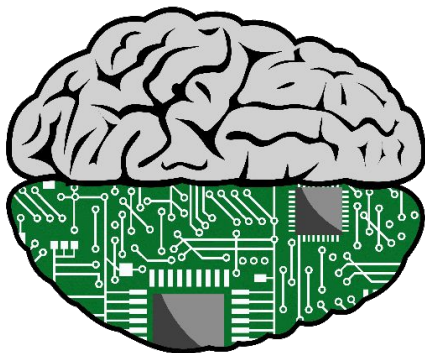


COLLABORATIVE ENCYCLOPEDIA OF ALGORITHMS



AlgPedia

<http://algpedia.dcc.ufrj.br/>

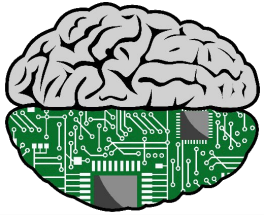
Thais N. Vianna, Carla A. D. M. Delgado

Programa de Pós Graduação em Informática PPGI - UFRJ

João Carlos P. Silva, Carlos Eduardo da S. Martins,

Fernando R. Gouvêa

Departamento de Ciência da Computação - UFRJ



ALGPEDIA, THE FREE ALGORITHMS ENCYCLOPEDIA

Algpedia is a...

...free encyclopedia about algorithms and programs in a wiki format.

...portal comprising theoretic and practical information about algorithms and implementations.

...project uniting structured information, comments, implementations, evaluation and performance aspects, among other related content.

WHY ALGPEDIA?

Learning how to program is an ***extremely difficult*** activity!

With technological advancement:

- new forms of learning emerged emerged, as self education;

- processes for building and sharing knowledge are now more democratic;

- There is a growing tendency of creating opportunities for “hands on” learning experiences.

HOW CAN ALGPEDIA BE USED?

Every person is welcome to use Algpedia!





creating, rating, collaborating and consuming **content**,
as all of which are valid forms of learning

As a means to **push the community knowledge further**
help the community to **find the best algorithms** and
implementations for their problems
by means of search and recommendation

Algpedia can **serve information to other programs**
so that other applications could profit from the knowledge stored.

“How to teach program for EVERYONE and EVERYTHING” WEI 2017

WHY IS ALGPEDIA SO COOL?

	Structured Information	Implementations	Comments and reviews	Recommendation and ranking
	✓	✗	✗	✗
	✗	✓	✗	✗
	✗	✗	✓	✓
Rosetta Code	✗	✓	✗	✗
	✓	✓	✓	✓

HOW ALGPEDIA LOOKS

Sorting Algorithms

About: Bubble sort, sometimes referred to as sinking sort, is a simple sorting algorithm that repeatedly steps through the list to be sorted, compares each pair of adjacent items and swaps them if they are in the wrong order. The pass through the list is repeated until no swaps are needed, which indicates that the list is sorted. The algorithm, which is a comparison sort, is named for the way smaller or larger elements "bubble" to the top of the list. Although the algorithm is simple, it is too slow and impractical for most problems even when compared to insertion sort.[1] It can be practical if the input is usually in sorted order but may occasionally have some out-of-order elements nearly in position. [More Information]

Implementations : 

PYTHON

```
def bubbleSort(alist):
    for passnum in range(len(alist)-1,0,-1):
        for i in range(passnum):
            if alist[i]>alist[i+1]:
                temp = alist[i]
                alist[i] = alist[i+1]
                alist[i+1] = temp
```



AlgPedia

The free algorithms encyclopedia

AlgPedia's goal is to become a reference for programmers, providing relevant information about algorithms and their implementations.

Search for algorithms...

