

INCISIVE Workshop

Health data sharing and AI in cancer imaging - empowering AI-driven solutions for cancer diagnosis, treatment and follow-up

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The logo for INCISIVE features a white circle containing the letter 'A' positioned above the letter 'I'. To the right of this circle, the word 'INCISIVE' is written in a large, bold, white, sans-serif font.

A
I **INCISIVE**

Improving cancer diagnosis
and prediction with
AI and big data

Table of Contents

- Workshop description
- System Roles
- Current implementation of the INCISIVE UI
 - Available functionalities
 - Registration and login
 - Home pages
 - View of data providers
 - Search and search results
 - Upload of AI models, creation of AI engines and train on Workspaces
 - Use of AI engines
 - View of inference results
 - Administrative functionalities
- Demo



Workshop Description

- Data repository and UI workshop
- Including user interfaces used by:
 - Data providers
 - Healthcare professionals
 - AI developers and AI researchers
 - Administrators and Organization administrators
- Showcase system functionalities:
 - Registration and login
 - Search and search results
 - AI models, AI services, and Workspaces
 - Use of AI services for inference



System roles (1/3)

The system includes 6 different roles, where each one can access different functionalities:

- **Administrator:** The administrative entity of the entire platform.
 - An administrator has access to all functionalities within the INCISIVE platform, from performing searches, to developing AI models and using AI engines.
 - The administrator is responsible for creating the Organization Administrator accounts for each organization, and to create an account for a new Data Provider.
- **Organization Administrator:** The organization administrator of an institution.
 - An organization administrator can access all functionalities within the system.
 - An organization administrator is responsible for accepting new user requests for their institutions
 - Given that the Organization Administrator's role is mainly related to the administration of their organization, they are not provided functionalities concerning the use of AI services or the addition of a new one (including also the sections regarding Workspaces, AI engines, and AI models)



System roles (2/3)

- **Medical Personnel:** A healthcare professional utilizing the INCISIVE platform.
 - A healthcare professional, can perform searches, view search results, as well as utilizing AI services, provided by the INCISIVE platform.
- **AI Developer:** A user whose responsibility is to implement AI models and train them in a federated manner using the data sets provided within the platform.
 - An AI Developer can perform searches to find data that fit their scope, implement and upload AI models, create AI engines, as well as training these models within Workspaces. In addition, they may also utilize already developed AI engines.
- **AI Researcher:** An AI researcher's role is similar to the AI Developer, yet the main difference is that their business scope may be slightly different. While an AI Developer should only be responsible for the development of AI models, an AI Researcher should also research and explore how a model should be developed and design the architecture of the AI engine, according to the provided data.
 - An AI Researcher has the same provided functionalities as the ones provided to an AI Developer. This means that, an AI Researcher could perform searches on the datasets, see the corresponding results, as well as implement and upload AI models, create AI engines and train them within a given Workspace. An AI Researcher is also able to use AI services.



System roles (3/3)

