



PREVENTING HATE AGAINST REFUGEES AND MIGRANTS

Interface

USER'S GUIDE



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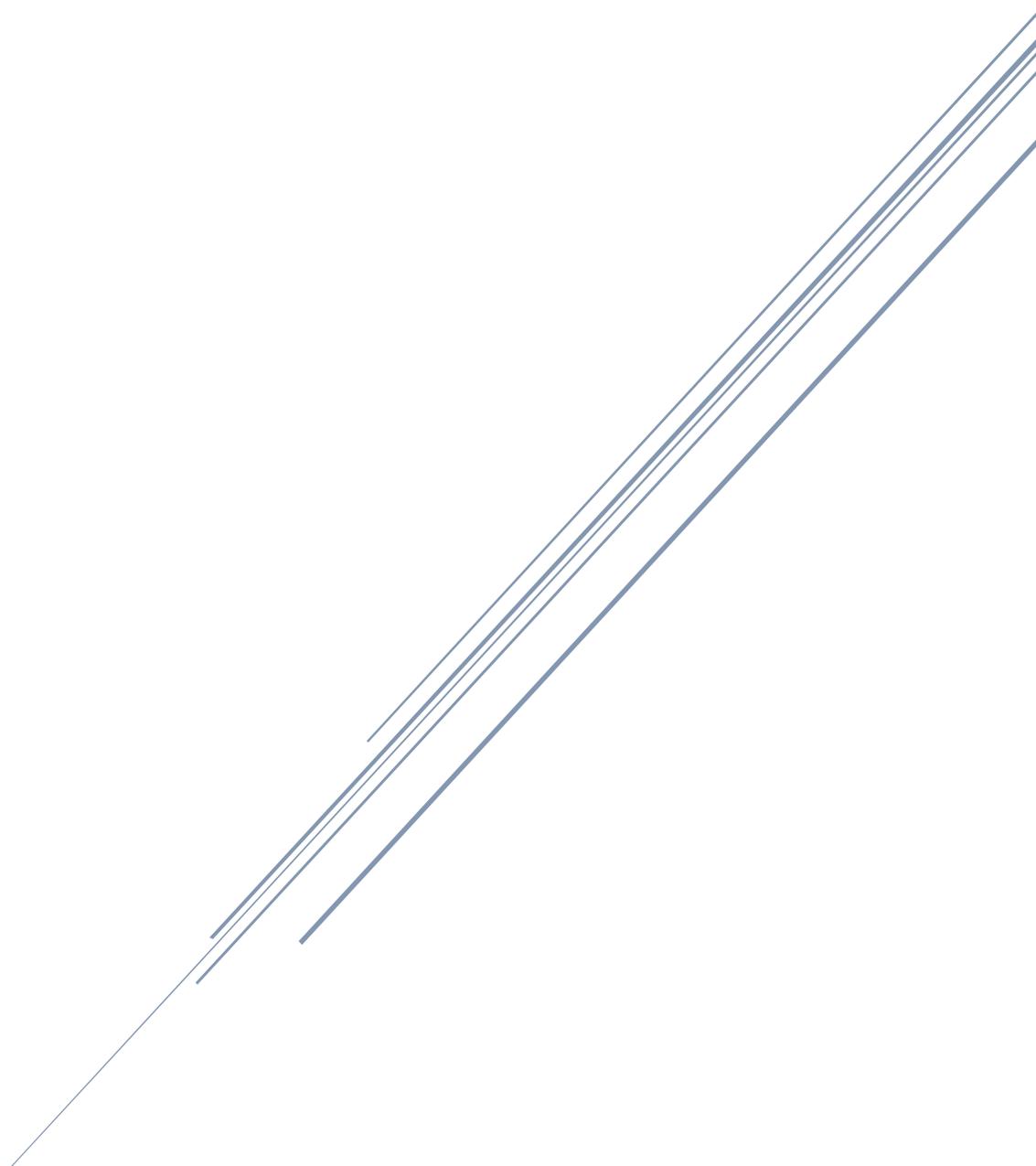
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USER'S GUIDE

For the Internet Interface of the PHARM project



English
version 1.0

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1 Technical Information

PHARM is a European project funded by the *European Union*, within *Rights, Equality, and Citizenship program REC-RRAC-RACI-AG-2019 (GA n. 875217)*. The main goal of *Preventing Hate Against Refugees and Migrants (PHARM)* is to monitor and model hate speech against refugees and migrants in Greece, Italy, and Spain to predict and combat hate crime and also counter its effects using cutting-edge techniques, such as data journalism and narrative persuasion. The main result will be the identification and reduction of online hate speech, and the prediction of potential hate crimes.

1.1 The Internet Interface

The *PHARM Internet Interface* is a web interface for a semi-structured integrated format orientated to store and query multi-source news and social media contents. The *Interface* consists of a database and front-end web interface for exposing data and functionality to the users. The first screen that is presented to the visitor is the home screen, which is presented in Figure 1. Apart from giving some basic information about the project, this screen provides a starting point for accessing the supported analyses on a text.

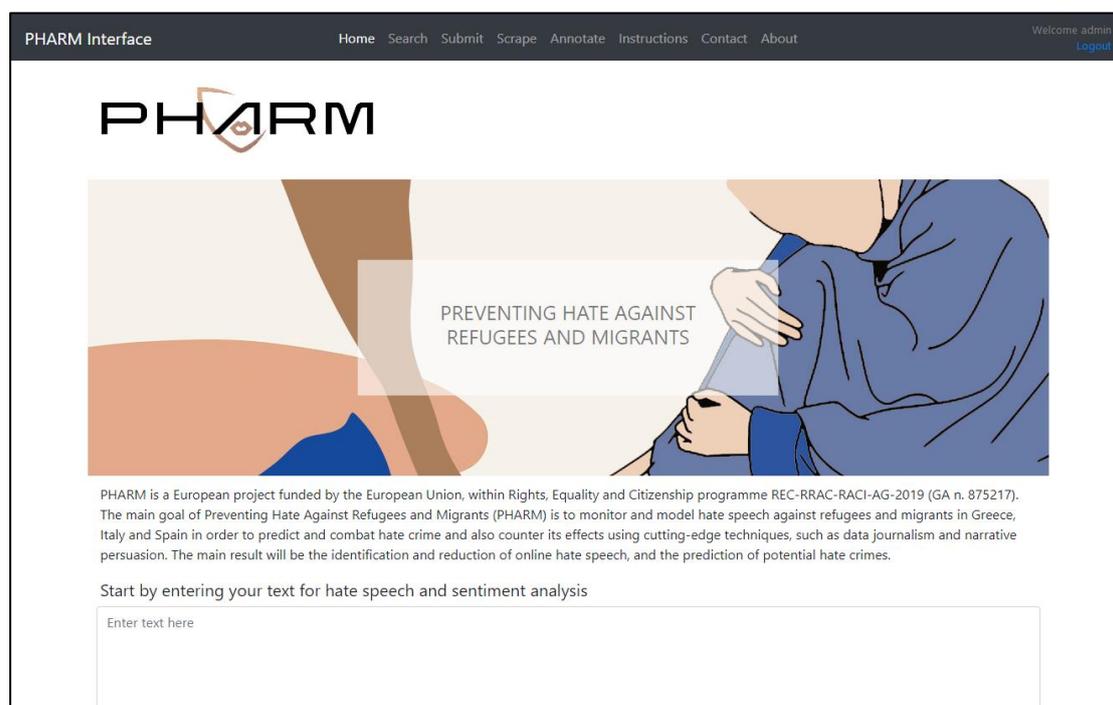


Figure 1 The Home Screen of the Internet Interface

The main actions that the interface supports are:

- **Search:** The search concerns database querying for filtering and downloading hate-speech data.
- **Analyze:** The analysis provides results of various types of text analyses, such as hate-speech detection, sentiment analysis, and geolocation estimation.
- **Scrape:** This action allows for scraping text data from the Twitter and YouTube social platforms.
- **Annotate:** Enables the annotation of the collected data.
- **Submit:** This functionality allows for adding new hate-speech records to the database.

The analysis and searching functions are freely exposed to all users that use the interface, whereas authentication is required for accessing the Scrape, Annotate and Submit actions. If users want to be part of the project for contributing with additional data, they should contact our team for requesting such a role by visiting the contact page of the interface.

