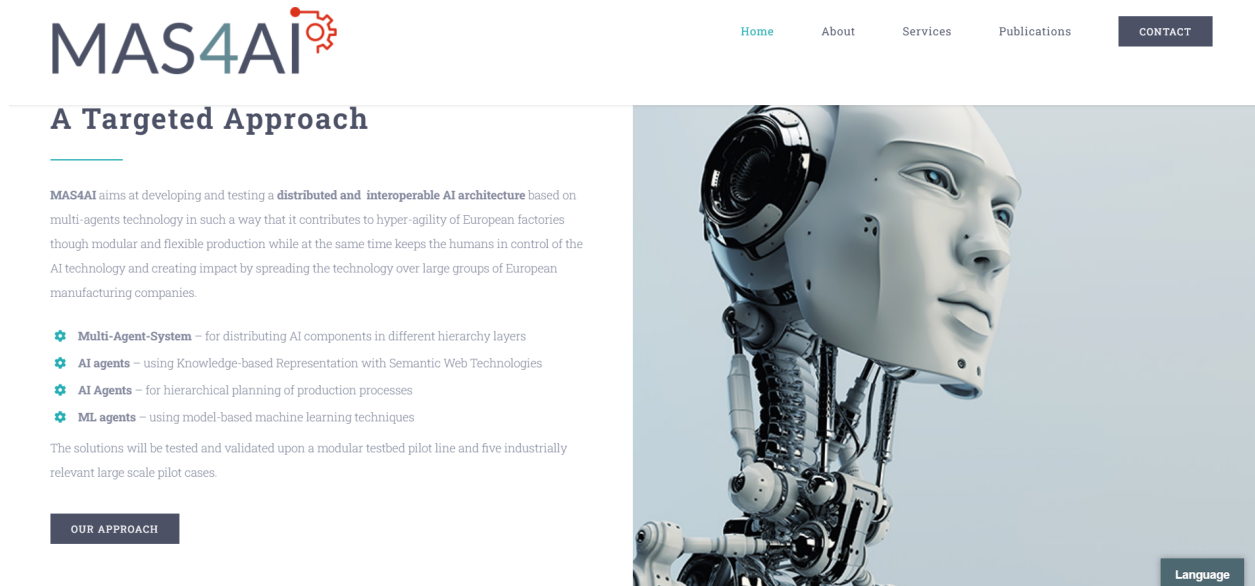


Figure 2: MAS4AI Homepage screenshot

In the homepage bottom, the list of the Consortium partners is being displayed, showing each time four (4) of the total seventeen (17) partners from 7 countries, alternated periodically (Figure 3).

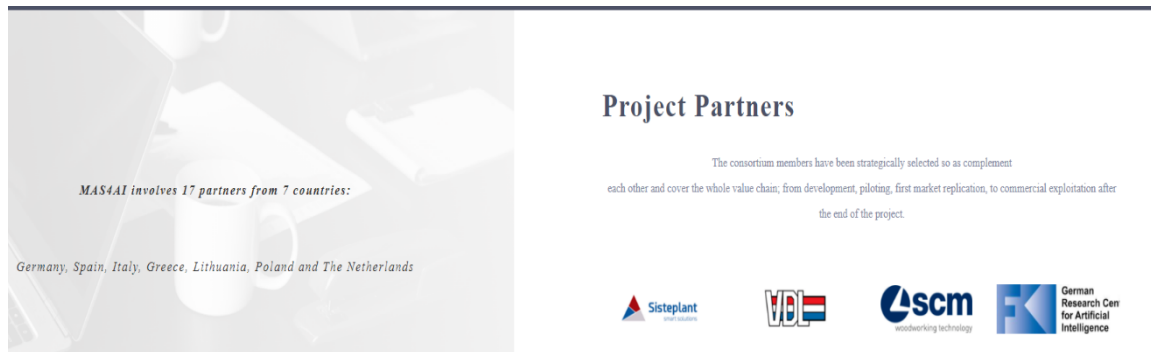


Figure 3: Display of the project partners in the portal homepage

3.1.2 About

In the About page, some overview information about the project is presented. This page currently provides information on the following aspects of the project:

- Concept:** The overall MAS4AI concept and methodology (Figure 4) is based on several ready to use and emerging technologies in the area of industrial AI and Industry 4.0 as well as the intelligent integration of technologies. AI core techniques based on i) Symbolic modelling, ii) Machine Learning and iii) combination of AI methods will be enhanced and applied as software services for modular production, which will be integrated into diverse aggregation levels of factory automation.