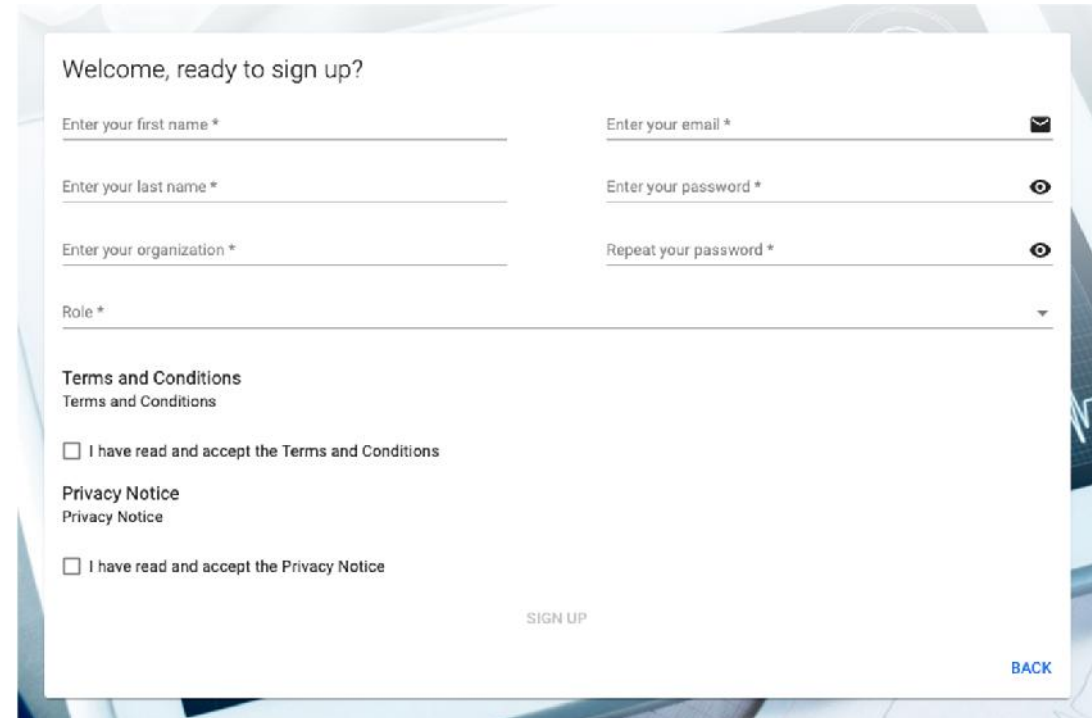
- **Data provider:** A data provider role is given to personnel of a specific organization whose responsibility is to access the platform and share their data in it.
 - A Data provider can share their datasets within the INCISIVE platform, using the data sharing portal, as well as perform searches on the already existing data and view these results.



System functionalities

Registration and login

- A new user may register to the INCISIVE platform.
- Their account will remain inactive until their organisation administrator approves it.



Welcome, ready to sign up?

Enter your first name *

Enter your last name *

Enter your organization *

Role *

Enter your email *

Enter your password *

Repeat your password *

Terms and Conditions
Terms and Conditions

I have read and accept the Terms and Conditions

Privacy Notice
Privacy Notice

I have read and accept the Privacy Notice

SIGN UP

BACK

System functionalities

Administrative functionalities

- The system administrator role has access to the platform's administrative pages.
- From these pages they may:
 - View active users
 - Activate pending accounts

First name	Last name	Email	Status	CLEAR
admin		admin@incisive-project.eu	Active	
Bruno	Alves	bruno.alves@eurodyn.com	Active	
FTSS	OFSTI	rofsti@ticsalutsocial.cat	Pending	

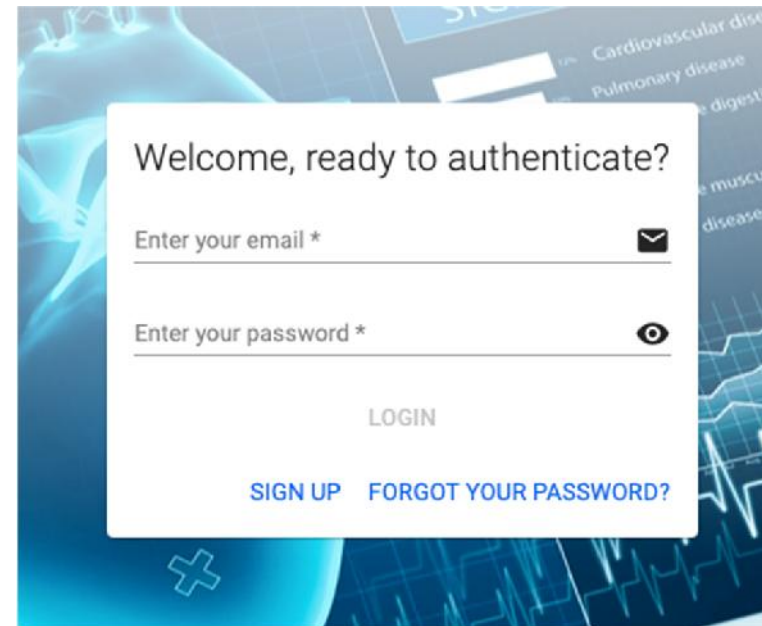
Items per page: 10 1 - 3 of 3



System functionalities


Registration and login


- Once the account is approved, the user may now enter the system and according to their role, they will be able to the available given functionalities.