1.2 Technical information

For the development of the interface, the *Python* web framework *Flask* has been used. The choice is justified, as the *Natural Language Processing (NLP)* and data analysis procedures are also written in *Python*. With this approach, all the functionality of the interface can be included within a common project. The front-end of the graphic user interface has been designed mainly in *Bootstrap*, a popular *HTML*, *CSS*, and *JavaScript* library. Additional *HTML*, *CSS*, and *JavaScript* blocks have been added where needed. The *Flask* project has been deployed on a Virtual Machine and is served using the *Waitress*, a production-quality pure-Python WSGI server with very acceptable performance.

Various libraries have been deployed for implementing the supported analysis methods, along with custom algorithms that have been developed specifically for the PHARM project. Some of the most important methods enable data scraping, date and time estimation, geolocation estimation, language detection, and hate speech detection. Additional functions, like sentiment analysis, will be available in the *Interface* once finished, according to the project's timeline. The main functionality and design choices of these methods are presented below. For further technical information, please visit the [PHARM Github Repository](#).

1.2.1 Scraping

The project supports text collection from *Twitter* via the appropriate *API* and the stream method. *Tweepy* is used for accessing the *Twitter API*. Four dictionaries for filtering tweets have been developed including Greek, English, Spanish and Italian keywords. *YouTube* comment collection is supported via the *Google API*. A search query relevant to the topic (e.g. "migration refugees") is required from the user and the comments from the top results (videos) are collected.

1.2.2 Datetime estimation

A method for detecting and standardizing date and time information from metadata and text has been implemented. Besides location and language, when metadata is available, *PHARM* makes use of relevant extra information for hate-speech analysis. Some of this extra information, such as date or time, might be available in most cases in several different formats. This introduces the necessity of standardization. For the needs of this requirement, *date-parser*, *datefinder*, and *parsedatetime* *Python* packages are exploited, ranked from higher accuracy to higher probability of returning a result. If the most accurate method fails to detect a datetime object, the next service is called. Detection is based on metadata analysis, where date information is commonly present. If datetime detection fails for all services for the metadata, the same workflow is applied to the text data.

1.2.3 Geolocation estimation

A method for detecting geolocation from text data has been implemented. The *geopy* library, along with the *nominatim* geocoder have been deployed. Named entities (linguistic features) are isolated from texts, according to the following ranking: GPE (countries, cities, states), LOC (mountains, bodies of water), FAC (buildings, airports, highways, etc.), ORG (companies, agencies, institutions, etc.) and geocoded.

1.2.4 Language detection

PHARM mainly processes text produced in Greek, Italian, and Spanish languages but many of the sources might have contents in other foreign languages or local dialects. To work with these three national languages, a procedure to detect the language of the media text when it is not properly declared has been coded. A recursive approach is adopted for improved robustness, exploiting the *textblob*, *googletrans*, and *langdetect* libraries. If a service fails, the result from the next one is requested.

1.2.5 Hate speech detection

A couple of methods for finding key terms for hate speech detection have been implemented. These include simple string matching, approximate string matching with the use of the appropriate metrics, such as Levenshtein Distance, Damerau-Levenshtein Distance, Jaro Distance, Jaro-Winkler Distance, Match Rating Approach Comparison, Hamming Distance. Term matching also aims at being suffix agnostic, accommodating the various suffixes that may exist in nouns for many languages (i.e. Greek language features different suffixes for gender or singular/plural versions). A word-vector approach has also been developed, taking into account the semantic meaning of the terms. A hybrid dictionary-based approach with predefined phrases, along with dynamic term combinations (i.e. adjectives combined with nouns) has been implemented and is under evaluation. A language model is loaded (according to the language of the text), common practices are followed (lowercasing, lemmatization, stop-words and punctuation removal), and the targeted terms are being searched in the text. If a term (or combination of terms) is found, the text is marked as "hate-speech". An additional supervised classification algorithm is also under development and will be embedded in the interface.

1.2.6 Sentiment analysis

Two methods for sentiment analysis are under development and will be embedded in the interface, according to the project's timetable. These include an unsupervised, lexicon-based approach and a supervised, exploiting machine learning technology, approach.

1.3 Users

The interface specifies two types of users: the visitor and the contributor. A visitor can access the analysis and search modules, while the contributor has full access to all available actions. The basic work-flows for a visitor (unauthenticated user) and a contributor (authenticated user) are defined as follows:

Contributor

- Search -> Analyze
- Scrape -> Annotate -> Submit

Visitor

- Search -> Analyze

1.4 Actions

The primary actions that are supported by the Interface are five: Search, Analyze, Scrape, Annotate, and Submit. A more detailed description of these functions follows.

1.4.1 Search

One of the main functionalities of the interface is navigating through the hate-speech (text) recordings of the database. The user can view all the results or apply a variety of filters (e.g. source, language, date). In detail, the available filters are:

- Source selection (Twitter, Facebook, Website Articles, Website Comments).
- Language selection (English, Greek, Italian, Spanish).
- Date and time selection (show only results inside a specific period).
- Keyword filtering (a search query for finding occurrences to texts).

The user can preview the results, chose either the “Simple” or the “Scientific” view, download them as a CSV or a JSON file, or display more detailed information for each record.

1.4.2 Analyze

When a record is selected (or for a text that is placed in the home screen), a view presenting detailed information appears (Figure 2). The location is marked on a map and the results of various text analysis algorithms are presented with graphics (icons, bars, etc.). The results concern hate speech detection (for both unsupervised and supervised classification methods), sentiment analysis (for both unsupervised and supervised classification methods), frequent word detection, and hate-speech entity collection.

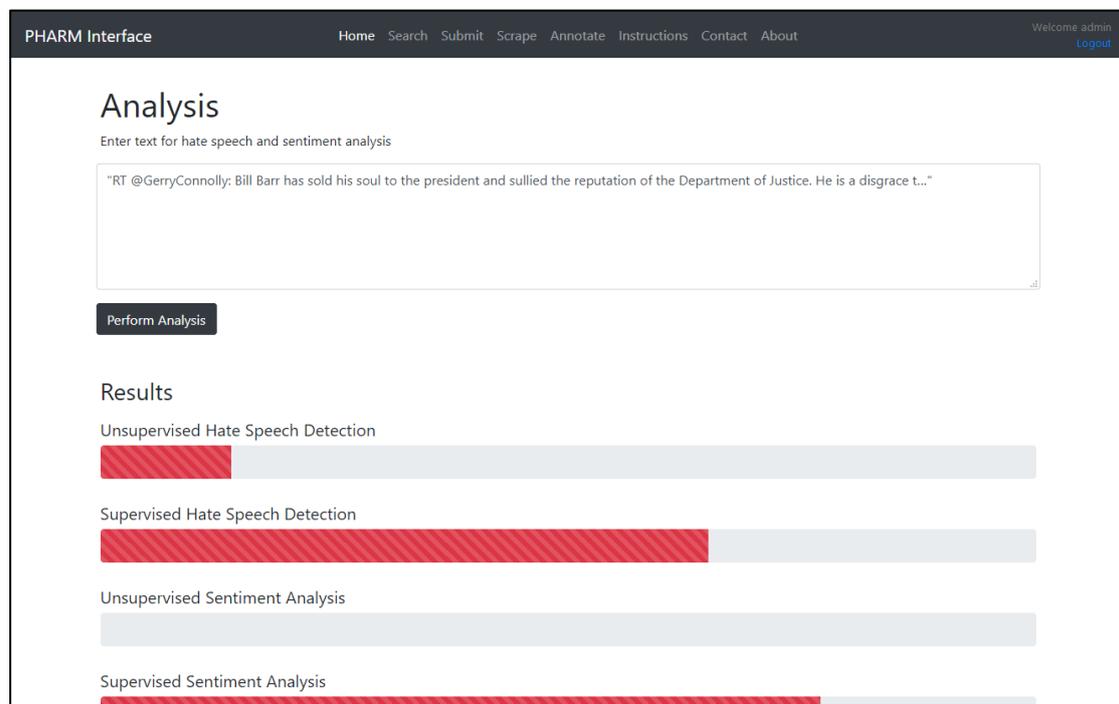


Figure 2 The Analyze Screen of the Internet Interface

1.4.3 Scrape

This module enables the mass-collection of text data from two popular platforms: Twitter and YouTube. A User can collect hate-speech data from Twitter, by simply choosing the desired language (Greek, English, Italian, or Spanish), and invoking the process by hitting the "Scrape" button. The data streaming starts and tweets are collected based on language-specific lexicons that have been developed in the context of the project. The process stops after a user-configurable time interval. A link is provided for downloading a JSON file that contains the data. These data may be used for any desirable *Natural Language Processing (NLP)* task. The user can repeat the process multiple times.