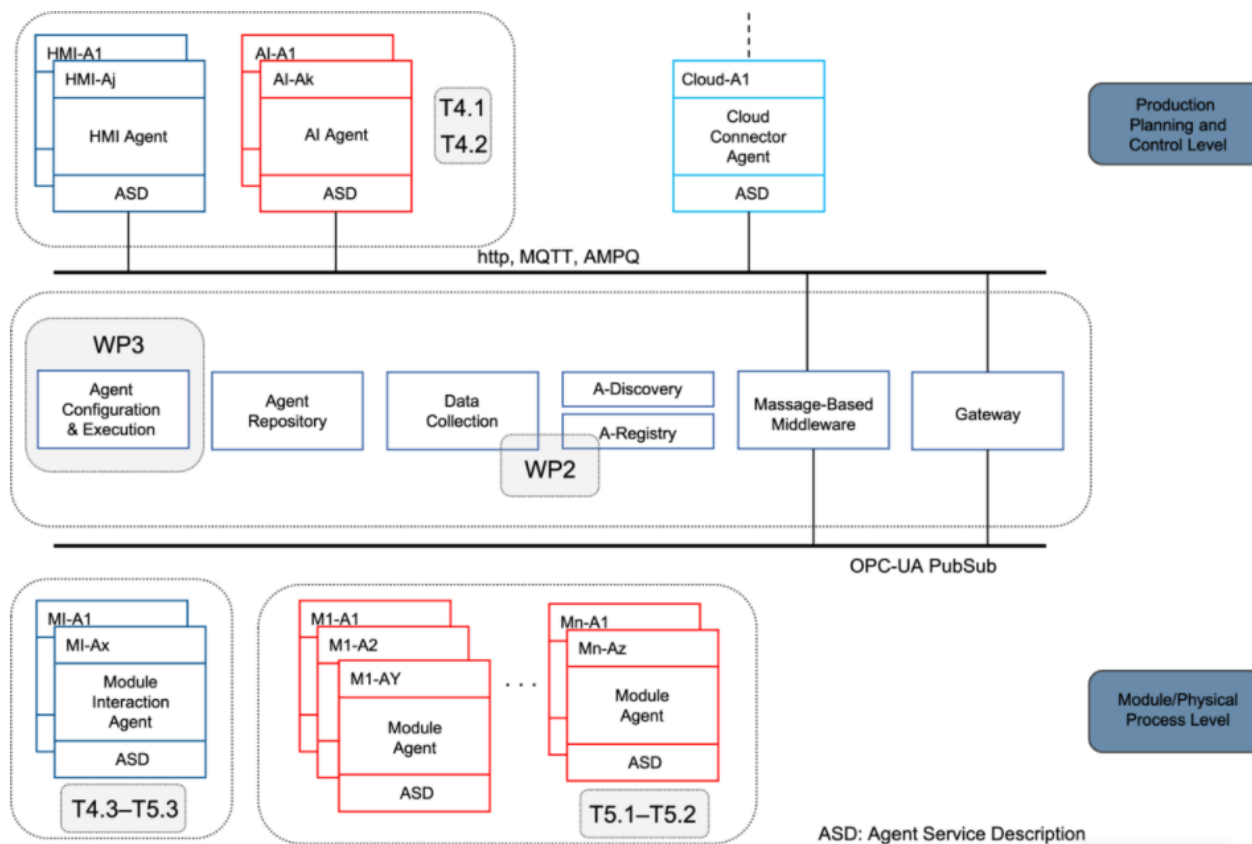


Figure 4: Agent service description

- **Architecture:** The proposed system architecture combines these experiences and patterns into recommended actions. The main idea under the system’s architecture includes i) control logic decentralization, ii) Integrated networks and iii) clear specification of interfaces.

