Content Presentation

Oliver Heidmann

23.5.2016

Contents

1 What is Rcpp

R is for easily acessing c functions in R +better description +more facts

2 How to setup Rcpp

2.1 to use in C/C++ code

simply include <Rcpp.h>
install.packages('Rcpp')
install.packages('inline') etc...

3 Rcpp basics

3.1 RObject and SEXP

Rcpp::RObject are very thin wrappers around an SEXP. In fact the SEXP is the only member of the Rcpp::RObject.(check if fact or just misunderstanding) SEXP is guarded from Garbage collection through Rcpp::RObject

SEXP types:

3.2 conversions

3.2.1 what is wrapable

3.2.2 C++ to R

Rcpp::wrap:

```
template <typename T> SEXP wrap(const T& object)
```

+expl

3.2.3 R to C++

```
template <typename T> T as(SEXP x)
```

+ expl

3.3 Structure of Rcpp code

better explanation of " first convert , calculate, convert

3.4 Calling a function

explanation of .call

4 two ways to use Rcpp

4.1 Using Rcpp Inline

what happens with the c++ inline function when executed - explanation

```
cppFunction("double add(double x, double y, double z){
    double sum = x + y + z;
    return sum;
    }"
)
```

4.2 Rcpp packages

Rcpp.package.skeleton - rough to very rough explanation
example of folder structure and where to write what
Example C++ function

```
std::vector<int> add_lists(std::vector<int> vec1, std::vector<int> vec2) {
    unsigned long max_length = std::min(vec1.size(), vec2.size());
    std::vector<int> result;
    for (unsigned long i = 0; i < max_length; i++) {
        result.push_back(vec1[i] + vec2[i]);
    }
    return result;}
```

Example binding to R function

```
add_lists <-function(vec1, vec2) {
   .Call( "test_add_lists", vec1, vec2, PACKAGE = 'test')
}
```

Example Export Wrapper function

```
RcppExport SEXP test_add_lists(SEXP vec1, SEXP vec2) {
    BEGIN_RCPP
    Rcpp::RObject __result;
    Rcpp::RNGScope __rngScope;
    __result =
    add_lists(Rcpp::as<std::vector<int>>(vec1), Rcpp::as<std::vector<int>>(vec2));
    return Rcpp::wrap(__result);
    END_RCPP
}
```

5 Paralell code(OPTIONAL NO IDEA IF IN FINAL VERSION OR NOT)

5.1 in C++ code used in R

5.2 in R

6 Other not self written Example

7 Sources

https://stat.ethz.ch/R-manual/R-devel/library/parallel/doc/parallel.pdf
http://dirk.eddelbuettel.com/code/rcpp/Rcpp-introduction.pdf
http://dirk.eddelbuettel.com/code/rcpp/Rcpp-package.pdf
http://dirk.eddelbuettel.com/code/rcpp/Rcpp-FAQ.pdf

REAL CITATIONS AS ARE WISHED FOR IN THOSE PDFs WILL FOLLOW!!! + better version of sources

all examples will be updated in later versions