In the case of *YouTube*, instead of selecting the language, a search query must be set. The search query can include individual search terms or a combination of them, separated by a comma. The process is instantaneous in this case and a view displays the corresponding data.

These data can be downloaded as a CSV or JSON file. For more information about the twitter-filtering lexicons and JSON-based data format, you can refer to the [PHARM GitHub repository](#).

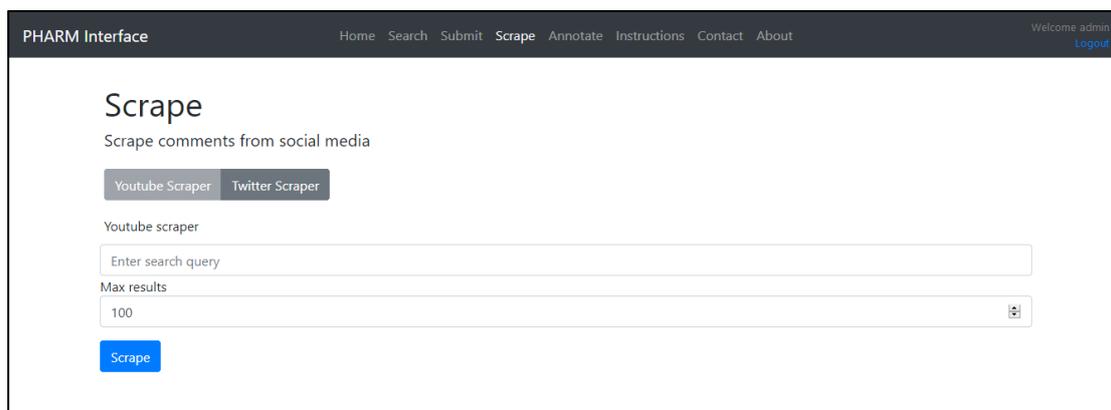


Figure 3 The Scrape Screen of the Internet Interface

1.4.4 Annotate

The annotation process is powered by the doccano tool. Doccano is an annotation management system for text data and can be used for developing datasets for facilitating classification, sentiment analysis, entity tagging, or translation tasks. In the context of the PHARM Project, it is used for text classification and each record should be labeled with specific tags.

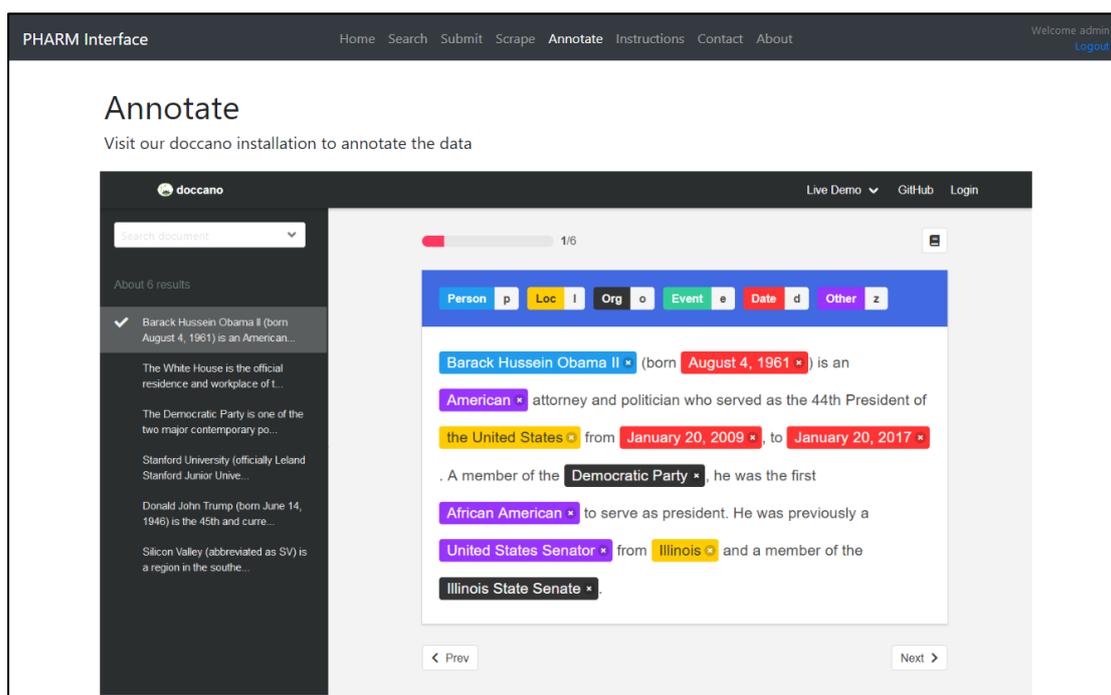


Figure 4 The Annotate Screen of the Internet Interface

1.4.5 Submit

For adding a new record (or a batch of records), the user should select “Submit” from the top menu (Figure 5). Data entry can be executed either one by one or massively. Concerning the first method, the user should set all data (text) and metadata (source, language, date, hate, sentiment, etc.) via the corresponding input forms (i.e. text fields, radio buttons, etc.). If data are already formed appropriately (see Paragraph 1.5), they can be imported as a JSON file too.

1.5 Data format

Taking into account the requirements of the project (i.e. the use of some relevant extra information for hate speech analysis), the sources that are used for gathering the relevant content (i.e. Website articles and comments, YouTube comments, and Twitter tweets), interoperability and compatibility considerations for importing/exporting data to third party applications that are exploited (i.e. doccano platform for annotation), some general specifications for the data format have been set.

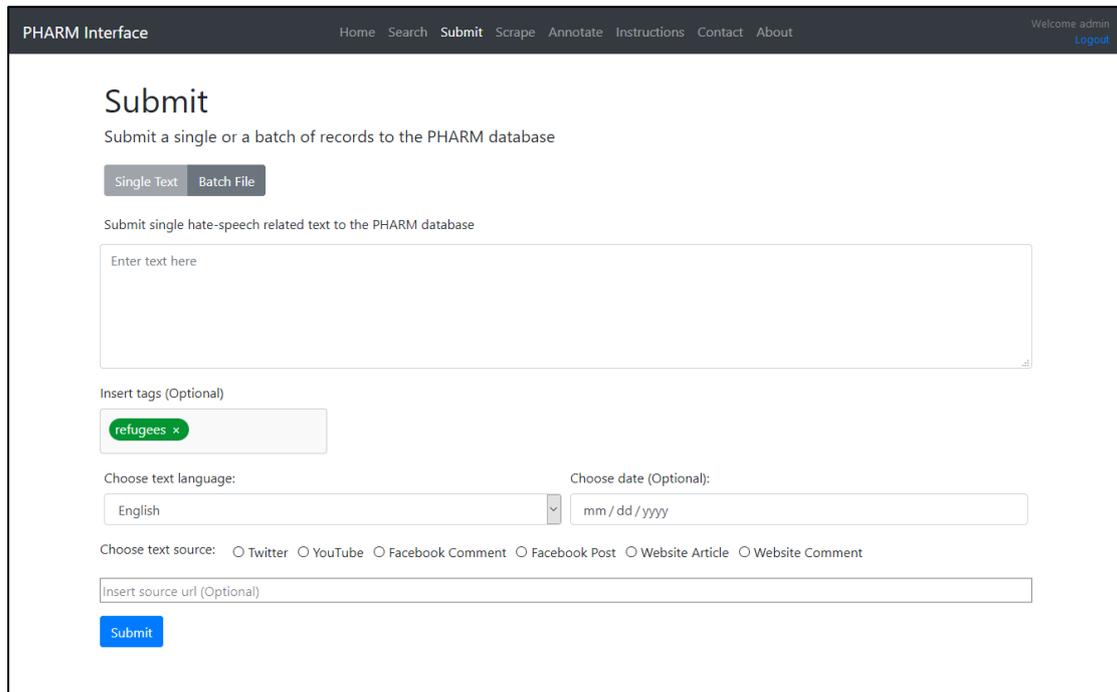


Figure 5 The Submit View of the Internet Interface

The main field is the text (content), accompanied by the id, annotations, and meta fields. The meta field is a container that includes all additional metadata. A fundamental/minimum set of metadata is used for all platforms (i.e. type, plang, pdate, phate, psent, pterms, ploc). These fields are more probable to be found for all records across different sources. The following table gives the overview of the proposed data scheme (Table 1).

