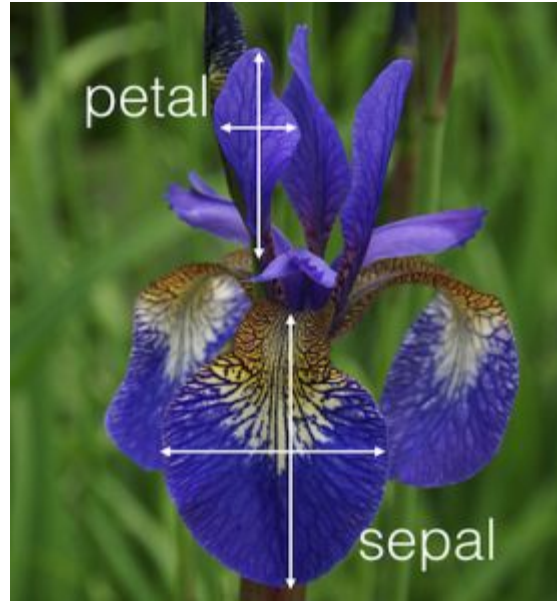


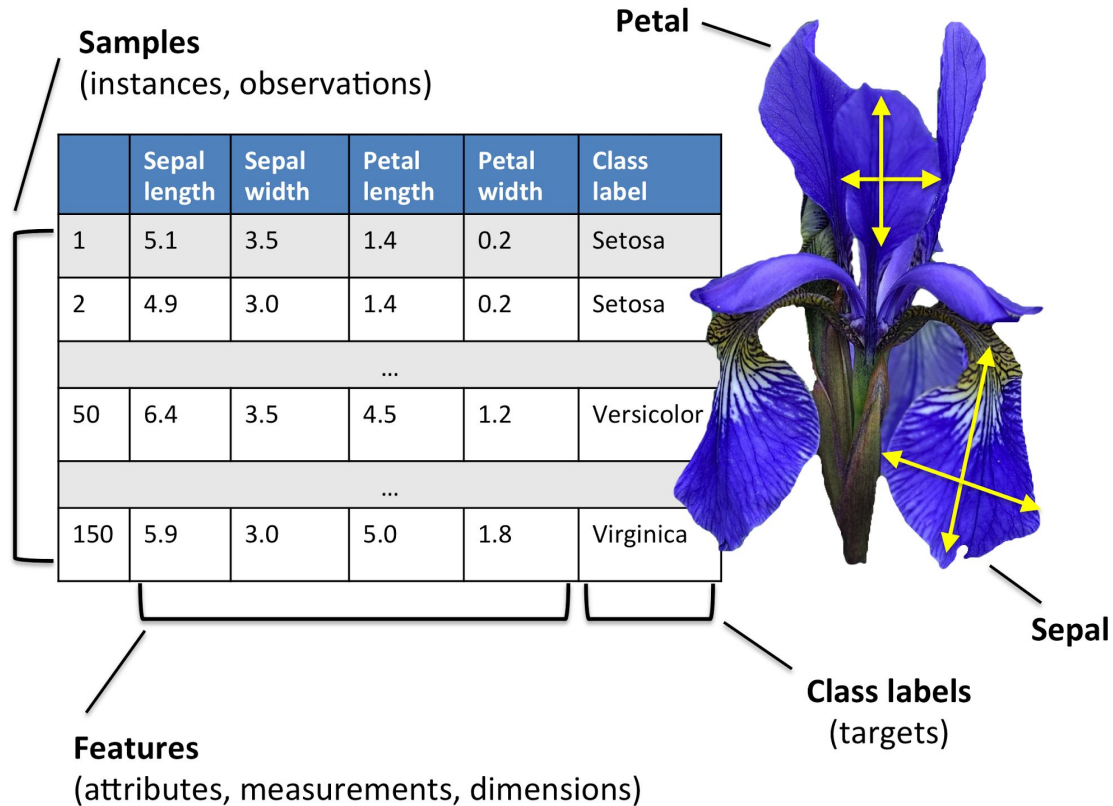
# Machine Learning

In PHP

# What is Data Mining and Machine Learning



# It's All About Feature Extraction





# Type Of Machine Learning

**Classification:** KNN, SVM, MLP, C4.5, RandomForest

**Clustering:** KMeans, DBSCAN, OPTICS



How many of you, Love PHP?

PHP



How many of you, ,Hate?