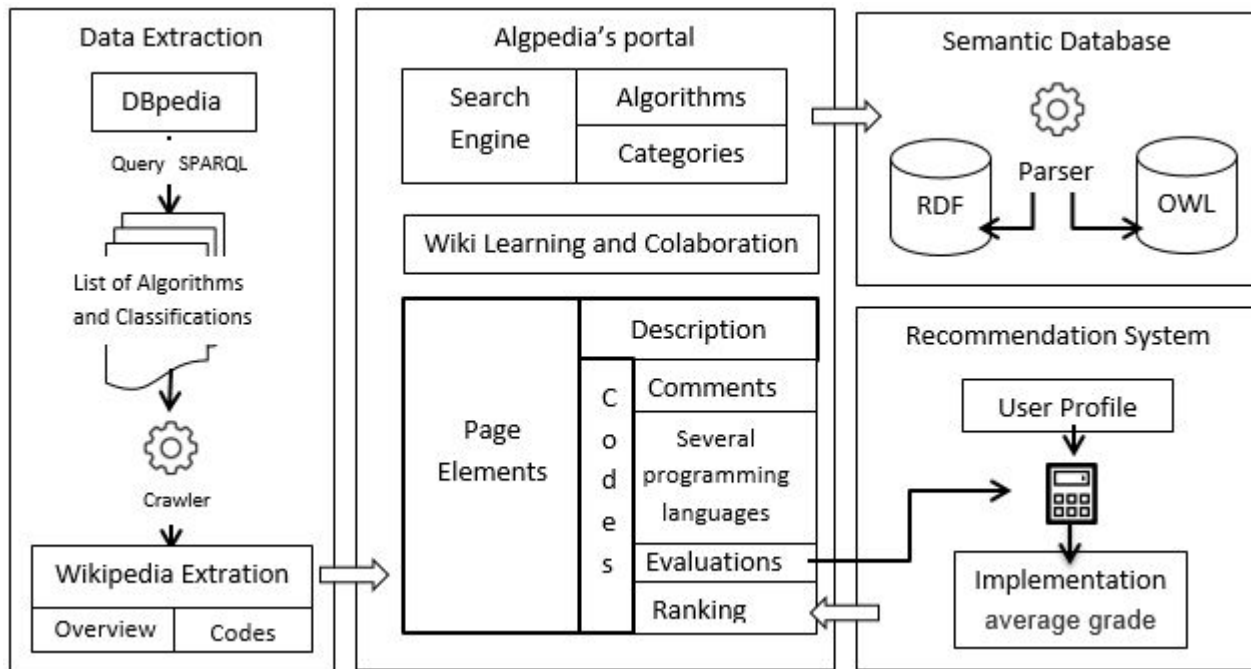


Download AlgPedia dataset in : [owl](#) or [rdf](#)

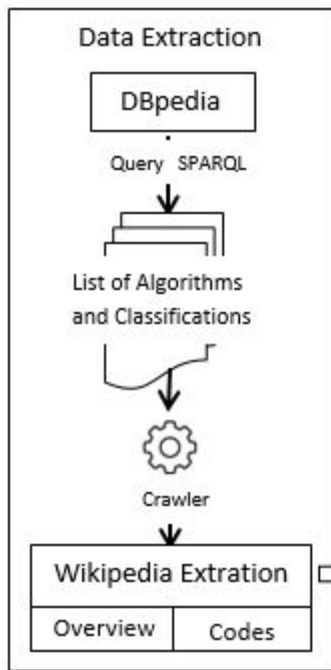
THE ALGPEDIA WEB PLATFORM



python

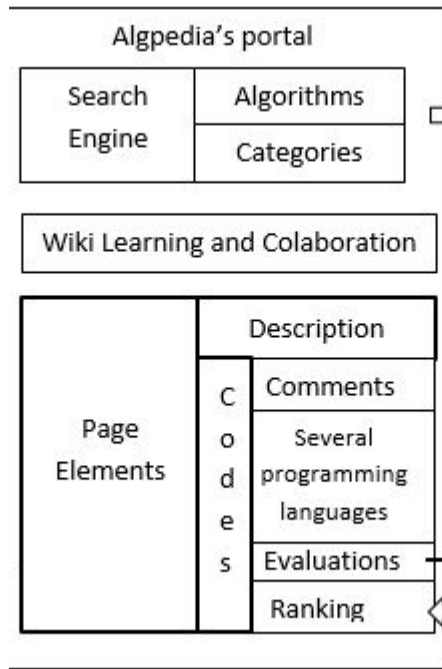


DATA EXTRACTION MODULE



- A crawler was created to extract information from DBpedia and Wikipedia and populate Algpedia;
- DBpedia was queried using a SPARQL endpoint, looking for algorithms' resources like **name**, **author**, **category** and its DBpedia and Wikipedia **pages**. Then we looked for **pseudo-codes** and **implementations** (identified as code boxes);
- 2144 algorithms were extracted in 2016.

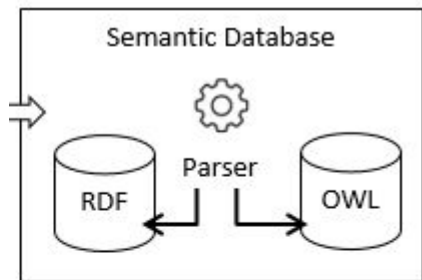
WEB PORTAL MODULE



This module adds all features a user has available:

- **WikiLearning and Collaboration**
Opportunities a user has to collaborate, add or edit algorithms and implementations, make comments, vote, ask to become a moderator user
- **Search engine**
- **Page elements**
information a user will see while looking at the webpage of an algorithm in AlgPedia

SEMANTIC BASE MODULE



- Responsible for the construction of the **RDF and OWL datasets**

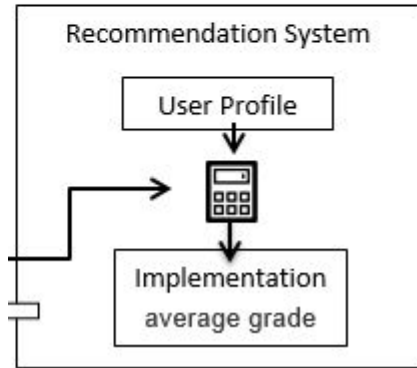
categories, algorithms, implementations, programming languages and relations among these entities.