Table 1 The common fields of the PHARM data format

Field	Description
id	unique identifier
annotations	hate speech and sentiment annotations
meta	metadata
text	content
type	type of text (tweet, article, comment, etc.)
plang	language detection via PHARM analysis
pdate	datetime estimation via PHARM analysis
phate	hate speech detection via PHARM analysis
psent	sentiment analysis via PHARM analysis
pterms	frequent terms collection via PHARM analysis
ploc	geolocation estimation via PHARM analysis

In the cases of web scraping, metadata depends on the available metadata provided by each site and the site-specific structure, whereas for YouTube Comments and Twitter Tweets, where the corresponding APIs are used, specific metadata have been selected and are collected along with the comment text (*Error! Not a valid bookmark self-reference.*).

Table 2 The extra fields (metadata) for YouTube and Twitter records

Twitter	YouTube
tweet_id	comment_id
is_retweet	reply_count
is_quote	like_count
user_id	video_id
username	video_title
scr_name	channel
location	video_description
followers	author_id
friends	author_name
date	date

For a more descriptive presentation, sample data from different data sources are presented below.

Facebook

```
{
  "id": "1",
  "annotations": [
    {
      "label": "hate",
      "user": 2
    },
    {
      "label": "negative",
      "user": 2
    }
  ],
  "meta": {
    "id": "80056833",
    "type": "facebook_comment",
    "source": "https://www.facebook.com/provinciale.rivista",
    "plang": "it",
    "pdate": "1571-10-15 00:00:00",
    "phate": "(nero cinesi)",
    "pterm": "",
    "ploc": "Italy, United States of America",
    "text": "andrebbe anche fatta con Venezia (principale flotta a Lepanto). 1571: le mie potentissime galeazze spaccheranno il culo all infedele ottomano. 2020: per favore basta quarantena, devo vendere lasagne sur-gelate in nero ai cinesi a 50 euro"
  }
}
```

Twitter

```
{
  "id": "2",
  "annotations": [
    {
      "label": "hate",
      "user": 2
    },
    {
      "label": "neutral",
      "user": 2
    }
  ],
  "meta": {
    "type": "twitter_comment",
    "date": "10/13/2020",
    "tweet_id": 1315981643111432192,
    "is_retweet": true,
    "is_quote": false,
    "user_id": 1025701121749340160,
    "username": "Christina Dim",
    "scr_name": "ChristinaDim31",
    "location": "Αθήνα",
    "followers": 3178,
    "friends": 4756,
    "quoted_text": "",
    "pid": 27454420,
    "plang": "el",
    "pdate": "",
    "phate": "(Τουρκία μετανάστες)",
    "pterm": "",
    "ploc": "Turkey",
    "text": "RT @kanekos69: Εν τω μεταξύ αν γίνει στραβή με Τουρκία βλέπω μετανάστες εθελοντές στο μέτωπο και δεξιούς προσφυγες στα Παρίσια"
  }
}
```

YouTube

```
{
  "id": "3",
  "annotations": [
    {
      "label": "no_hate",
      "user": 2
    },
    {
      "label": "neutral",
      "user": 2
    }
  ],
  "meta": {
    "type": "youtube_comment",
    "comment_id": "Ugy-SPKz3HG04OohJnFR4AaABAg",
    "reply_count": 3,
    "like_count": 30,
    "video_id": "Gaz6UvRWOG8",
    "channel": "Μηδέν Ένα Μηδέν 010",
    "video_title": "0 1 0 ~ Πρόσφυγες",
    "video_desc": "Lyrics/Raps - 0 1 0 Beat by Apo (Αισθήσεις) Recorded @ Blackspot Studio Mix/Master by Sativa Cover by SpyOne (Baseline Co.) 0 1 0 IG: ...",
    "author_id": {
      "value": "UCPP-OugMmE8pNbWRbFv4YCA"
    },
    "author_name": "GATE21QNZ",
    "rating": "none",
    "date": "2020-09-03T21:16:31Z",
    "plang": "el",
    "pdate": "2020-10-25 00:00:00",
    "phate": "(Αφγανιστάν ισλαμιστές)",
    "pterm": "",
    "ploc": "Afghanistan",
    "text": "Είμαι 25 ετών, ονομάζομαι Μήτσος ο μαλάκας, Μαζεύω ισλαμιστές και λιποτάκτες από μια τούρκο βάρκα, Το παίζω ανοιχτόκαρδος με τις τσέπες του μπαμπάκαα, Και όταν ο Μήτσος πήγε να κάνει φίλους στο Αφγανιστάν, Τον σφάξαν σαν τους προγόνους του, για χάρη του Ισλαμ."
  }
}
```

Website Article

```
{
  "id": "4",
  "annotations": [
    {
      "label": "no_hate",
      "user": 2
    },
    {
      "label": "positive",
      "user": 2
    }
  ],
  "meta": {
    "id": "92860318",
    "type": "article",
    "source": "http://defencereview.gr/gnorizontas-ta-gallika-ploia-oi-fremm-kai-o/",
    "meta": "Άμυνα Ελλάδα 9 Σεπτεμβρίου 2020 18:22",
    "title": "Γνωρίζοντας τα γαλλικά πλοία: Οι FREMM και οι [email protected] (Video)",
    "lang": "el",
    "date": "2020-09-09 00:00:00",
    "hate": "",
    "terms": "",
    "loc": "",
    "text": "Συχνά πυκνά αναφερόμαστε στις γαλλικές ναυπηγικές σχεδιάσεις. Τα παρακάτω βίντεο που βρήκα-με είναι αντιπροσωπευτικά για τις δυνατότητες των πλοίων με πολύ καλά σκηνοθετημένα βίντεο και ενδιαφέροντα πλάνα. Αξίζει να τα δείτε: "
  }
}
```