Cardiovascular disease
Pulmonary disease
digestive
musculo
diseases

Welcome, ready to authenticate?

Enter your email * 

Enter your password * 

LOGIN

[SIGN UP](#) [FORGOT YOUR PASSWORD?](#)

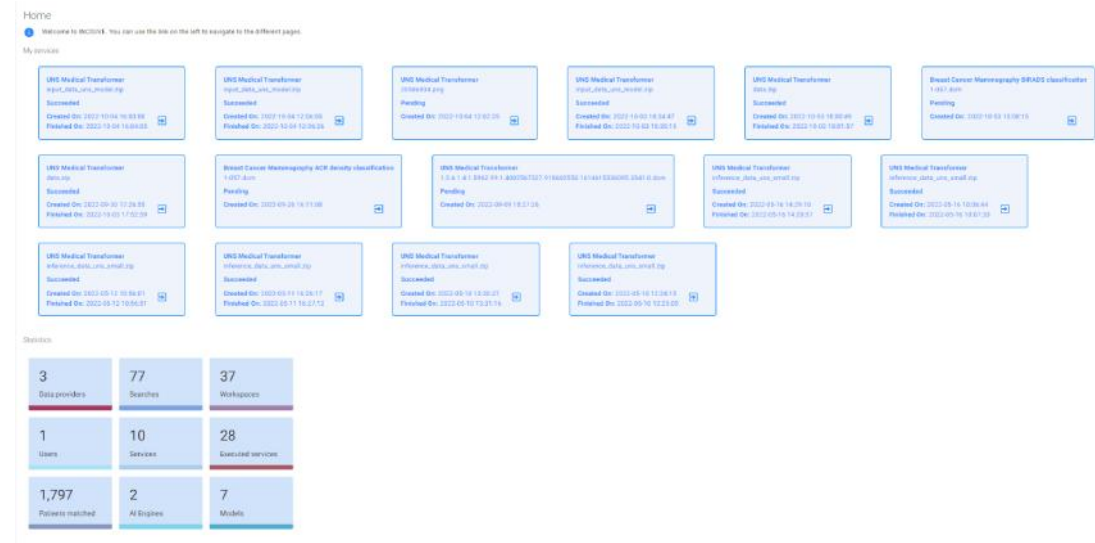
+



System functionalities

Home pages

- According to each user role, the home page is customized in order to reflect their business scope.
- In more detail:
 - **Administrators:** View running services and previously executed on the home page
 - **Organization Administrators:** View pending account requests and list of AI services trained using the OA's institution
 - **AI Researchers / AI Developers:** View list of AI Models and AI engines they implemented, and a list of searches they previously performed.
 - **Medical Personnel:** View AI engines they previously used, and searches they previously made.
 - **Data Providers:** View number of patients whose data is shared within the INCISIVE platform, and a list of the AI engines that were trained using their organisation's shared data.



This project has received funding from the European's Horizon 2020 research and innovation programme under Grant Agreement number: 952179



System functionalities

Data Providers section

- The user may see the available Data Providers along with some important information about them, including:
 - The organization's contact person
 - The data provider's website
 - And the cancer type the data they shared within the INCISIVE platform regards

Data providers

Data providers reflect the sources from which data becomes available in INCISIVE. The list below presents all Data Providers currently registered in INCISIVE together with details about each one.

GOC
Cyprus

CONTACT:
Yiannis Rousakis

WEBSITE:
<https://www.goc.com.cy>

DATA SETS FOR CANCER TYPES:
breast

UNS
Serbia

CONTACT:
Nikola Janković

WEBSITE:
<https://www.uns.ac.rs>

DATA SETS FOR CANCER TYPES:
breast, colorectal



System functionalities

Search and search results

- The user may perform searches in the platform in order to retrieve back data sets that can be used for the training of AI engines in Workspaces.
- They need to fulfill a set of fields and based on them a query will be performed among the distributed data providers
- The aggregated results will be shown once the search is over, and the results can be shown to the user.

