

# Robot Vision Systems

## Lecture 8: Debugging in Eclipse

Michael Felsberg

[michael.felsberg@liu.se](mailto:michael.felsberg@liu.se)

C/C++ - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Run Window Help

Project Explorer

- Dihedral [Cpp/Features/Dihedral/lib]
- dihedralfeat
  - Binaries
  - Includes
  - Debug
  - Release
  - dihedralfeat.cpp
  - compare\_juelich.txt
- testDfeat [Cpp/Features/Dihedral/testDfeat]
- testDihedral [Cpp/Features/Dihedral/testDihedral]

Editor

```
#include "Dfeat.h"

using namespace std;

void combineChannels(const std::vector<cv::Mat> &featurevec, cv::Mat &res) {
    int vlen = featurevec.size();
    // Calculate sum of the featurevec
    res = featurevec[3];
    // for (int vind = 1; vind < vlen; ++vind) {
    //     res += featurevec[vind];
    // }
    // Normalize
    // res = res / vlen;

    // Check max values
    double minval, maxval;
    cv::minMaxLoc(res, &minval, &maxval);
    cout << "Combined featurevec min: " << minval << " max: " << maxval << endl;
}

void calcWeibullScaleShape(const cv::Mat &feature, std::vector<double> &scale,
                          std::vector<double> &shape) {

    // Make sure output vectors are empty
    scale.clear();
    shape.clear();

    // Split feature into vector of components
    std::vector<cv::Mat> featureVec;
    cv::split(feature, featureVec);
    for (unsigned int chn = 0; chn < featureVec.size(); ++chn) {
        // Create mask that hides feature values below threshold
    }
}
```

Problems Tasks Console Properties

CDT Build Console [dihedralfeat]

```
**** Build of configuration Debug for project dihedralfeat ****

make all
Building file: ../dihedralfeat.cpp
Invoking: GCC C++ Compiler
g++ -I"/home/jowi/CVLCpp/include" -O0 -g3 -Wall -c -fmessage-length=0 -MMD -MP -MF"dihedralfeat.d" -MT"dihedralfeat.d" -o
"dihedralfeat.o" "../dihedralfeat.cpp"
../dihedralfeat.cpp: In function 'void combineChannels(const std::vector<cv::Mat>&, cv::Mat&)':
../dihedralfeat.cpp:10:6: warning: unused variable 'vlen' [-Wunused-variable]
../dihedralfeat.cpp: In function 'int main(int, char**)':
../dihedralfeat.cpp:141:16: warning: unused variable 'imageScaleFactor' [-Wunused-variable]
Finished building: ../dihedralfeat.cpp

Building target: dihedralfeat
Invoking: GCC C++ Linker
g++ -L"/home/jowi/CVLCpp/lib" -fopenmp -o "dihedralfeat" ../dihedralfeat.o -lDihedral -lopencv_core -lopencv_imgproc -
lopencv_highgui -lpthread
Finished building target: dihedralfeat

**** Build Finished ****
```

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C/C++ - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Run Window Help

Set Next Statement Ctrl+Alt+R

Run Ctrl+F11

Debug F11

Profile

Profile History

Profile As

Profile Configurations...

Run History

Run As

**Run Configurations...**

Debug History

Debug As

Debug Configurations...

Toggle Breakpoint Shift+Ctrl+B

Toggle Line Breakpoint

Toggle Method Breakpoint

Toggle Watchpoint

Skip All Breakpoints

Remove All Breakpoints

Breakpoint Types

Manage Python Exception Breakpoints

Disable Step into properties

External Tools

Project Explorer

- Dihedral [Cpp/Features/Dihedral/lib]
- dihedralfeat
  - Binaries
  - Includes
  - Debug
  - Release
  - dihedralfeat.cpp
  - compare\_juelich.txt
- testDfeat [Cpp/Features/Dihedral/testDfeat]
- testDihedral [Cpp/Features/Dihedral/testDihedral]

