

# Introduction to H2O

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Machine learning and data mining have been used everyday in all industries driven by data. H2O is a platform using for performing machine learning and predictive analytics for large scale data using cloud. When the data that is generated is large scale and is in terrabytes, H2O serves a very important purpose of being able to accurately predict using different algorithms using different programming languages through APIs. This paper introduces to H2O, how this platform has impacted various industries across several domains with improved accuracy and reduced processing time. Different use cases of the H2O platform has been explained as well.

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**Keywords:** machine learning, data mining, predictive analytics, cloud

<https://github.com/SushmitaSivaprasad/sp17-i524/tree/master/paper1/S17-IR-2038/report.pdf>

This review document is provided for you to achieve your best. We have listed a number of obvious opportunities for improvement. When improving it, please keep this copy untouched and instead focus on improving report.tex. The review does not include all possible improvement suggestions and for each comment you may want to check if it applies elsewhere in the document.

**Abstract:** There are some grammar issues that need to be addressed, otherwise looks good.

Your paper is a little short of the requirement and can be expanded a little bit.

Please, make sure you know how to use citations correctly. Citations go after the text that references them, and before any periods or other punctuation. In some instances you've just included them at the beginning of a whole paragraph, but a citation should be used for more specific statements in your paper.

Your paper gives a good overview of H2O, but certain sections can be expanded and/or clarified. The use cases can use more detail on what the actual outcomes were. See the specific notes below.

**Assessment:** Revisions required. Please address the review comments by end of March.

## Citation

The citations needs to go at the end of the text that references it.

is an open source platform that is used to create machine learning and predictive analytics models on big datasets. It is mainly written in Javascript but have APIs for R, Python, Excel, Tableau and Flow and works on the conventional operation systems.

"conventional operating systems" is too vague. You either can omit OS information altogether since someone can check this in the docs easily, or give a better idea of what is supported. The first option is sufficient for an overview paper like this.

This platform allows the online scoring and modelling of data on a single algorithm.

This is not worded very clearly. Do you mean that each algorithm provided can be evaluated separately? If so, this is too fine a detail for an overview and you can omit it. If not, please clarify.

The main algorithms implemented on the datasets are deep learning, gradient boosting, generalized linear model, distributed random forest, k-means etc.

With the "etc." it's not clear whether these are really the main algorithms, or just a subsection that you decided to list. This can be worded better.

The algorithms implemented on the big datasets is read in a parallel manner and is then distributed and stored in mem-

## INTRODUCTION

[1]H2O

ory in a compressed column format. H2O also has an inbuilt intelligence to detect and support the data ingest

Term

data ingest?

from various sources in different formats.

## HOW DOES H2O WORK?

[2]H2O

Citation

is mainly used for large dataset , usually in the range of terrabytes.

Are there any drawbacks to using on smaller datasets?

A company might have their dataset stored on big data systems such as hadoop.

Please, capitalize names like "Hadoop."

When we analyze a data

Grammar

usually we choose a smaller sample dataset rather than the entire dataset to build model due to the large processing time involved. H2O has the advantage of being able to use the entire dataset to run the algorithm on as larger the dataset we are able to analyse better the predictions would be. Suppose a business is trying to understand the best product placement for optimal customer enagement, the model would be created based on the dataset formed collecting information about the interactions of the customer on the website.

Grammar

H2O is used to model all of the data with multiple algorithms using more than one machine at the same time, this way we don't have to sample the data to predict for performance.

This is not quite true. There are reasons beyond performance you may want to sample your dataset or break it up into portions for training and testing your algorithms for example. In addition, some of the algorithms simply don't scale, and being implemented well in H2O or another parallel system still doesn't make them applicable to very large data.

H2O is also used to score hundreds of models in nano seconds to reach better predictions.

Nanoseconds is very specific. Do you have a citations for this?

## REQUIREMENTS

### Operating Systems

[3] It works on the following operating systems

Windows 7 or later

OSX 10.9 or later

Ubuntu 12.04

RHEL/CentOS6 or later

### Languages

Java 7 or later

Scala 2.10 or later

R version 3 or later

Python 2.7x or 3.5x

## Browser

Chrome

Safari

Internet Explorer

Firefox

## Hadoop

Optional Cloudera CDH 5.2 or later

MapR 3.1.1 or later

Hortonworks HDP 2.1 or later

This kind of detail is not necessary in an overview paper. Your goal is to give an overview so someone can decide if H2O is something they may be interested in. They can later consult the docs about specific system information like this.