Search

i The search functionality allows you to query the data available in INCISIVE. Each search being performed is distributed among data providers and the results are aggregated by INCISIVE.

Gender Age from Age to

Cancer type * Cancer stage Months of observations

Image modality

Treatment / Therapy

Data Provider / Research group Dataset country of origin

Datasets will full cases
 Genomic data available

[SEARCH](#)

System functionalities

Search and search results

- Using the search results section in the INCISIVE platform, the user may view previously performed searches, including the one that they performed.
- Once the search is finished, they user may view its results in this page.
- The user may select a specific search to view the exact results in a dedicated page.

Search results

The search results are the aggregated results from INCISIVE data providers for your previously performed searches. You can review a search result and then use it to create a workspace for training or evaluation.

Query	Status	Date started ↓	Date finished
Breast cancer, male	FINISHED	2022-09-26 14:54:46	2022-09-26 15:54:47
Breast cancer	FINISHED	2022-09-26 14:54:20	2022-09-26 14:54:21
Breast cancer	FINISHED	2022-09-26 14:53:36	2022-09-26 15:53:36
Breast cancer	FINISHED	2022-09-26 11:43:39	2022-09-26 12:43:43
Breast cancer	FINISHED	2022-09-26 11:42:52	2022-09-26 11:42:57
Breast cancer	FINISHED	2022-09-26 11:42:11	2022-09-26 11:42:16
Colorectal cancer	FINISHED	2022-09-26 11:41:58	2022-09-26 11:42:01
Breast cancer	FINISHED	2022-09-26 11:41:42	2022-09-26 11:41:46
Breast cancer	FINISHED	2022-09-26 11:07:00	2022-09-26 11:07:11
Breast cancer	FINISHED	2022-09-26 11:06:34	2022-09-26 11:06:41

Items per page: 10 11 - 20 of 45 < > >>

[CREATE NEW SEARCH](#)

System functionalities

Search and search results

- Using the search results section in the INCISIVE platform, the user may view previously performed searches, including the one that they performed.
- Once the search is finished, they user may view its results in this page.
- The user may select a specific search to view the exact results in a dedicated page.

Search results

Query	Status	Results collected	Date started	Date finished
Breast cancer	FINISHED	57	2022-09-26 15:35:03	2022-09-26 15:35:05
004-000003	female			GOC closed
004-000004	female			GOC closed
004-000005	female			GOC closed
004-000006	female			GOC closed
004-000007	female			GOC closed
004-000008	female			GOC closed
004-000052	female			GOC closed
004-000053	female			GOC closed
004-000054	female			GOC closed
004-000055	female			GOC closed