SVN Repo... Team Syn... Debug C/C++

bgr5x5.cpp line5x5.cpp

```
c.size(); ++v) {  
v.size(); ++chn) {  
    maxval;  
    mv[chn], sminxval, smaxval);  
    .0) {  
        eature " << v << ", channel " << chn << ": ";  
        axval " << maxval << endl;  
    }  
    team resfname;  
    ase << " " << v << " " << chn << ".png";  
    /r/.
```

terminated: dihedralfeat Debug [C/C++ Application] dihedralfeat

```
0, 0, 0, 0, 0;  
-0.5, 0, 0, 0, 0.5]
```

Processing image file './rnd5x5.png'

Combined featurevec min: 3.26598 max: 233.518  
Masked featurevec min: 3.26598 max: 233.518  
Mean: [0.5701873302459717]  
Stddev: [18.10104942505892]  
Weibull scale: 6103.53  
Weibull shape: 0.070855  
Masked featurevec min: 21.5058 max: 143.641  
Mean: [0.07683042526245118]  
Stddev: [18.01041893312442]  
Weibull scale: 3577.71  
Weibull shape: 0.0712115  
Fisher: [1.347654983518373e-10, -6.926881451909571e-05;  
-6.926881451909571e-05, 363.2518260146452]  
Fisher: [3.961789913813894e-10, -0.0001181718884782861;  
-0.0001181718884782861, 359.6233873764718]  
Sharpness (angle)= 1.5708  
Sharpness (trace)= 363.252  
Sharpness (angle)= 1.5708  
Sharpness (trace)= 359.623

Create, manage, and run configurations



Name:

Main Arguments Environment Debugger Source Common

C/C++ Application:  
 Search Project... Browse...

Project:  
 Browse...

Build (if required) before launching

Build configuration:

Select configuration using 'C/C++ Application'

Enable auto build  Disable auto build

Use workspace settings [Configure Workspace Settings...](#)

Using GDB (DSF) Create Process Launcher - [Select other...](#) Apply Revert

Close Debug

Filter matched 28 of 28 items

## Create, manage, and run configurations



Name: dihedralfeat Debug

Main Arguments Environment Debugger Source Common

Program arguments:  
../rnd5x5.png

Variables...

Working directory:  
\${workspace\_loc:dihedralfeat}

Use default

Workspace... File System... Variables...

Using GDB (DSF) Create Process Launcher -  
[Select other...](#)