## ARCHITECTURE

[4] The H2O architecture consists of a different component

Grammar

which combine together to form the H2O software stack. We can divide the H2O architecture into 3 different components, top section includes all the REST API clients, middle includes the Network Cloud and the bottom section contains the different components that run within an H2O JVM process. The top section contains the programming languages that can be used on the big dataset here. The REST API clients communicate with the H2O with the help of a socket connection. The Network cloud consists of the different inbuilt algorithms to create the necessary model on the data, this can also contain a customized customer algorithm to analyze the required dataset and produce the desired outputs. The H2O cloud can consists of two or more nodes which can contain a single JVM process.

H2O being based on JVM is something you want to mention earlier and more prominently.

Each JVM process consists of language, algorithm and infrastructure (manages the resources management such as memory and CPU).

## FIGURES

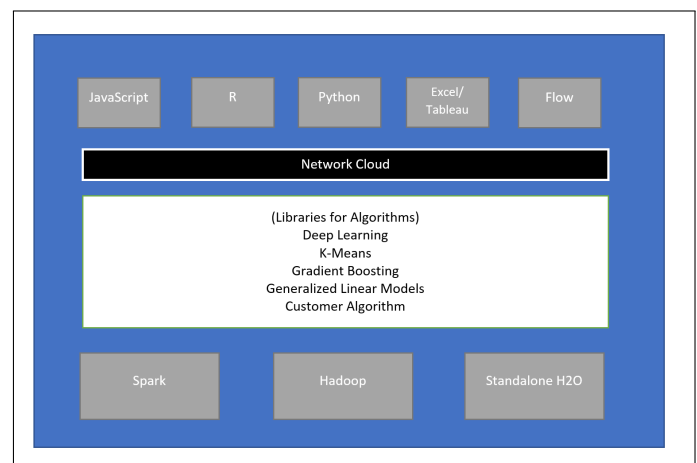


Fig. 1. H2O Architecture[4]

## USED CASES

### CapitalOne

[5]

#### Citation

CapitalOne, a fortune 500 bank with 960 banks and 2000 ATMs accumulates terrabytes of information in real time on customer information and financial processing. H2O was used to reduce the iterative timing

I am not sure what "iterative timing" refers to here. Please elaborate.

over the large data sets on applying various algorithms. Different algorithms can be applied to find which one works best due to reduction in time consumed in processing these large datasets. A large number of hard and soft metrics were evaluated as well using machine learning frameworks.

It's not clear from this paragraph what CapitalOne actually used H2O for. What did they analyze and what did they find? Or how are they applying the algorithms to their real-time data?

### MarketShare

[6] The company MarketShare have implemented H2O to optimize budgeting for marketing. Since marketing approaches are data driven features, predictive analytics under H2O was used to give a comparison on how the current state of the marketing budget is and how much is the predicted revenue, using H2O solutions were generated as to what are the changes that can be made to improve the current projection and what an improved projection will look like.

This was a very long sentence. It will be more clear and easier to read if you break it up.

H2O can ingest large amount of data as its capability is not limited to using one machine, since it is a cloud based system, multiple machines can be used at the same time.

This is information you already went over earlier and doesn't need to be restated here.

MarketShare was able to go on the cloud and use as much machines as required and get desired outputs on the large datasets. They use 25 machines for all of their clients to process the data and were able to expand the scalability of the dataset. If their datasize increases by x amount then they would add y more machines to solve the problem. Scaling across lot of nodes is critical to their business as the company deals with digital log data and irrespective of the complexity of the modelling and the huge size of the data. It has a distributed in-memory processing with the kind of data involved and the algorithms implemented on the data.

Like before, this is information about H2O you already went over.

It would be helpful to find what the outcomes for MarketShare were when using H2O. Did their marketing yield better results when using H2O?

## RELEVANT COURSEWORK

Better use "resources" than "coursework"

H2O has an open source platform and hence has a community for support.

Step by step instructions with documentation and videos have been provided for installation and to understand the work flow of H2O.

Free online training videos are provided on the main webpage [7]

H2O documentation is available on their website. [1]

h2ostream is an open source google group where H2O users can post questions and get answers.

They have built an online community at [8] which is a discussion platform.

They also conduct conferences around the year in United States for users to interact among one another and update new releases and happenings in the big data community. [9]

You shouldn't use the *newline* command like this. You can either use paragraphs or bullet points. This kind of formatting is very unusual.

## CONCLUSION

[10]

#### Citation

Being an open source platform it gives user the flexibility to solve the problems. It is easy to set up and has a smooth installation and usage feature due to its interface with familiar programming environments using APIs. Models can also be inspected during training. It can ingest

#### Term

any format of file, it can even connect to data from HDFS, S3, SQL and NoSQL data sources. It has a massive

"massive" is subjective, please avoid

scalability, large datasets can be analyzed by using multiple machines. It also conducts a real time data scoring for accurate predictions.

## ACKNOWLEDGEMENT

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