Website Comment

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```
{"id": "5", "annotations": [{"label": "no_hate", "user": 2}, {"label": "neutral", "user": 2}], "meta": {"id": "92860318", "type": "comment", "source": "http://defencereview.gr/gnорizontas-ta-gallika-ploia-oi-fremm-kai-o/", "lang": "el", "date": "", "hate": "", "terms": "", "loc": ""}, "text": "Το μπαρτζ επεκτεινεται. Ελπίζω αυριο τετοια ωρα πανω κατω να μην κλαιμε"}
```

You can also get more information about the data format and the fields that are used by visiting the [PHARM GitHub repository](#).

2 Interface Guide

2.1 Introduction

The Internet Interface allows for searching, viewing, analyzing, adding, and scraping hate-speech texts for the PHARM project, providing a friendly graphic user interface. The interface is accessible by visiting the following hyperlink: pharm-interface.usal.es.

2.2 Home

The home screen serves as the starting point for making text analyses on a user-defined text. Type (or paste) the desired text in the **textbox** and hit the **“Perform Analysis”** button, as depicted in Figure 6.

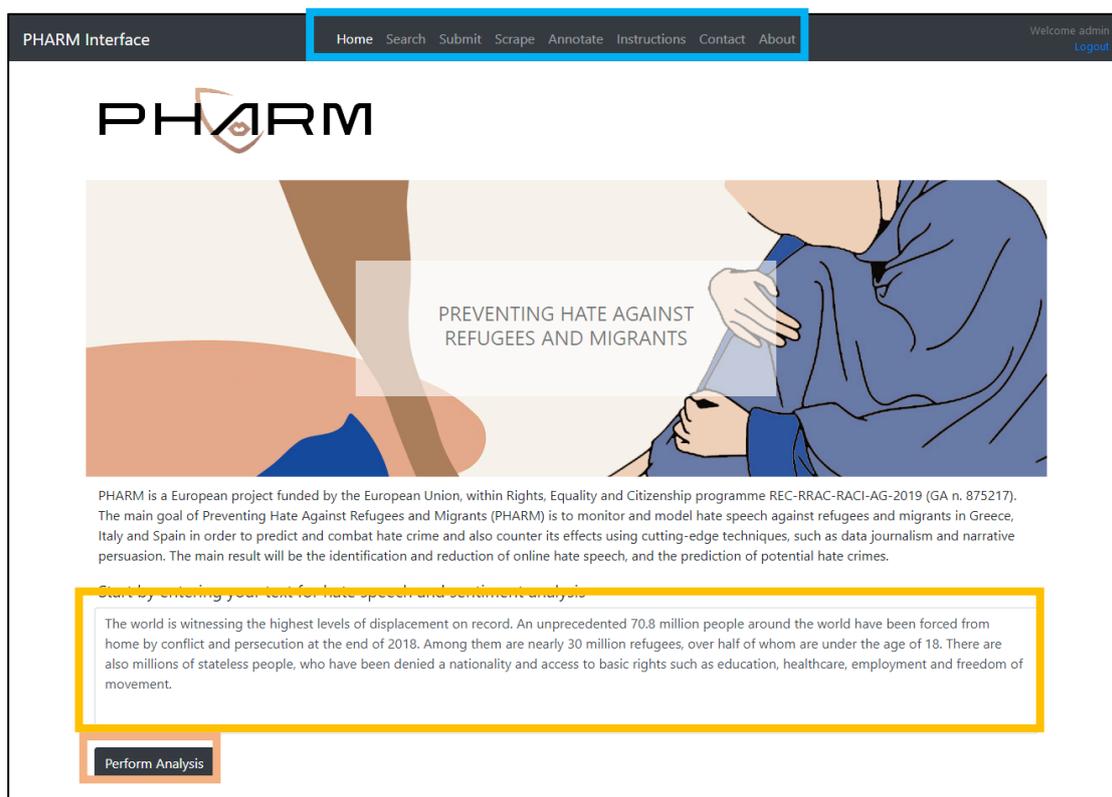


Figure 6 Home Screen functionality

A new tab in the web-browser opens and the analysis results are presented (Figure 9. Analysis Screen functionality). For more information refer to Section 2.4.

Navigation to all subpages of the Internet Interface is available by using the **top menu**.

2.3 Search

One of the core actions of the Interface is the navigation through the hate speech records of the database.

The users can visit the “Search Screen” by selecting “Search” from the top menu. After setting the **desired filters**, namely source, language, date range, and search query, they must press the **“Search”** button (Figure 7 Search Screen functionality). Source and language filters are mandatory, whereas setting a date and a search query is optional.

The “Search Results Screen” loads and a list of the corresponding results are listed (Figure 8 Search Results Screen functionality). The user can preview the records, chose either the “Simple” or the “Scientific” view, download them as a CSV or a JSON file, delete a record or display detailed information about it.

It must be noted that the delete action is only available to authenticated users.

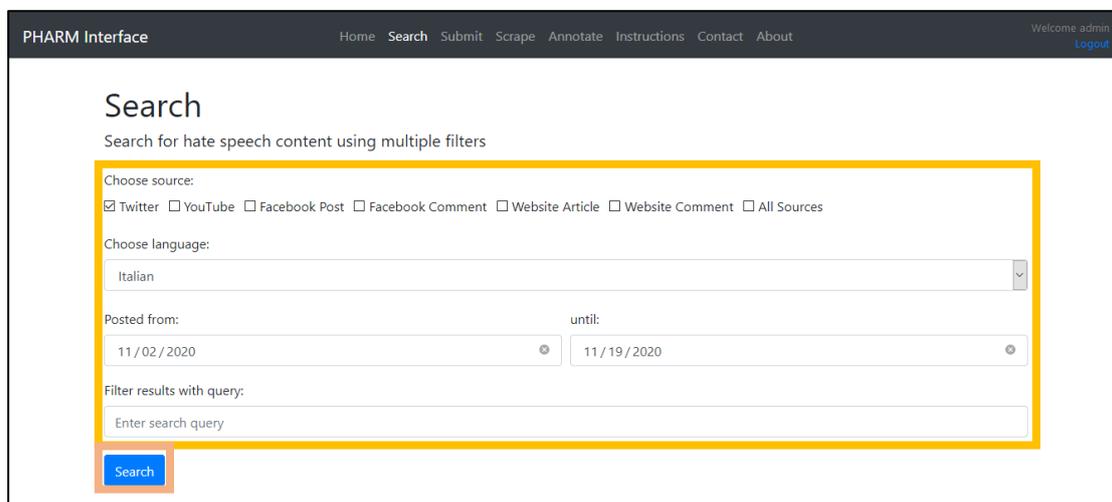


Figure 7 Search Screen functionality

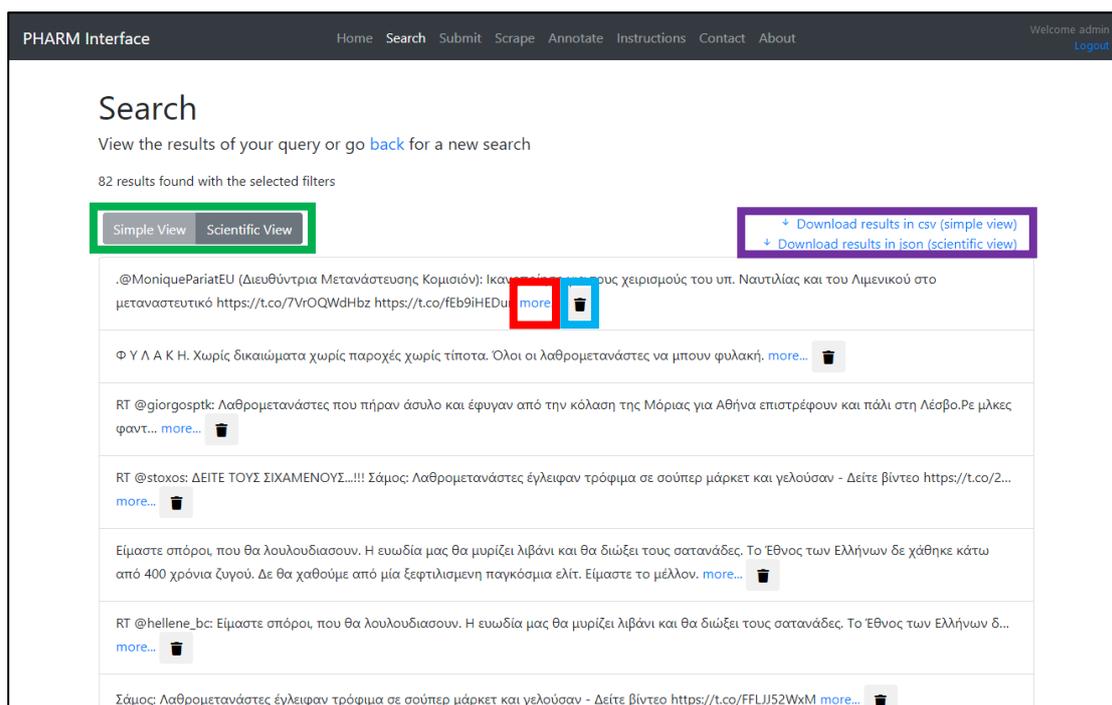


Figure 8 Search Results Screen functionality

2.4 Analyze