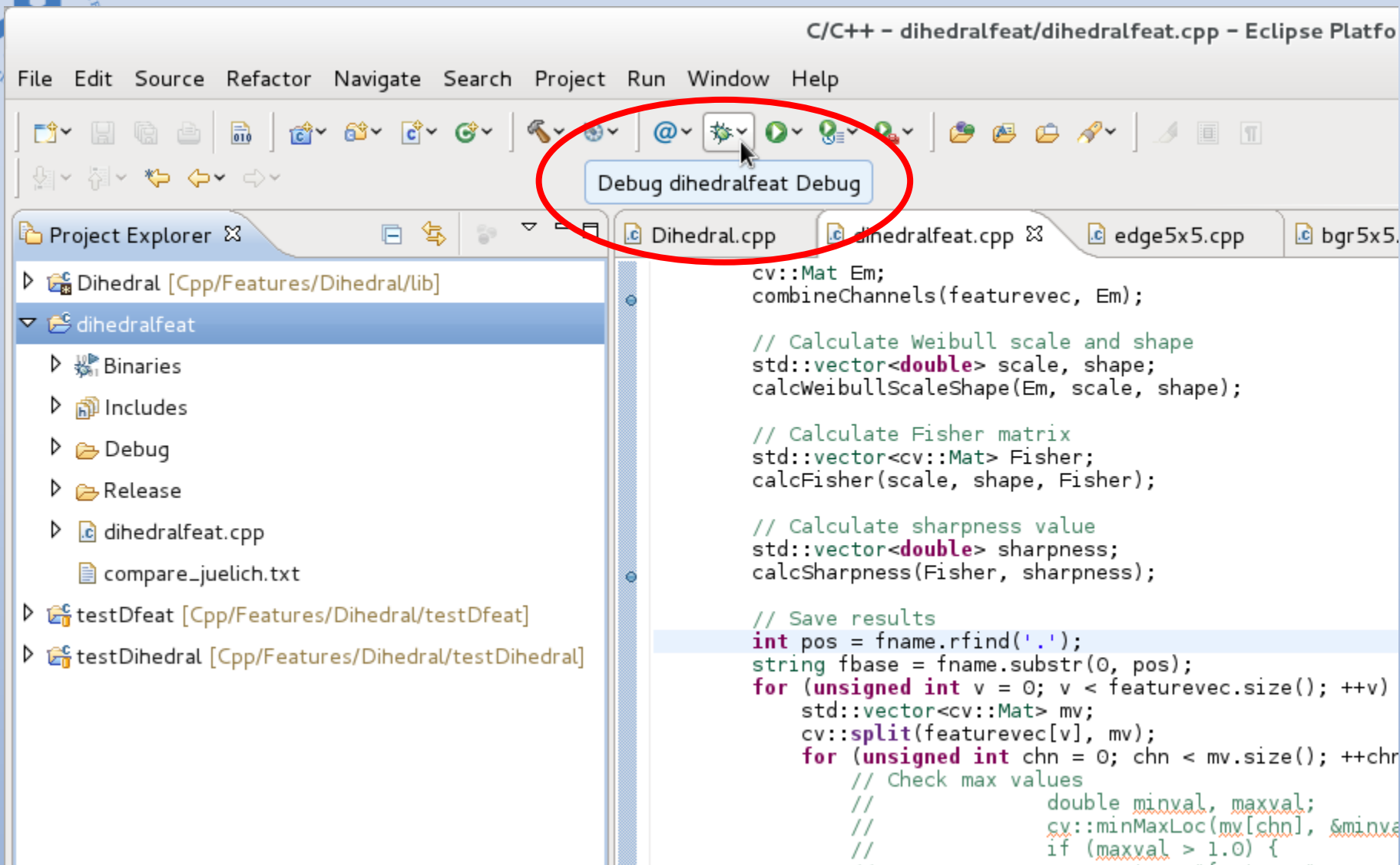
Apply Revert



Filter matched 28 of 28 iter

Close

Debug



The screenshot shows the Eclipse IDE interface. The title bar reads "C/C++ - dihedralfeat/dihedralfeat.cpp - Eclipse Platfo". The menu bar includes "File", "Edit", "Source", "Refactor", "Navigate", "Search", "Project", "Run", "Window", and "Help". The toolbar contains various icons, with the "Debug" icon (a gear) highlighted by a red circle and a tooltip that says "Debug dihedralfeat Debug".

The Project Explorer on the left shows the project structure:

- Dihedral [Cpp/Features/Dihedral/lib]
- dihedralfeat
  - Binaries
  - Includes
  - Debug
  - Release
  - dihedralfeat.cpp
  - compare\_juelich.txt
- testDfeat [Cpp/Features/Dihedral/testDfeat]
- testDihedral [Cpp/Features/Dihedral/testDihedral]

The main editor displays the source code for `dihedralfeat.cpp`. The code includes comments and function calls for calculating Weibull scale and shape, Fisher matrix, and sharpness value. The current line of code is:

```
int pos = fname.rfind('.');
```

Debug - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Pydev Run Window Help

Debug Console Variables Breakpoints Registers Modules

Debug Console: dihedralfeat Debug [C/C++ Application] /home/jowi/CVLcpp/Features/Dihedral/dihedralfeat/Debug/dihedralfeat [27320] [cores: 4] Thread [1] 27320 [core: 4] (Suspended: Breakpoint) main() at dihedralfeat.cpp:124 0x40309e gdb

Name	Type	Value
argc	int	2
argv	char **	0x7fffffff858
dfb	cvl::features::Dfeat	{...}

```
cvl::Scalar focus = cv::trace(Fisher[comp]);
cout << "Sharpness (trace)= " << focus[0] << endl;
}
int main(int argc, char** argv) {
    // Setup Dihedral filter bank
    cvl::features::Dfeat dfb;
    //dfb.edge5x5();
    dfb.line5x5();
    dfb.printFilters();

    for (int f = 1; f < argc; ++f) {
        // Read input image
        std::string fname = argv[f];
        cout << "Processing image file " << fname << " " << endl;
        cv::Mat bgr = cv::imread(fname);
        if (bgr.empty()) {
            cerr << "Failed to read image file " << fname << endl;
            continue;
        }

        // Normalize to [0..1]
        cv::Mat nbgr;
```