- RDF is created by translating the relational database using DBpedia ontology resources and URI.

A simple ontology was defined with the basic elements **Classes** (author, algorithm, category, programming language) and **Object Properties** (belongs, implements, etc)

- (HOT!) Available for download

EVALUATION AND RECOMMENDATION MODULE



Prioritize the most **relevant implementations** as contributions increase

The ranking schema combines:

- (1) the **expertise of the users**, with
- (2) **evaluation scores** users can give to an implementation, generating
- (3) a **reputation** for each one of the different implementations of an algorithm.

implementations for the same algorithm are ranked according to its reputation.

RESULTS

The first AlgPedia's version released to the public access took place on July 10, 2014 at 4:00pm.

- In the first two days:
1,397 sessions of 229 users spread over 9 countries.
- One week after release:
3,685 sessions of 3,273 users from 81 countries
- Today:
19,509 sessions of 15,908 users from 133 countries,
with an average 300 sessions per month since 2016.

RESULTS

“

**Learning a
second
programming
language? Try
these 5 sites...**

AlgPedia

An ambitious project created by Universidade Federal do Rio de Janeiro in Brazil, [AlgPedia](#) is a collaborative encyclopedia that focuses on implementations of algorithms. Sorting, checksumming, arbitrary precision, data mining, pattern matching, and many other categories of algorithms are all included. The project is still in its early stages, so the coverage of algorithms and the types of examples provided are somewhat incomplete; most of them have only one or two examples.

”




OCT 13, 2014

<http://www.infoworld.com/article/2825055/application-development/5-sites-to-help-developers-make-a-cross-language-leap.html>

RESULTS

Algpedia was mentioned several times on Twitter and Facebook by many software developers, and also by Python Weekly :-)




Rebeca Bordini Retweeted

Python Weekly @PythonWeekly · 21 Jul 2014

AlgPedia - The free algorithms encyclopedia buff.ly/1k5ehsL #algorithm #python

15 24




PET SI UFRuralRJ @PETSUFRuralRJ · 22 Jul 2014

Divulgando um belo exemplo de projeto final desenvolvido na Ufrj.

fb.me/3esaMKdr8

1




Python Hub @PythonHub · 9 Oct 2014

AlgPedia is a free collaborative encyclopedia about algorithms [reddit]


algpedia.dcc.ufrj.br

1 3



InfoSysDataSciReddit @InfoSysReddit · 15 Jul 2014

AlgPedia - the free algorithm encyclopedia submitted by thaisviana[link]
[comment] ift.tt/1mfrsSY



AlgPedia - the free algorithm encyclopedia • /r/java

3 points and 0 comments so far on reddit

reddit.com

CONTRIBUTIONS

Algpedia is still an ongoing project, but

- it is a live, web accessible repository of algorithms and implementations
- counts with a community of users who actively add comments, reviews, and contribute with evaluations
- implements all the vital features of a collaborative learning tool
- is in a technically robust state: the semantic database handles the structured information, the wiki interface handles user contributions and navigation.

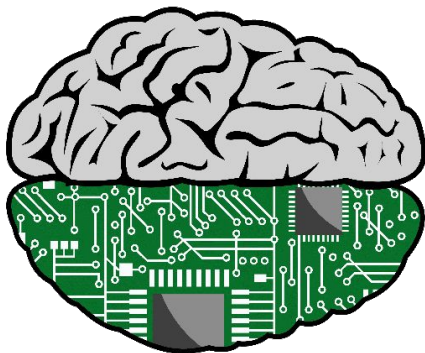
CONTRIBUTIONS

- Regarding **individual knowledge** we have many users actively using Algpedia: contributing, interacting, and consuming its content.
- Regarding advancing the knowledge of the community, the Algpedia Project also has made some contributions:
 - (1) it led to the discovery that **no satisfactory ontology relating algorithms, problems and implementations exist**, and also
 - (2) that **testbeds and benchmarks to evaluate implementations** would benefit to have a **central repository**

FUTURE WORK

- extend the Algpedia ontology to other program ontologies like
 - COPS (Core Ontology of Programs and Software) [Lando et al. 2007] and
 - COS (Core Ontology of Software) [Oberle et al. 2009]
- include testbeds and benchmarks in the the Algpedia repository
- Gamify Algpedia usage

COLLABORATIVE ENCYCLOPEDIA OF ALGORITHMS



AlgPedia

<http://algpedia.dcc.ufrj.br/>

Thais N. Vianna, Carla A. D. M. Delgado

Programa de Pós Graduação em Informática PPGI - UFRJ

João Carlos P. Silva, Carlos Eduardo da S. Martins,

Fernando R. Gouvêa

Departamento de Ciência da Computação - UFRJ