OpenBR – Open Source Biometric Recognition

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Motivation

Why Open Source?

Brendan's passionate speech on the need for open source biometrics software!

What's in it?

Off-the-shelf algorithms

- Face Recognition
- Gender Classification
- Age Estimation
- Commercial Wrappers

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- Automatic plot generation
- Command line interface supporting common use cases

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Software framework for algorithm development

- C++ plugin API for implementing new algorithms
- Grammar for image processing
- Automatic testing, packaging and deployment

Software Architecture

Qt

Cross-platform application and UI framework

OpenCV

Image processing library

Eigen

Linear algebra library

CMake

Cross-platform build system

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br

Command line application for running algorithms and evaluating results.

C API

High-level interface for other programming languages.

C++ Plugin API

Core interface for using and developing algorithms.

Supported Platforms

Now

Mac

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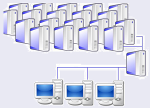
Soon

iOS



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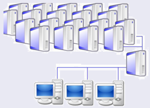

Future

intel inside

Xeon Phi

NVIDIA

ACCELERATED A·SERIES PROCESSOR

AMD

Algorithm Evaluation

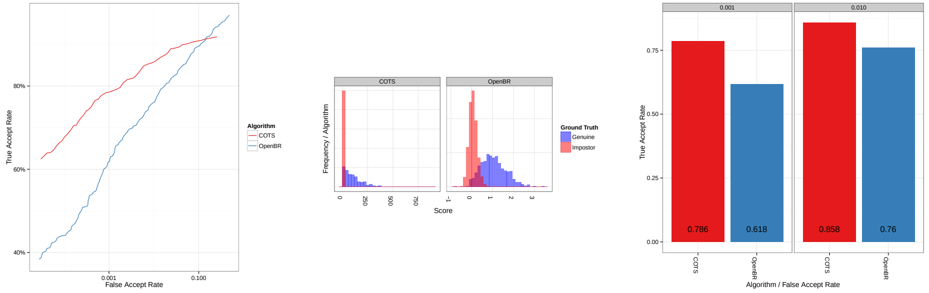

Figure : Automatic plot generation of OpenBR vs COTS face recognition on NIST *MEDS* mugshot database.

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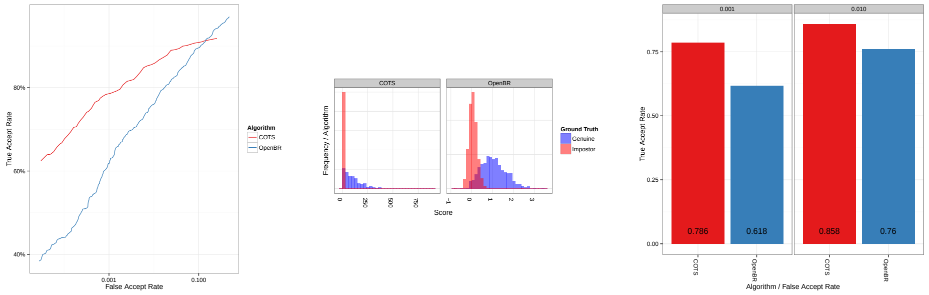

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Requires *R* Software Environment

```
> install.packages(c("ggplot2", "gplots", "reshape", "scales"))
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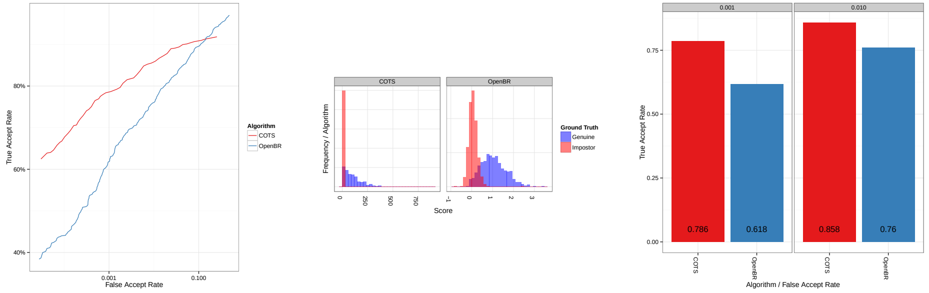

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ggplot2 is amazing!

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Transform *fr = Transform::make("FaceDetection+FaceRegistration+
                                 LBP(1)+U2+RSLDA");
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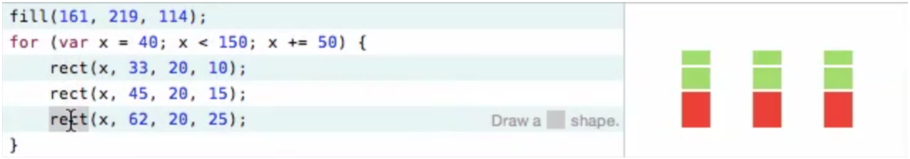
Live Coding