Outline: stdio.h, stringstream, opencv2/highgui/highgui.hpp, opencv2/imgproc/imgproc.hpp, Dfeat.h, std, combineChannels(const std::vector<cv::M, calcWeibullScaleShape(const cv::Mat&, s, calcFisher(const std::vector<double>, cor, calcSharpness(const std::vector<cv::Mat, main(int, char\*\*): int

Console: dihedralfeat Debug [C/C++ Application] dihedralfeat

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Debug - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Pydev Run Window Help

Debug Console

Debug Console: dihedralfeat Debug [C/C++ Application]

- Thread [8] 30433 [core: 4] (Suspended: Container)
- Thread [7] 30430 [core: 2] (Suspended: Container)
- Thread [6] 30428 [core: 4] (Suspended: Container)
- Thread [5] 30427 [core: 6] (Suspended: Container)
- Thread [4] 30424 [core: 0] (Suspended: Container)
- Thread [3] 30421 [core: 0] (Suspended: Container)
- Thread [2] 30419 [core: 7] (Suspended: Container)
- Thread [1] 27320 [core: 0] (Suspended: Step)

main() at dihedralfeat.cpp:166 0x40334f

gdb

Name	Type	Value
nbgr	cv::Mat	{...}
sharpness	std::vector<double, std::allocator<double>>	{...}
[0]	double	1.5707965174857881
[1]	double	1.570796655393905
f	int	1

Variables Breakpoints Registers Modules

Outline

- stdio.h
- sstream
- opencv2/highgui/highgui.hpp
- opencv2/imgproc/imgproc.hpp
- Dfeat.h
- std
- combineChannels(const std::vector<cv::Mat>&, cv::Mat&)
- calcWeibullScaleShape(const cv::Mat&, double, int)
- calcFisher(const std::vector<double>, cv::Mat)
- calcSharpness(const std::vector<cv::Mat>, cv::Mat)
- main(int, char\*\*) : int

```
cv::Mat Em;
combineChannels(featurevec, Em);

// Calculate Weibull scale and shape
std::vector<double> scale, shape;
calcWeibullScaleShape(Em, scale, shape);

// Calculate Fisher matrix
std::vector<cv::Mat> Fisher;
calcFisher(scale, shape, Fisher);

// Calculate sharpness value
std::vector<double> sharpness;
calcSharpness(Fisher, sharpness);

// Save results
int pos = fname.rfind('.');
string fbase = fname.substr(0, pos);
for (unsigned int v = 0; v < featurevec.size(); ++v) {
    std::vector<cv::Mat> mv;
    cv::split(featurevec[v], mv);
    for (unsigned int chn = 0; chn < mv.size(); ++chn) {
        // Check max values
        double minval, maxval;
        cv::minMaxLoc(mv[chn], &minval, &maxval);
```

Console

```
dihedralfeat Debug [C/C++ Application] dihedralfeat
-0.0001181718884782861, 359.6233873764718]
Sharpness (angle)= 1.5708
Sharpness (trace)= 363.252
Sharpness (angle)= 1.5708
Sharpness (trace)= 359.623
```





Debug - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Pydev Run Window Help

Debug [C/C++ Application]

- diagonal /home/jowi/CVLCpp/Features/Dihedral/dihedralfeat/Debug/dihedralfeat [27320] [cores: 0,2,4,6,7]
  - Thread [8] 30433 [core: 4] (Suspended: Container)
  - Thread [7] 30430 [core: 2] (Suspended: Container)
  - Thread [6] 30428 [core: 4] (Suspended: Container)
  - Thread [5] 30427 [core: 6] (Suspended: Container)
  - Thread [4] 30424 [core: 0] (Suspended: Container)
  - Thread [3] 30421 [core: 0] (Suspended: Container)
  - Thread [2] 30419 [core: 7] (Suspended: Container)
  - Thread [1] 27320 [core: 0] (Suspended: Step)
    - main() at dihedralfeat.cpp:166 0x40334f

