Big Data Analytics Symposium - Summer 2019

Analytics Project: What's the trend of hot area in Computer Science field?

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Abstract: Forecasting research trends has always been a dream of researchers, scientists, investors and those who want to step into a new area. However, one can not predict the next hot area before he know the trend of past hot area. This incurs the most interesting question - what's the trend of hot area in Computer Science field? Most of the trend prediction are mainly based on some experts and there always existing some difference between each one, which also ignore the valuable data part. Thus, how to find the trend of hot area in the perspective of data is quite a crucial yet challenging problem.In this paper, we propose a novel technique that analyze the trend of hot area reasonably. The experiment results show that our work performs well at showing the trend of hot area in computer science area.

What's the trend of hot area in Computer Science field?

Motivation

Who are the users of this analytic?

1. Computer Science field researchers
2. Newcomers who want to step into the computer field.
2. Venture capital

Who will benefit from this analytic?

1. Computer Science field researchers are able to study the changing trend of the whole industry.
2. Newcomers who want to step into the computer field can get a taste whats the most attractive area currently within the field
3. Venture capitalist can easily track hot topics and make appropriate assessments and investments.

Why is this analytic important?
The hot area point out the research interests of researchers, which is also a significant indicators to the strength of attention received from scientific communities.

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Goodness

What steps were taken to assess the 'goodness' of the analytic?

We plot the ranking trend of the past hot areas and manually check top 20 hot areas. Results show:

1. The hot area in ranking list are really popular in real life.
2. The accuracy of internal rankings is reliable.

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Data Sources

Name: arxiv

Description:

Arxiv is a document submission and retrieval system that is heavily used by computer science communities. It has become the primary means of communicating cutting-edge manuscripts on current and ongoing research. Almost all scientific papers are self-archived on the arXiv repository. Arrive API allows application developers to access all of the arXiv data, search and linking facilities with an easy-to-use programmatic interface.

Size of data: 10-100GB

Name: Open Academic Graph

Description:

Open Academic Graph (OAG) [13], [14] contains 166,192,182 papers from MAG and 154,771,162 papers from AMiner (see below) and generated 64,639,608 linking (matching) relations between the two graphs. In OAG v2, author, venue and newer publication data and the corresponding matchings are available.

Size of data: 10-100GB

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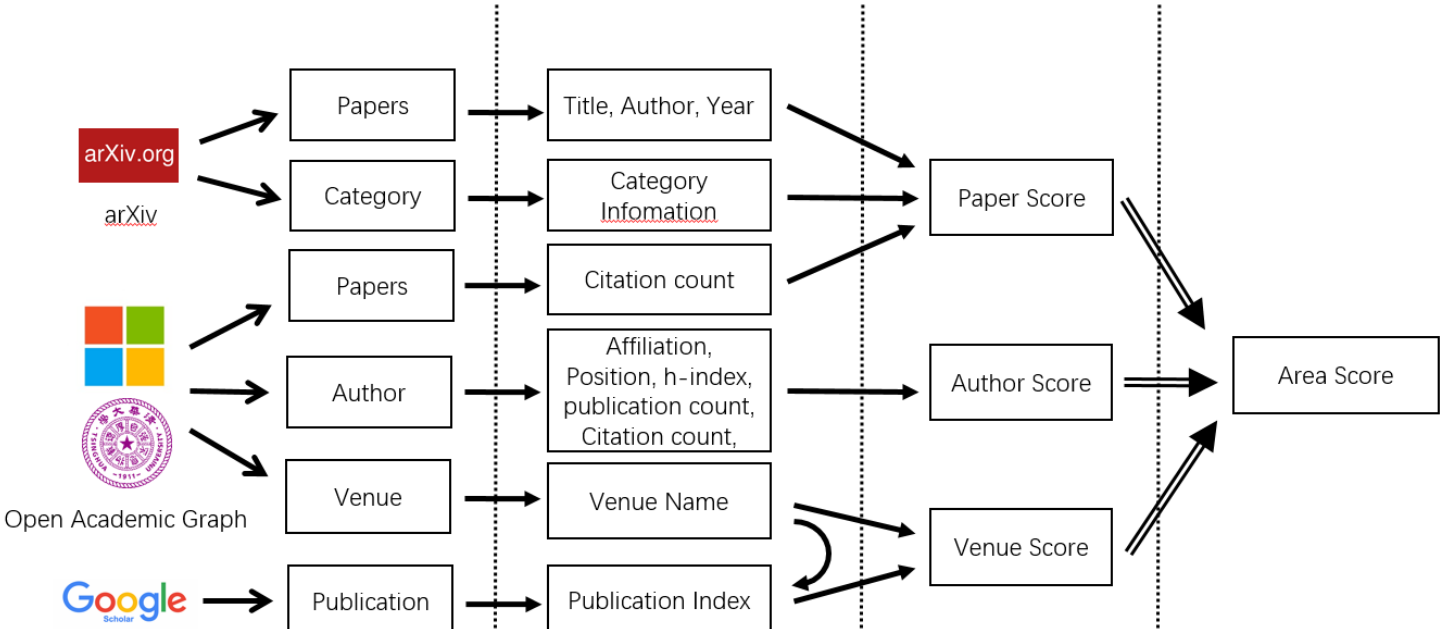
Design Diagram