When a record is selected (or a text is placed in the “Home Screen”), a view presenting detailed information appears (Figure 9. Analysis Screen functionality). The results of the various text analysis algorithms are presented. The algorithms concern hate speech detection, sentiment analysis, frequent word detection, geolocation estimation.

The user can perform a new text analysis without leaving the screen, **by editing the text in the textbox** and pressing the **“Perform Analysis” button**.

On the bottom of the page, there are **shortcuts** for suggesting a correction to our team or referring to the PHARM GitHub repository for finding more information about the text analysis algorithms deployed in the Interface.

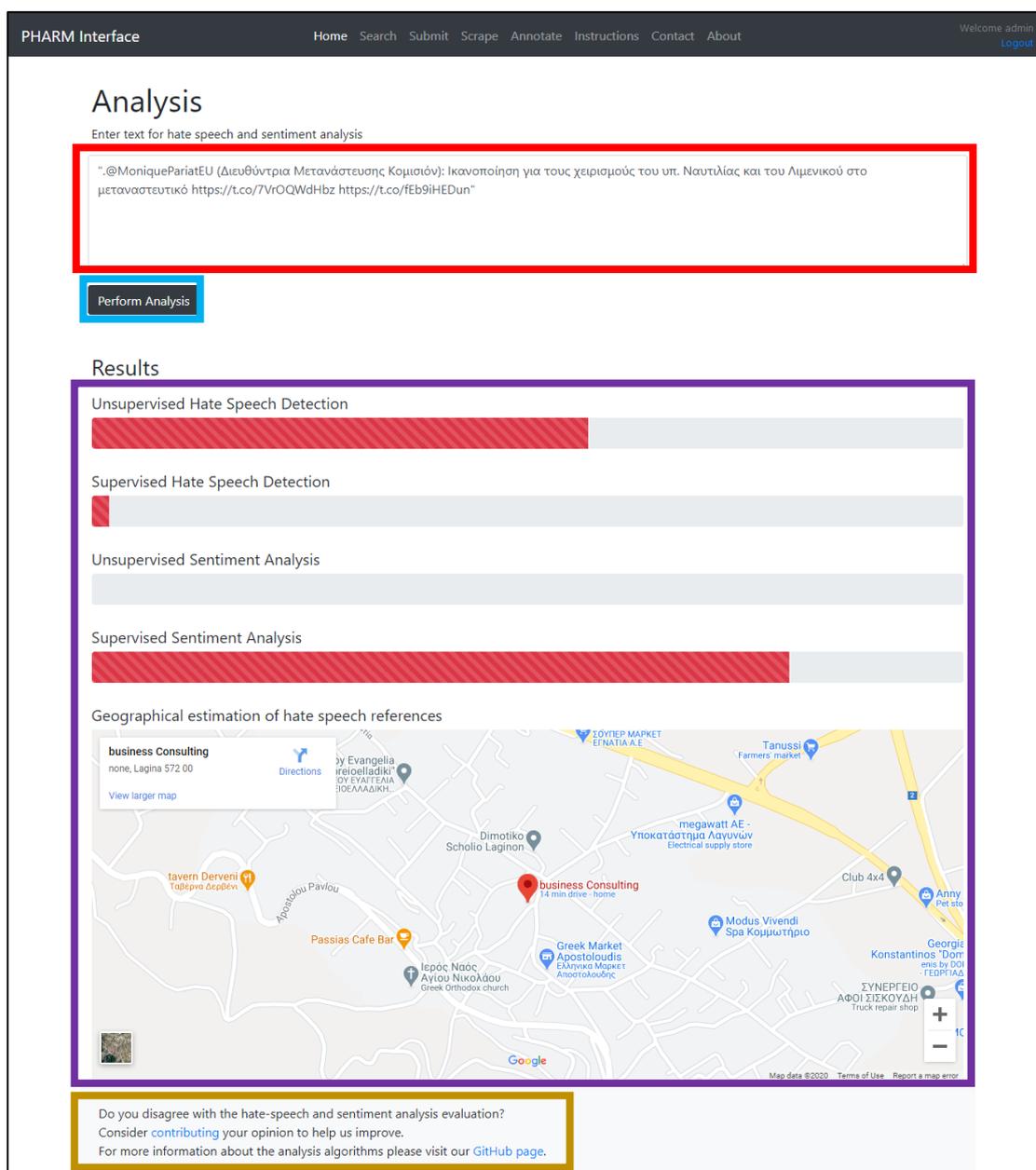


Figure 9. Analysis Screen functionality

2.5 Scrape

This screen provides functionality for enabling the mass-collection of text data from two social platforms, Twitter and YouTube.

When **YouTube Scraper** is selected, the screen that is depicted in Figure 10 appears. The user must **type some search terms** for collecting relevant comments from YouTube. The number of **results also can be set**. Finally, the **“Scrape” button** must be pressed to load the results,

which are presented as shown in Figure 8, while data can be downloaded in CSV or JSON format as well.

In the case of Twitter scraper, the screen has a similar form (Figure 11 Twitter scraping functionality). A language should be selected, along with the time interval that the scraping operation will be active. When the “Scrape” button is pressed a hyperlink is generated for downloading the corresponding data after the predefined time interval passes.

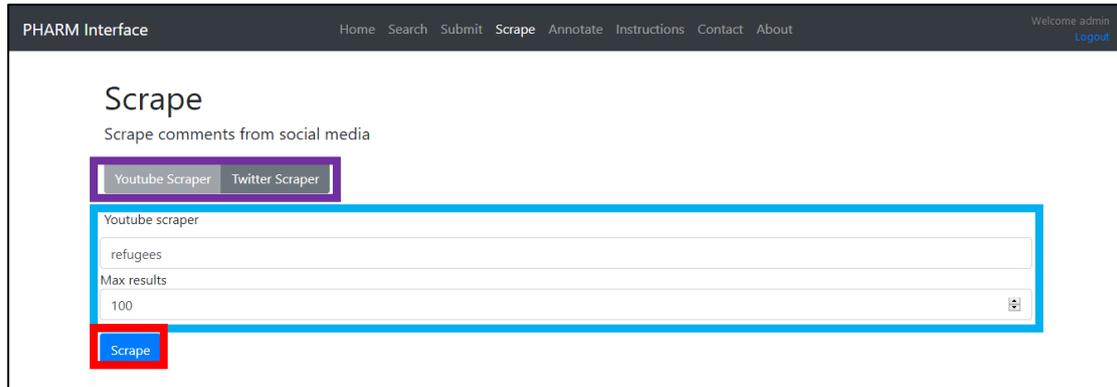


Figure 10 YouTube scraping functionality

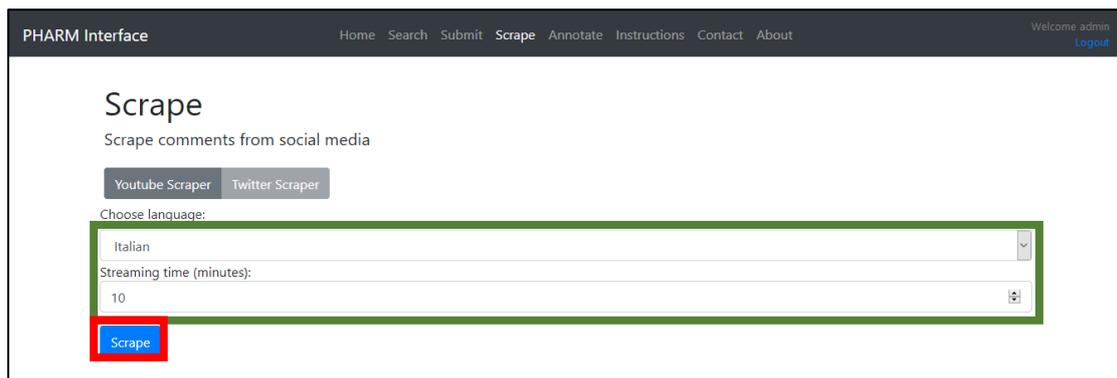


Figure 11 Twitter scraping functionality

2.6 Annotate

For annotating data, select “Annotate” from the top menu to navigate to the doccano annotation platform. For more information refer to Section 3.

2.7 Submit

For adding a new record, the user should select the “Submit” from the top menu. Data entry can be executed either *one-by-one* or *massively*.

Concerning the first method, the user should set all data (text) and metadata (source, language, date, hate, sentiment, etc.) via the corresponding input forms. Data is added to the database by hitting the “Submit” button (Figure 12 Single text submission functionality).