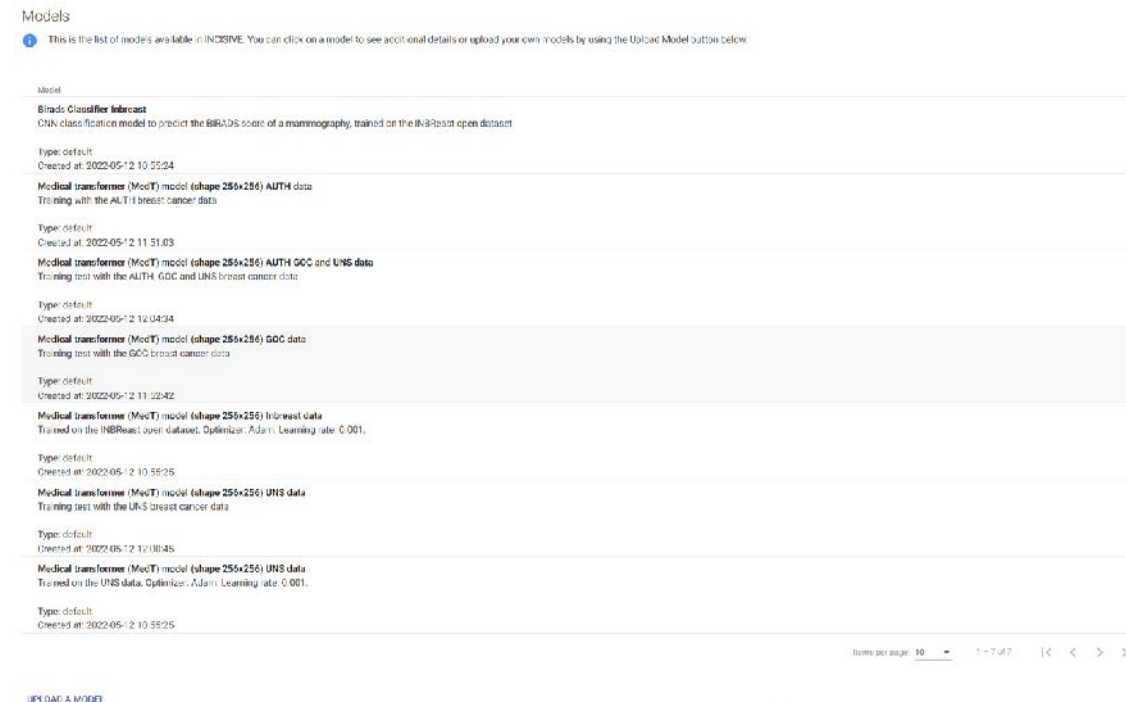
Items per page: 10 1 - 10 of 57 < >

DELETE FILTER RESULTS CREATE WORKSPACE

System functionalities

View and upload Models, create AI engines and train in Workspaces

- A user may see the models that are already uploaded in the INCISIVE platform including some important information about them, such as a description of what this model does, when it was created, in which AI engine it is used, etc.
- A user (in this case either an AI Researcher, or an AI Developer) may also choose to upload a new model they implemented in the INCISIVE platform.



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System functionalities

View and upload Models, create AI engines and train in Workspaces

- The user needs to upload the model in the INCISIVE platform, and fill in specific fields with information accompanying the model.

Upload a model

Model details

Enter the name of your model *

Enter the type of your model *

Enter a description for your model

AI Engine *

Model files

SELECT A MODEL FILE

CANCEL
UPLOAD MODEL

System functionalities

View and upload Models, create AI engines and train in Workspaces

- The user may also view the available AI Engines or create new ones.

AI Engines

i This is the list of AI Engines available in INCISIVE. You can click on an AI Engine to see additional details or register a new AI Engine using the Create AI Engine button below.

Name ↑	Description
Breast Cancer BIRADS	This service performs BIRADS classification of an input image. Given a DICOM mammography, this service predicts: - 1) if the actual BIRADS score equals to 1, 2, or 3 - 2) if the actual BIRADS score equals to 4a, 4b, or 4c - 3) if the actual classification BIRADS score equals to 5 or 6
Deleteme	This is a thing that does stuff
Test2	Test2
UNS breast tumour segmentation tool	Application that trains and uses MedT model (Medical Transformer: Gated Axial-Attention for Medical Image Segmentation)

Items per page: 10 1 - 4 of 4
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[CREATE AI ENGINE](#)



System functionalities

View and upload Models, create AI engines and train in Workspaces

- The user may also view the available AI Engines or create new ones.
- By selecting an already existing AI Engine, the user may view important information about this AI Engine, including its description, which organization owns it, and which models are utilized.

AI Engine

Breast Cancer BIRADS classification

Name	Breast Cancer BIRADS classification
Description	This service performs BIRADS classification of an input image. Given a DICOM mammography, this service predicts: - 1) If the actual BIRADS score equals to 1, 2, or 3 - 2) if the actual BIRADS score equals to 4a, 4b, or 4c - 3) if the actual BIRADS score equals to 5 or 6
Container name	breast-cancer-birads-classification
Container version	0.1.0
Owner	ICCS
Created at	2022-05-12 10:55:24
Supported use cases	Inferencing from pretrained model
Models produced	Birads Classifier Inbreast