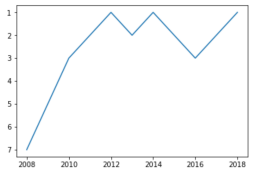


Platform(s) on which the analytic ran:

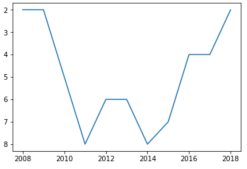
NYU HPC cluster

What's the trend of hot area in Computer Science field?

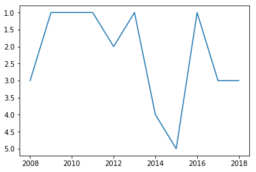
Results



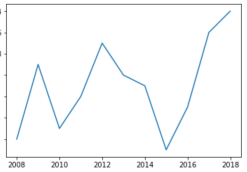
cs,lg: machine leanring



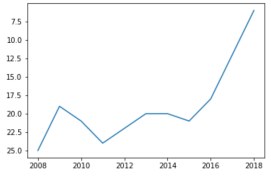
cs.ds: Data Structure And Algorithm



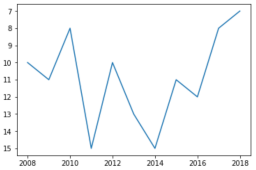
cs.it: Information Theory



cs.dm: Discrete Mathematics

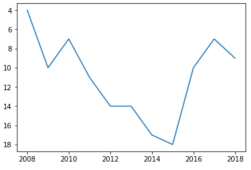


cs.cg: Computational Geometry

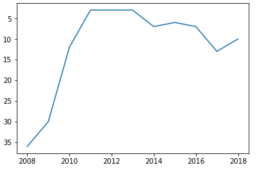


cs.cc: Computational Complexity

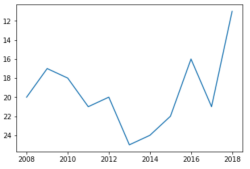
cs.gt: Game Theory



cs.dc: Distributed, Parallel, and Cluster Computing



cs.si: Social and Information Networks



cs.db: Databases

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Obstacles

1. Cannot match some author score to paper score

2. Processing raw dataset (format of the data is not uniform)

Summary

We have developed a system to present the trend of hot area in Computer Science by using the research information from arXiv and Open Academic Graph. By incorporating the paper information, the author information and the venue information within a specific area, our system are able to generate the popularity score of the given area.

Acknowledgements

We would like to thank NYU High Performance Computing (HPC) for their support and for administering our Hadoop cluster, Dumbo. We would also like to thank Cloudera for providing the CDH Hadoop distribution through the NYU-Cloudera Academic Partnership.

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Thank you!