3.1.3 Services

In this tab, the main services of MAS4AI are briefly analysed. This tab includes the following domains as presented in the figures below (Figure 5 to Figure 9):

➤ AI Components Distribution

AI Components Distribution

A basic concept in MAS4AI is to integrate all Smart Components in a holistic system architecture to enable the easy development and deployment of industrial AI technologies. Service implementations on the Factory Edge level facilitates:

- ⚡ **Horizontal** control of production modules
- ⚡ **Data** aggregation
- ⚡ **Execution** – of higher-level AI routines

Due to the open structure, the Software Agents can be distributed freely on the hardware and software resources. The structure can be scaled with low effort by adding external IoT cloud services using its high-performance resources.



Figure 5: AI components distribution description

➤ Knowledge Representation

Knowledge Representation



MAS4AI will employ semantics as an integration between various systems for production, coordination and interaction. This in turn requires formalized knowledge representations for products, process, human worker, object/resources, along with a generic asset/agent description.

MAS4AI semantic models will also adhere to certain principles:

- ① **Extendable** – models adapted and extended, to fit the open-world context, to incorporate a new situation or changing environment
- ① **Deal with uncertainty** – due to ignorance, errors, unreliable sources or lack of observations
- ① **Modularization** – in order to be able to incorporate new knowledge and refine/extend existing knowledge

Figure 6: Knowledge representation description

➤ Hierarchical Planning of Production Processes

Hierarchical Planning of Production Processes

An intelligent hierarchical planning agent that will evaluate the flow of information from the different abstraction layers of production and will take into account the user defined criteria in order to provide the best scheduling alternatives. It will be based on the following pillars:

- ④ **Integration** of product- and safety-related aspects at system level
- ④ **Open** allowing interfacing with existing legacy systems
- ④ **Service-oriented** communicating all information to external systems through dedicated methods

The concept includes the building of a rule-based mechanism that takes advantage of a knowledge base, which is constructed and expanded by accumulating problem-solving expertise. The goal is to find a good – not necessarily optimum – solution aiming to schedule the different production processes.



Figure 7: Hierarchical planning of production processes description

➤ **Model-based Machine Learning**

Model-based Machine Learning



The Model-based machine learning agent will be responsible of the mathematical comprehension of the process in terms of KPI's, so MAS4AI implementation is able to correlate process parameters with important KPIs. The modelling approach here has three alternatives:

- **Machine Learning (ML) data based models**
- **Process simulation-based models**
- **Hybrid models : also known as grey-box**

Once the model-based machine learning correlate process parameters with KPIs, and taking benefit of the models and scenarios developed, the system is then ready to implement optimization. MAS4AI will address different optimization solutions in different hierarchical levels, guaranteeing the interaction amongst them.

Figure 8: Model-based Machine Learning description

➤ **Testing & Validation**

Testing & Validation

MAS4AI involves challenging use cases that will demonstrate the feasibility, adaptability, scalability and flexibility of the MAS4AI multi-agent-based framework.

- ⊙ **Lagging Majority** – comprises those manufacturing processes where the maturity level is low and modularity is only achieved at activity level (e.g. logistics, assembly, inspection, etc.)
- ⊙ **Early adopters** – beginning to adopt and implement flexible modular productions concepts in their manufacturing processes in order to maintain their competitive positioning in the market
- ⊙ **Innovators** – vendor independent research facility

MAS4AI solutions will be deployed in different hierarchical layer for autonomous modular production and human assistance in a wide range of sectors (automotive, wood, bicycles, bearings and metal) of key economic impact for European economy.



Figure 9: Testing & validation description

3.1.4 Publications


This tab contains a publications' list related to the MAS4AI project. Publications are divided into three (3) domains: i) Latest Publications, ii) In the Press (MAS4AI consortium work pending for publication) and iii) On-Going Research (research activities and work in progress from the MAS4AI project).