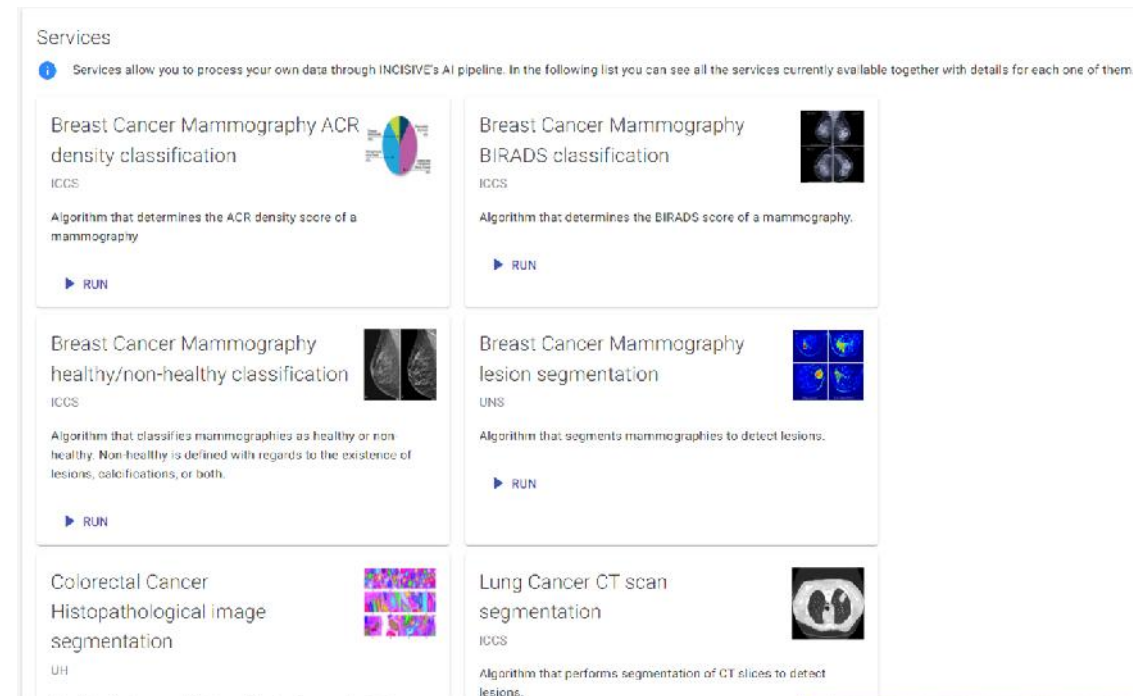
DELETE









System functionalities

Use of AI Engines

- Once an AI Engine is trained in the Workspace it is made available for use
- The user may see the complete list of the available AI Engines with information about them in the dedicated page.



The screenshot displays a 'Services' page with an information icon and a description: 'Services allow you to process your own data through INCISIVE's AI pipeline. In the following list you can see all the services currently available together with details for each one of them.'

Service Name	ICCS	Description	Thumbnail	Run Button
Breast Cancer Mammography ACR density classification	ICCS	Algorithm that determines the ACR density score of a mammography		▶ RUN
Breast Cancer Mammography BIRADS classification	ICCS	Algorithm that determines the BIRADS score of a mammography.		▶ RUN
Breast Cancer Mammography healthy/non-healthy classification	ICCS	Algorithm that classifies mammographies as healthy or non-healthy. Non-healthy is defined with regards to the existence of lesions, calcifications, or both.		▶ RUN
Breast Cancer Mammography lesion segmentation	UNS	Algorithm that segments mammographies to detect lesions.		▶ RUN
Colorectal Cancer Histopathological image segmentation	UH			
Lung Cancer CT scan segmentation	ICCS	Algorithm that performs segmentation of CT slices to detect lesions.		