If data are already formed appropriately (see Paragraph 1.5), they can be imported as a file (JSON). Select “Batch File”, browse for the file, and hit the “Submit button”.

After data import is completed the Import Summary Screen is presented (Figure 14). This screen displays useful information about the total records that have been processed, the number of duplicates, or records that are already stored in the database.

Additionally, invalid entries, which lack mandatory fields are detected and the user is notified accordingly.

Figure 12 Single text submission functionality

Figure 13 Batch records submission functionality

Figure 14 Import Summary Screen of the Internet Interface

2.8 Login

When the user selects a page that requires authentication (i.e. Search, Scrape, and Annotate), the Login Screen appears (Figure 15 The Login Screen of the Internet Interface), where the username and the password must be filled in to proceed.

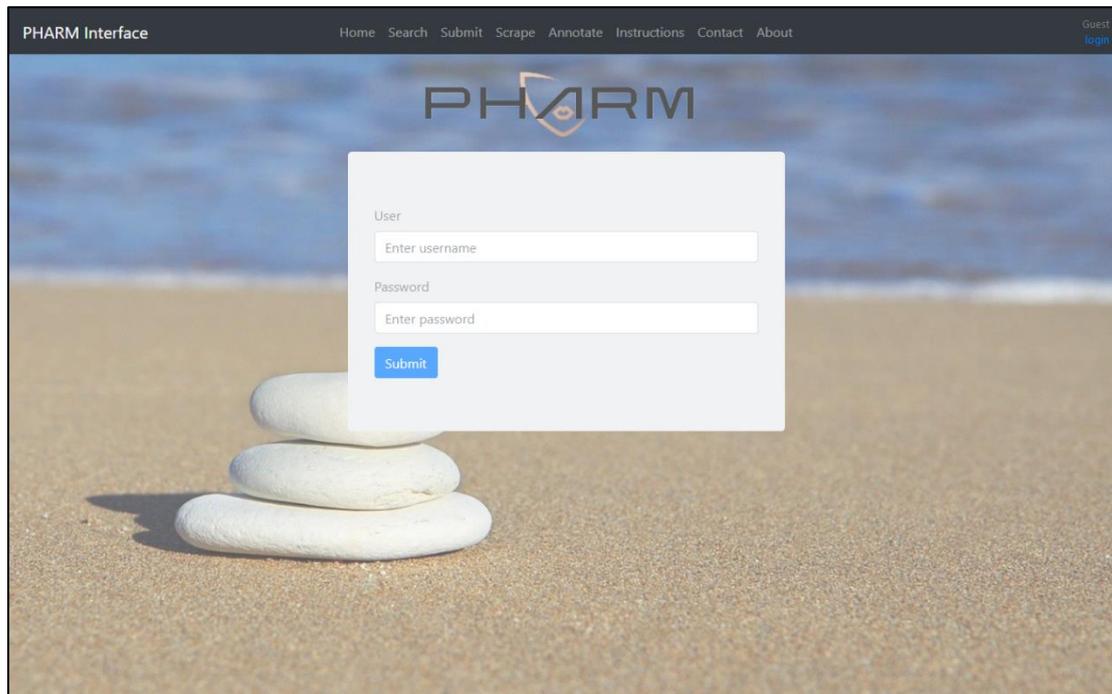


Figure 15 The Login Screen of the Internet Interface

For obtaining an authenticated account, please visit the “Contact Screen” and contact our team.

3 Annotation Guide

The Internet Interface utilizes the doccano tool for supporting the required annotation tasks.

3.1 Introduction

Doccano is an annotation management system for text data. It can be used for developing datasets for classification, sentiment analysis, entity tagging, or translation. In the context of the *PHARM Project*, it is used for text classification purposes. Therefore, each entry should be labeled with tags.

First, the user may take a look at the online demo for sentiment analysis (the same procedure can be followed for classification as well): <http://doccano.herokuapp.com/demo/text-classification>. The user can access the doccano installation by visiting <http://pharm-doccano.usal.es>. The tool is also accessible from the corresponding screen of the PHARM Internet Interface (Figure 4 The Annotate Screen of the Internet Interface).

In a few words, the user/annotator should assign labels (“Hate” or “No Hate”, “Positive”, “Neutral” or “Negative”) to each entry. The annotations are stored automatically.

3.2 Annotate

Sign in using your credentials as an annotator (Figure 16 Login Screen of the doccano).

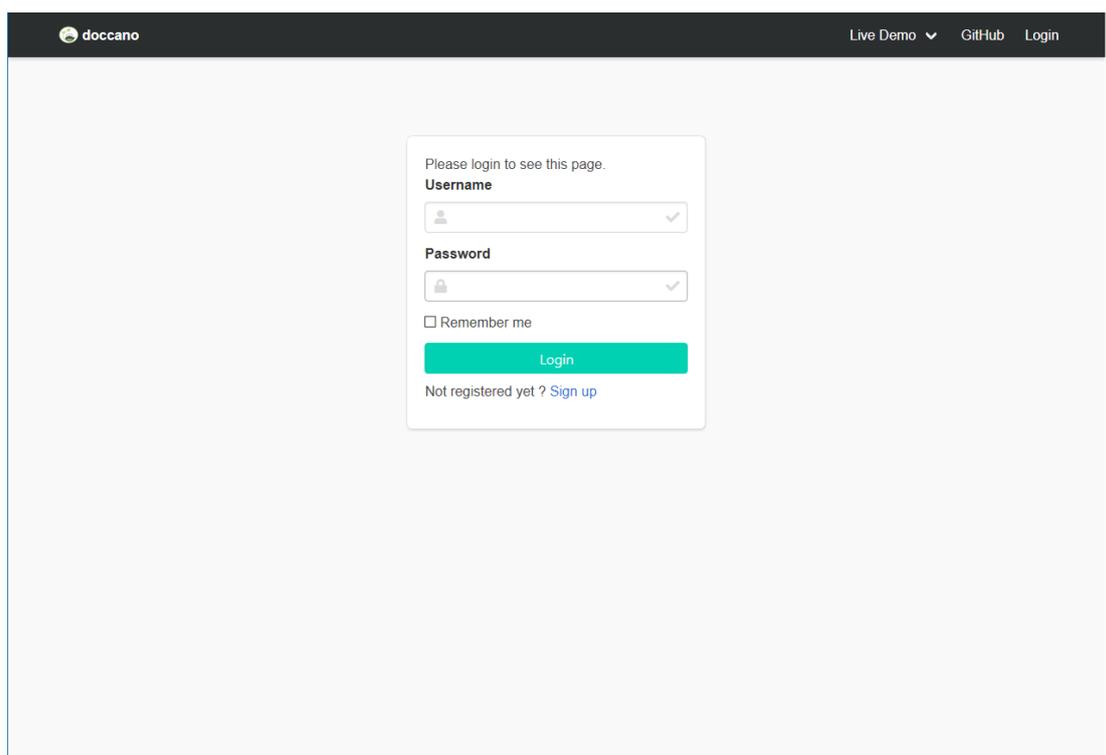


Figure 16 Login Screen of the doccano