3.1.5 Contact

The Contact tab (Figure 10) contains a submission form with which a random visitor can get in touch with the MAS4AI partners, ask any questions or express interest in the MAS4AI solutions.

Get In Touch

We value your interest and questions. They are an indication of the importance of our work. Thus, if you have **questions** about the MAS4AI activities or **interested** in the MAS4AI solutions do not hesitate to contact us.



For more information:

- info@mas4ai.eu
- [Share Our Website](#)

How Can We Help?

Name*

Email*

How can we help?*

Message*

CONTACT US

Figure 10: MAS4AI's Contact form

4 Dissemination activities via social networks

At the very bottom of the 'Home' page appears a number of shortcuts aim to connect the MAS4AI project with the created social networks (Figure 11). In particular and by the time of writing this document, Twitter (Figure 12), LinkedIn (Figure 13) and YouTube (Figure 14) accounts have been created.

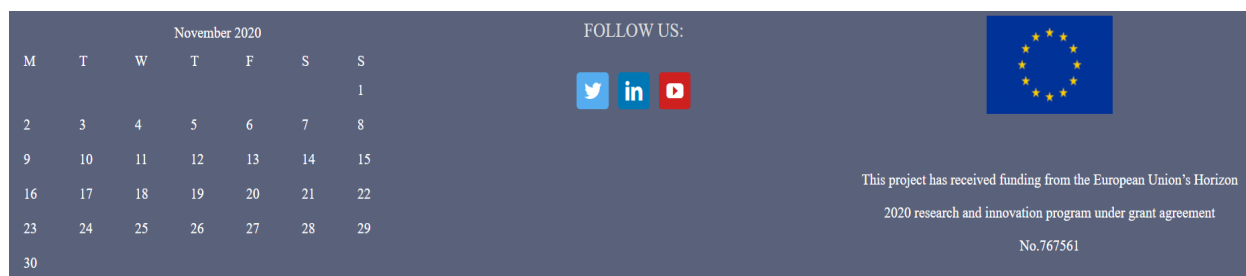


Figure 11: Social media shortcuts and Calendar in the portal's homepage