System functionalities

Use of AI Engines

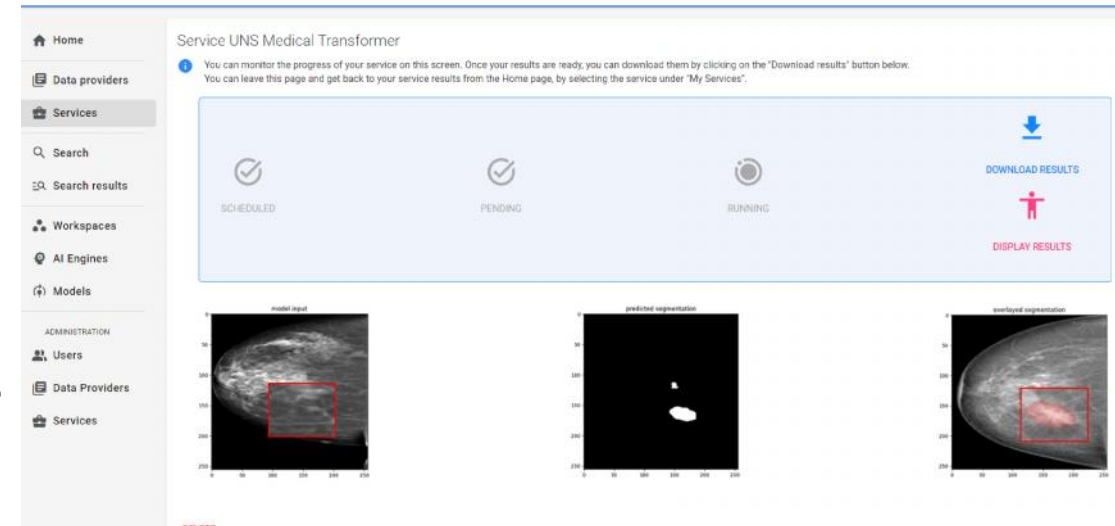
- Once an AI Engine is trained in the Workspace it is made available for use
- The user may see the complete list of the available AI Engines with information about them in the dedicated page.
- In addition, the user may select to utilize on of the available engines.
- The user needs to upload an image (or a set of images) for inference



System functionalities

Use of AI Engines

- Once the service is called, the inference process is instantiated.
- This process runs in the background, and once it is over, the user will be notified about it.
- Once the inference process is over, the user may then choose to:
 - Download the results in order to view them locally on their computer, or
 - Choose to view them within the platform



System functionalities

Administrative functionalities

- The system administrator role has access to the platform's administrative pages.
- From these pages they may:
 - View available registered Data Providers
 - Update existing Data Providers' information
 - Register new Data Providers

Data providers

Name ↑	Country	Cancer data sets
AUTH	Greece	breast, colorectal
GOC	Cyprus	breast
UNS	Serbia	breast, colorectal
UOA	Greece	breast

Items per page: 10 1 - 4 of 4 << < > >>

[REGISTER A DATA PROVIDER](#)

System functionalities

Administrative functionalities

- The system administrator role has access to the platform's administrative pages.
- From these pages they may:
 - View available services
 - Update existing services
 - Register new services

Services	
Name ↑	Provided by
Breast Cancer Mammography ACR density classification	ICCS
Breast Cancer Mammography BIRADS classification	ICCS
Breast Cancer Mammography healthy/non-healthy classification	ICCS
Breast Cancer Mammography lesion segmentation	UNS
Colorectal Cancer Histopathological image segmentation	UH
Lung Cancer CT scan segmentation	ICCS
Lung Cancer PETCT scan segmentation	ICCS
Lung Cancer Staging	AUTH
Lung cancer X-ray classification	VIS
UNS Medical Transformer	UNS

Items per page: 10 | 1 - 10 of 10 | << < > >>

[REGISTER A SERVICE](#)

LIVE DEMO

AI INCISIVE

Improving cancer diagnosis
and prediction with
AI and big data

INCISIVE Platform Demo

Steps:

- Login as a user
- View home page
- View available data providers
- Perform a search
- View search results
- Utilize an AI engine for segmentation
- View inference results in the platform and locally
- Download and view outcomes locally



Questions / Discussion

- How easy did you find to use the INCISIVE Platform?
- How easy it was to use a service?
- How easy was it to view the results of the service?
- How easy was it to perform a search?
- How clear (to understand) were the results provided by INCISIVE Platform?



THANKS FOR YOUR
ATTENTION



INCISIVE

Improving cancer diagnosis
and prediction with
AI and big data