Choose the project you have been asked to collaborate on (Figure 17 Project Selection Screen). Next, read the text (for the current entry), choose either “Hate” or “No Hate” (if the text contains content against refugees or migrants or not), and mark it as “Positive”, “Neutral” or “Negative” (according to the sentiment of the text). It is mandatory to choose one “blue” and one “purple” label for each entry, as the annotation is performed for two individual classification schemes simultaneously (Figure 18 Annotation Screen and label selection functionality of the doccano). “Blue” labels are for hate speech detection, while “purple” labels are

necessary for sentiment analysis. Annotated entries are highlighted with a checkmark icon. Finally, choose “next” to move on to the next entry.

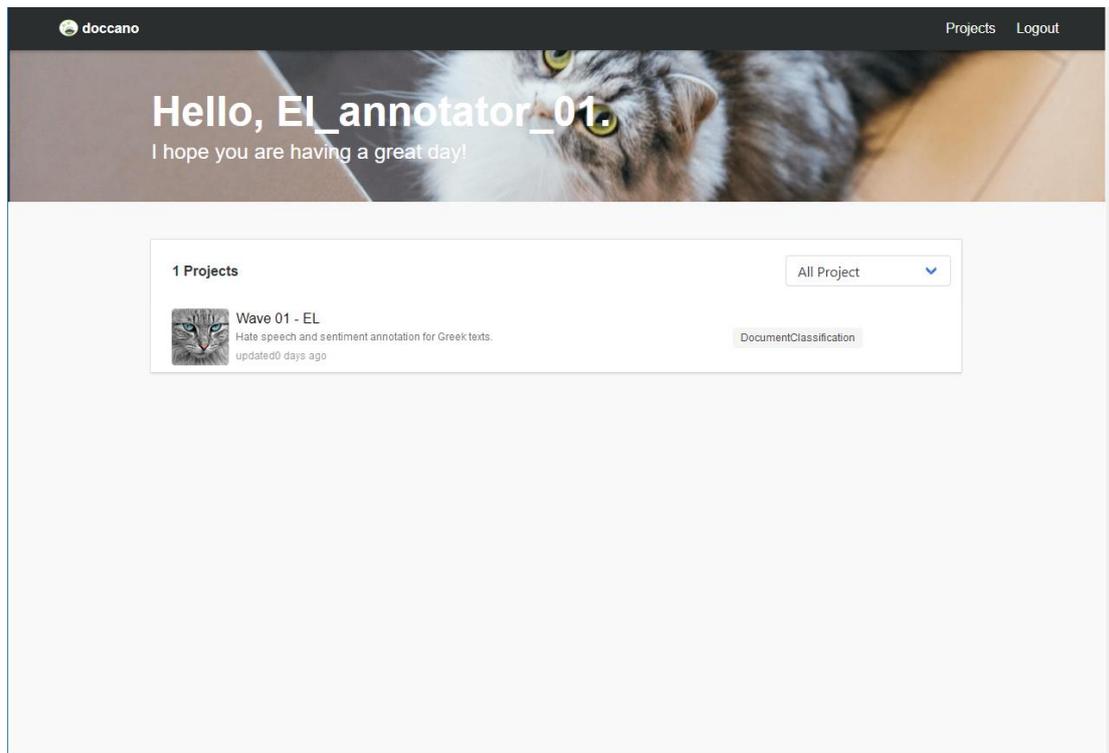


Figure 17 Project Selection Screen of the doccano

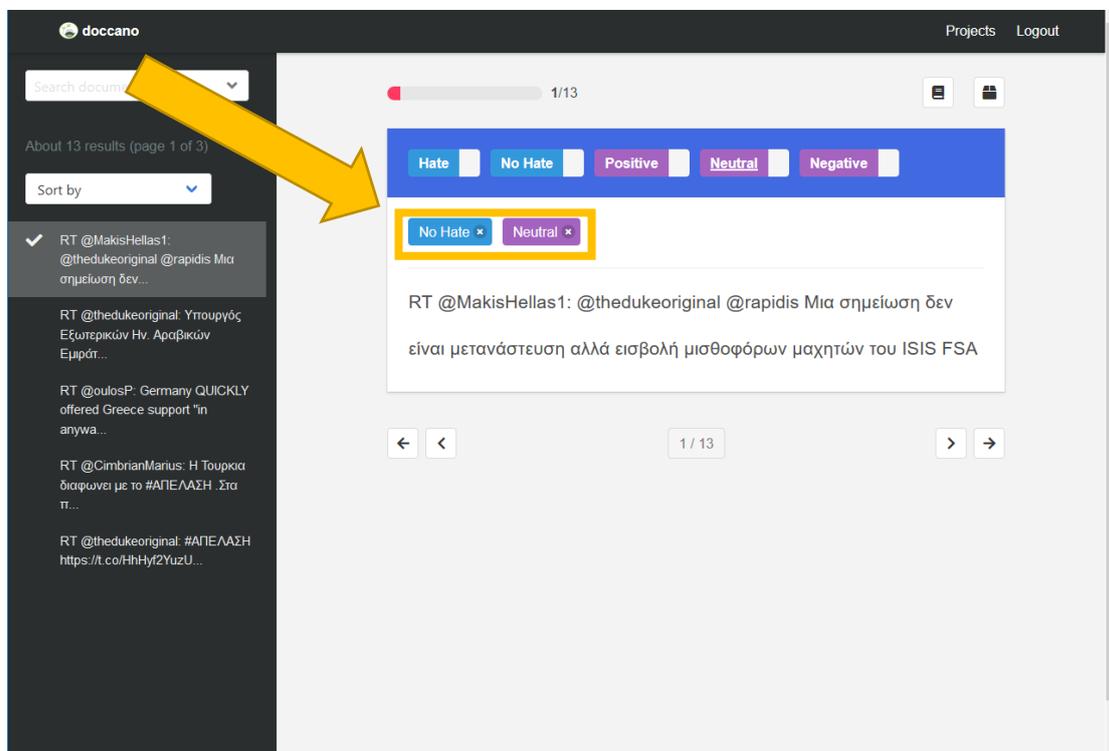


Figure 18 Annotation Screen and label selection functionality of the doccano

3.3 Approve

Log in to doccano and select the appropriate project (follow the same steps as described previously). Approve an annotation using the button shown in Figure 19. Approved entries are shown with a thumbs up icon.

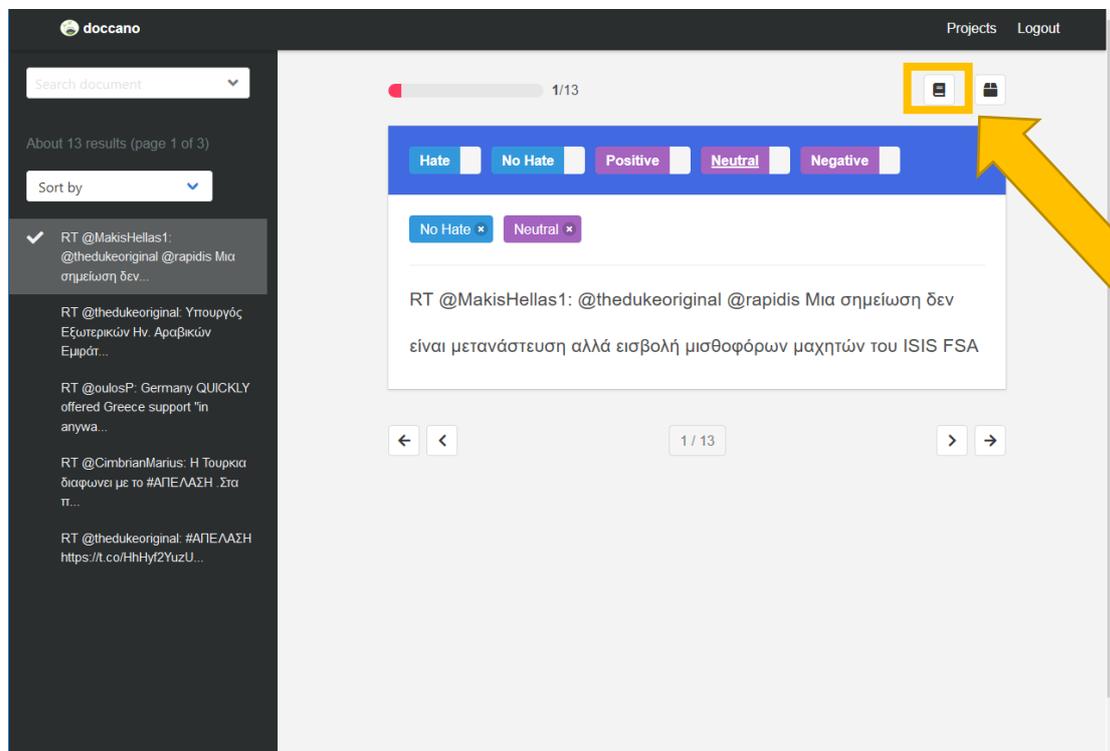


Figure 19 Annotation Screen and approval functionality of the doccano



PREVENTING HATE AGAINST REFUGEES AND MIGRANTS

ABOUT PHARM (2020-2022)

Preventing Hate against Refugees and Migrants (PHARM)

Migration to Europe has grown in the last years in scale and complexity. The so called 'refugee crisis' and the migratory pressure is particularly acute in southern EU countries as the main entrance to the EU.

The main goal of PHARM project is to monitor and model hate speech against refugees and migrants in Greece, Italy and Spain in order to predict and combat hate crime and also counter its effects using cutting-edge techniques, such as data journalism and narrative persuasion. The activities distributed in 5 coordinated work packages include:

(i) Implementation of a conceptual and methodological common framework for large-scale analysis and detection of hate speech; (ii) Implementation and evaluation of machine learning approaches to model and predict hate crimes against refugees and migrants based on hate speech features; (iii) Survey journalists to understand how they inform and raise awareness about hate speech and how they can help building and disseminating counter-narratives based in data-driven news pieces; (iv) Creation, evaluation and dissemination of counter-narrative fictional stories adapted to different characteristics of citizens using large-scale narrative persuasion.

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