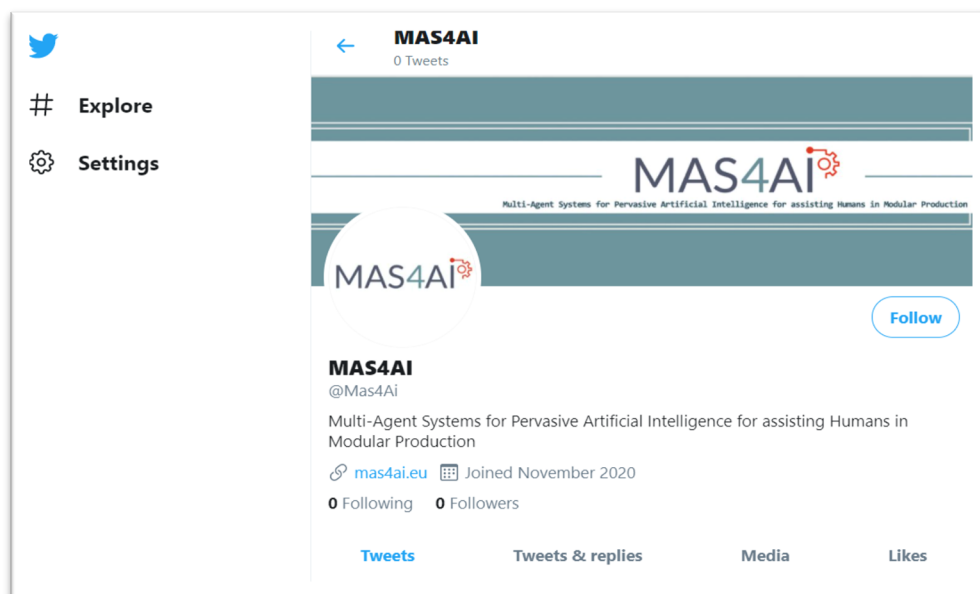


Figure 12: Dissemination via Twitter

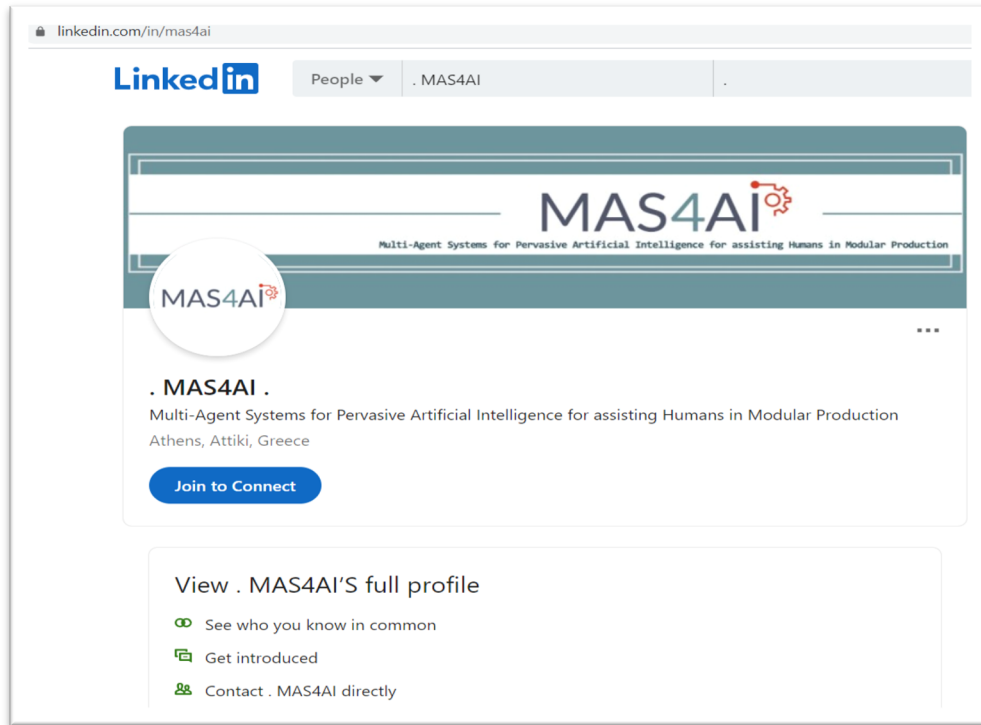


Figure 13: Dissemination via LinkedIn

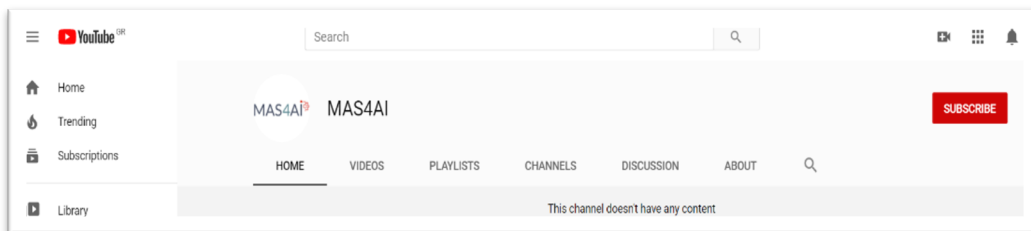


Figure 14: Dissemination via YouTube

5 Conclusions

This deliverable aims to report the development of the MAS4AI project's public web portal. As it has already been mentioned the MAS4AI Public Web Portal has been developed upon the WordPress platform. Consequently, the users of the portal may find additional information regarding the use of WordPress based sites in different sources freely available on the Internet. Some sources are indicated below:

- WordPress User Manual, <https://easywpguide.com/wordpress-manual/>

At this point, there are still items pending for the portal. In the course of the project, additional material, news and event updates will populate the portal. Moreover, the integration of maintenance activities to the MAS4AI portal is part of the ongoing work.

References

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