PHP



Source: [4]

# Data Mining Is About to Matrix





# A Benchmark, PHP VS Python

Problem: Find All Prime Number Below 10000

PHP	<b>1.39</b>
Python	<b>1.84</b>

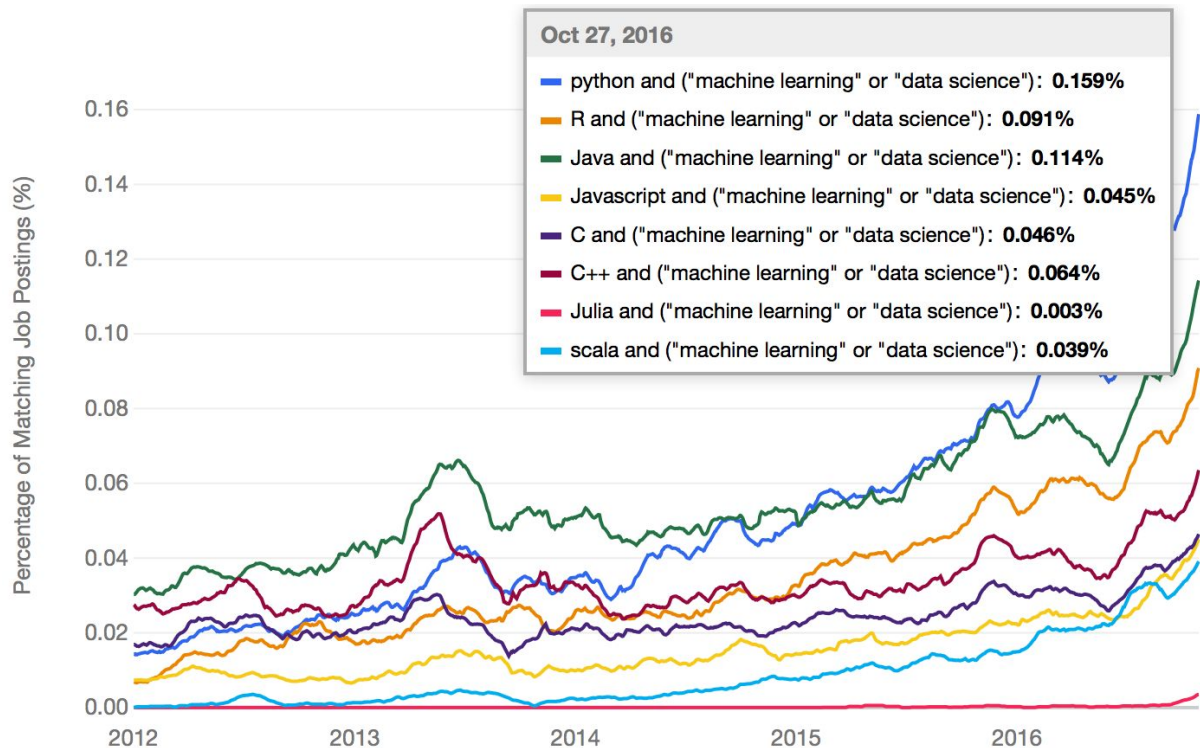
# Another Benchmark, PHP VS Python

Problem2: 2000000 Time Calculating MD5(N+N)