gdb

Name	Type	Value
nbgr	cv::Mat	
sharpness	std::vector<double, std::allocator<double>>	{...}
[0]	double	1.5707965174857881
[1]	double	1.570796655393905
f	int	1

```
cv::Mat Em;
combineChannels(featurevec, Em);

// Calculate Weibull scale and shape
std::vector<double> scale, shape;
calcWeibullScaleShape(Em, scale, shape);

// Calculate Fisher matrix
std::vector<cv::Mat> Fisher;
calcFisher(scale, shape, Fisher);

// Calculate sharpness value
std::vector<double> sharpness;
calcSharpness(Fisher, sharpness);

// Save results
int pos = fname.rfind('.');
string fbase = fname.substr(0, pos);
for (unsigned int v = 0; v < featurevec.size(); ++v) {
    std::vector<cv::Mat> mv;
    cv::split(featurevec[v], mv);
    for (unsigned int chn = 0; chn < mv.size(); ++chn) {
        // Check max values
        double minval, maxval;
        cv::minMaxLoc(mv[chn], &minval, &maxval);
```

Outline

- stdio.h
- sstream
- opencv2/highgui/highgui.hpp
- opencv2/imgproc/imgproc.hpp
- Dfeat.h
- std
- combineChannels(const std::vector<cv::Mat>&, cv::Mat&, cv::Mat&)
- calcWeibullScaleShape(const cv::Mat&, cv::Mat&, cv::Mat&)
- calcFisher(const std::vector<double>, const std::vector<double>, std::vector<cv::Mat>&)
- calcSharpness(const std::vector<cv::Mat>, std::vector<double>&)
- main(int, char\*\*): int

Console

```
dihedralfeat Debug [C/C++ Application] dihedralfeat
-0.0001181718884782861, 359.6233873764718]
Sharpness (angle)= 1.5708
Sharpness (trace)= 363.252
Sharpness (angle)= 1.5708
Sharpness (trace)= 359.623
```

Terminate



Debug - dihedralfeat/dihedralfeat.cpp - Eclipse Platform

File Edit Source Refactor Navigate Search Project Pydev Run Window Help

SVN Repo... Team Syn... Debug C/C++

C/C++ perspective

Debug <terminated>dihedralfeat Debug [C/C++ Application]

<terminated, exit value: 0>gdb

Name	Type	Value
------	------	-------

Dihedral.cpp dihedralfeat.cpp Dfeat.cpp edge5x5.cpp bgr5x5.cpp Dfeat.h line5x5.cpp 2

```
cv::Mat Em;
combineChannels(featurevec, Em);

// Calculate Weibull scale and shape
std::vector<double> scale, shape;
calcWeibullScaleShape(Em, scale, shape);

// Calculate Fisher matrix
std::vector<cv::Mat> Fisher;
calcFisher(scale, shape, Fisher);

// Calculate sharpness value
std::vector<double> sharpness;
calcSharpness(Fisher, sharpness);

// Save results
int pos = fname.rfind('.');
string fbase = fname.substr(0, pos);
for (unsigned int v = 0; v < featurevec.size(); ++v) {
    std::vector<cv::Mat> mv;
    cv::split(featurevec[v], mv);
    for (unsigned int chn = 0; chn < mv.size(); ++chn) {
        // Check max values
        double minval, maxval;
        cv::minMaxLoc(mv[chn], &minval, &maxval);
```

Outline

- stdio.h
- sstream
- opencv2/highgui/highgui.hpp
- opencv2/imgproc/imgproc.hpp
- Dfeat.h
- std
- combineChannels(const std::vector<cv::M
- calcWeibullScaleShape(const cv::Mat&, s
- calcFisher(const std::vector<double>, cor
- calcSharpness(const std::vector<cv::Mat
- main(int, char\*\*): int

Console

<terminated> dihedralfeat Debug [C/C++ Application] dihedralfeat

```
-0.0001181718884782861, 359.6233873764718]
Sharpness (angle)= 1.5708
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