```
fill(161, 219, 114);
for (var x = 40; x < 150; x += 50) {
    rect(x, 33, 20, 10);
    rect(x, 45, 20, 15);
    rect(x, 62, 20, 25);
}
```

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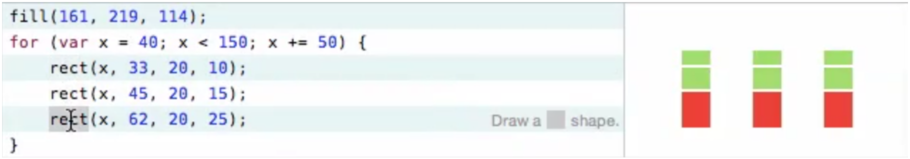

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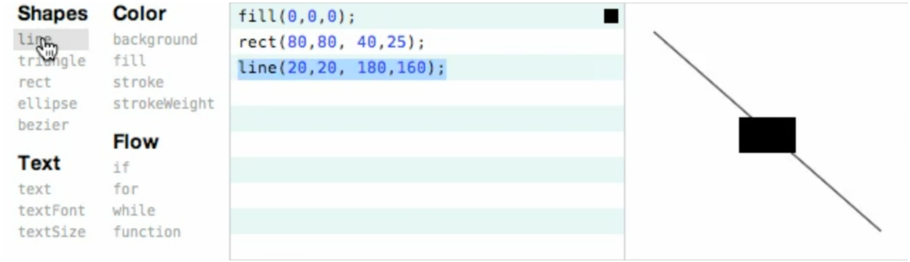

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fill(0,0,0);
rect(80,80, 40,25);
line(20,20, 180,160);
```
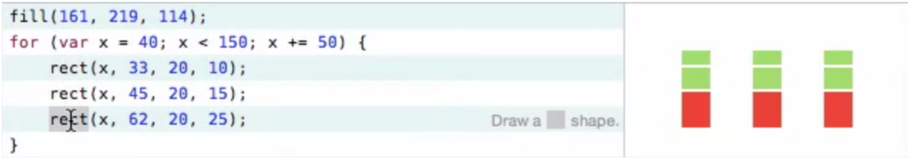

Live Coding



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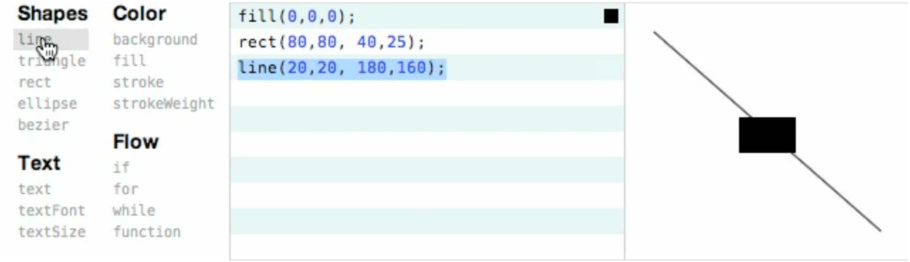

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Inventing on Principle

http://www.youtube.com/watch?v=PUv66718DII

Welcome to the Parallel Jungle!

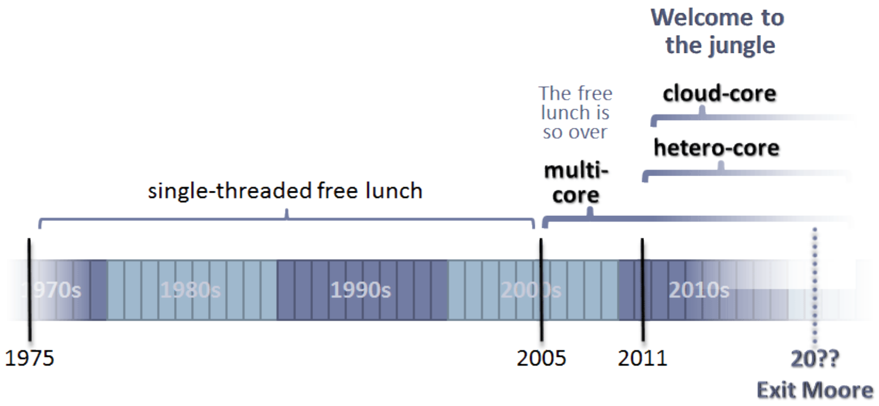

Figure : http://www.drdobbs.com/parallel/welcome-to-the-parallel-jungle/232400273

The Economics

Figure : i7 3930k

Figure : GTX 680

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$570.00

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Gotcha: Memory Bandwidth

12.8 GFLOPS **48.0 GFLOPS**

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What we want

- Write once and run everywhere
- Automatically utilize all available hardware
- Run faster on future hardware

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What we're proposing

- LLVM IR and JIT compiler
- Designing for OpenCL 2.0 standard
- C++ API for kernel construction

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A grammar for building algorithms from orthogonal primitive kernels with typeless semantics and optimized execution.

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Take-Home Message

$Compilation = Source\ Code + Available\ Hardware + First\ Image$

The End

Website

www.openbiometrics.org

Source

https://github.com/biometrics/openbr

E-mail

openbr-dev@googlegroups.com

Slides

www.openbiometerics.org/slides.pdf

Thank You!