PHP5	<b>21.43</b>
Python	<b>9.87</b>

> So, PHP5 Is Not Good For Computation

# Languages that Companies Used Fro ML



# Any Q Bro?

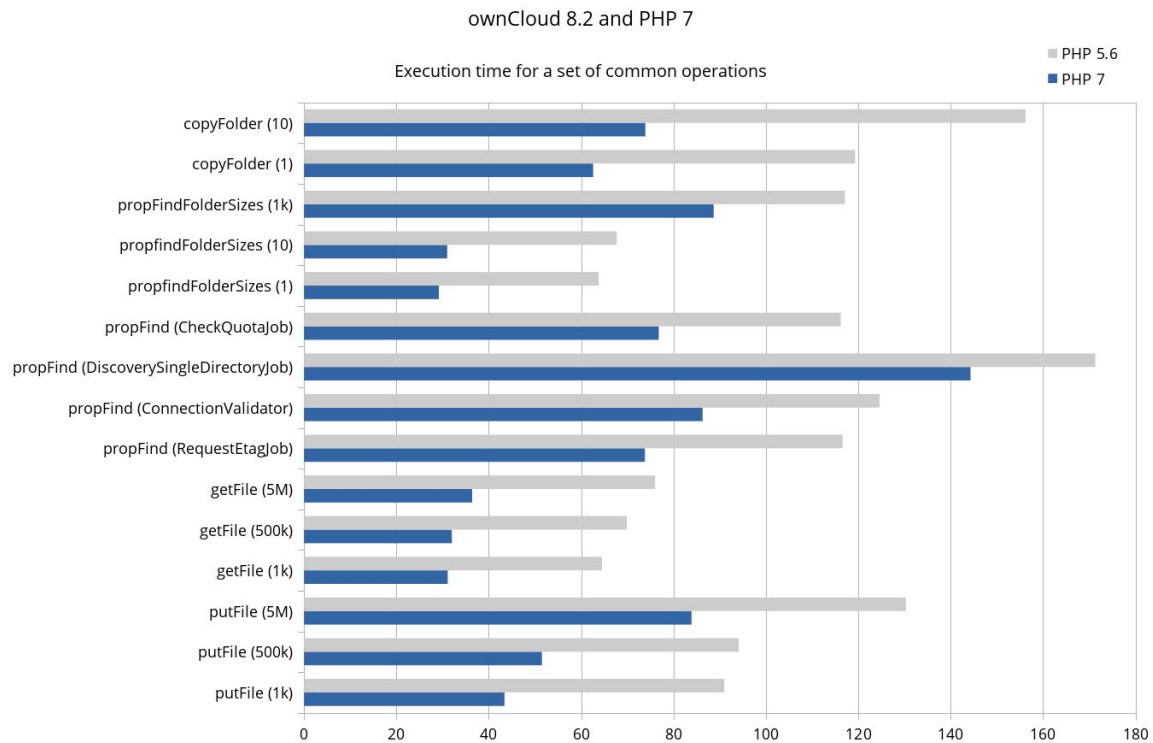


But Wait, Something Change these days

**PHP**



# Comparison



# A Little About Optimization

> You Want to Optimize IO?

**1. High Level Optimization  $\Rightarrow$  Disk IO**

**2. Low Level Optimization  $\Rightarrow$  RAM IO**



# We Focus On Low Level Optimization

> You Want to Optimize IO?

1. High Level Optimization  $\Rightarrow$  Disk IO

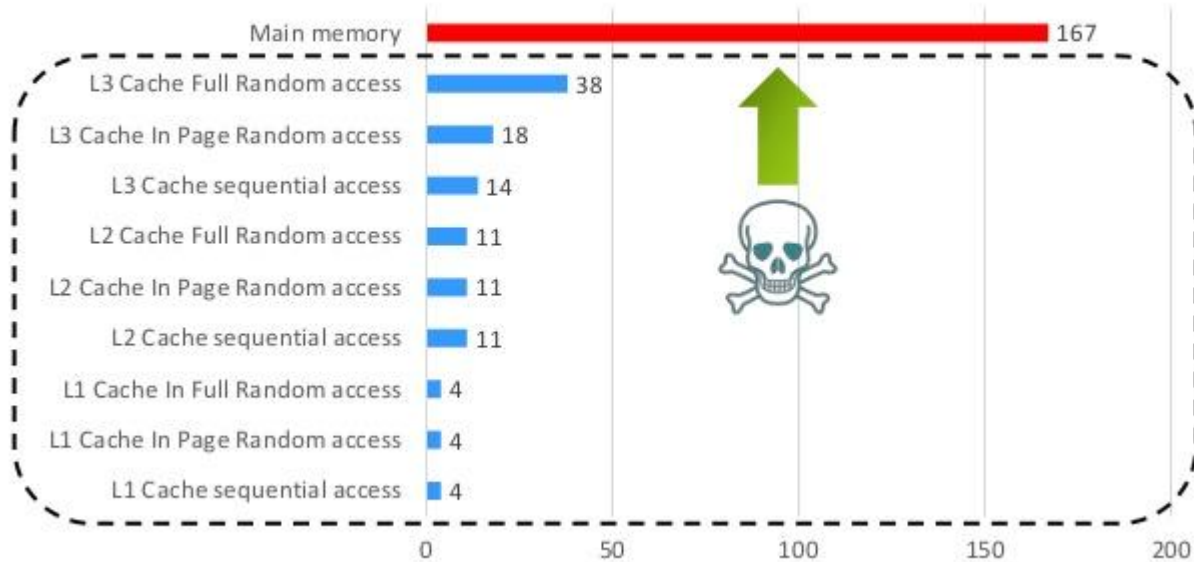
**2. Low Level Optimization  $\Rightarrow$  RAM IO**





# Cache Vs RAM Access Time

## The CPU Cache Hierarchy Latencies In CPU Cycles



We must Optimize these 3:

1. Memory Allocation
2. Memory Usage
3. Memory Indirection



# Something Improved IN PHP7

> **Ints, Floats**

> **Objects**

> **Strings**

> **Arrays → HashTables**



# Something Improved IN PHP7

> Ints, Floats

> Objects

> Strings

> **Arrays** → **HashTables**



# PHP 5(Core Variables)

Behind All PHP Variables There is a **ZVAL C struct**:

```
typedef union _zvalue_value {  
    long lval;  
    double dval;  
    struct {  
        char *val;  
        int len;  
    } str;  
    HashTable *ht;  
    zend_object_value obj;  
} zvalue_value;
```

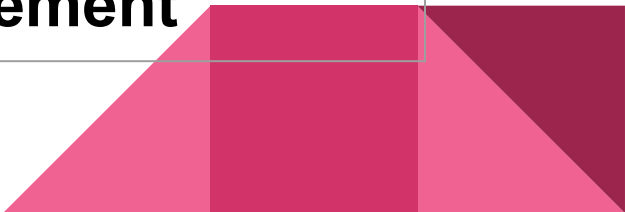
# PHP 7(Core Variables)

Behind All PHP Variables There is a **ZVAL C struct**:

```
typedef union _zend_value {
    zend_long    lval;
    double       dval;
    zend_refcounted *counted;
    zend_string  *str;
    zend_array   *arr;
    zend_object  *obj;
    zend_resource *res;
    zend_reference *ref;
    zend_ast_ref *ast;
    zval         *zv;
    void         *ptr;
    zend_class_entry *ce;
    zend_function *func;
    struct {
        uint32_t w1;
        uint32_t w2;
    } ww;
} zend_value;
```

# What is The Difference In Arrays(5 vs 7)?

	PHP5	PHP7
Allocations:	<b>2 + 2 per element</b>	<b>2 + 0 per element</b>
Size:	<b>72 + 112 per element</b>	<b>56 + 36 per element</b>



# Now, What tools to use?

<https://github.com/gburtini/Learning-Library-for-PHP>

**Fork: 74**

**Star: 246**

**DBScan, Kmeans, KNN, Markov Chain, Naive Bayes and ...**

## **Learning Library for PHP**

---

Some machine learning/artificial intelligence/natural language processing algorithms implemented in PHP. Note that in almost all cases, PHP as it stands today is the wrong tool for most machine learning jobs. This library provides a pedagogical introduction to these tools more than it is a recommendation that it is used for day-to-day development.

Copyright (C) 2011-2015 Giuseppe Burtini [joe@truephp.com](mailto:joe@truephp.com) and contributors as appropriate.





# A Better Tool

<https://github.com/php-ai/php-ml> > Only For PHP 7

Fork: 493      Star: 3988

**SVC, KNN, KMean, Naive Bayes, SVR, Least Square and ...**

**Cross Validation, Normalization, TF-IDf, Metrics and ...**



# Hybrid Approaches

Use PHP with these services:

- > Amazon Machine Learning
- > Python Core with Tensorflow, Scikit and ...
- > Google Cloud Prediction API
- > IBM Watson



# Any Question Again?



# Images and Contents Sources

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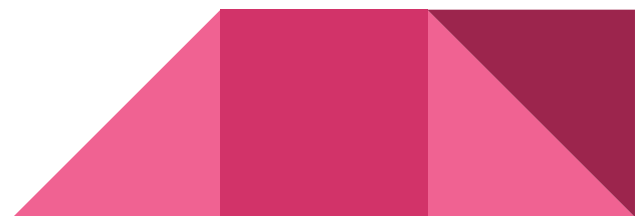
[7] <http://www.bartarinha.ir/fa/news/332320/%D8%A7%D9%87%D9%85%DB%8C%D8%AA-%D8%A7%D8%B5%D8%BA%D8%B1-%D9%81%D8%B1%D9%87%D8%A7%D8%AF%DB%8C-%D8%A8%D9%88%D8%AF%D9%86>

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[9] <https://www.slideshare.net/christadkin/sql-server-engine-cpu-cache-as-the-new-ram>

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[11] [https://www.ibm.com/developerworks/community/blogs/jfp/entry/What\\_Language\\_Is\\_Best\\_For\\_Machine\\_Learning\\_And\\_Data\\_Science?lang=en](https://www.ibm.com/developerworks/community/blogs/jfp/entry/What_Language_Is_Best_For_Machine_Learning_And_Data_Science?lang=en)



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