

# Degree Project

## Presentation #1

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April 28, 2020

- ▶ Advisor: Rodrigo Paredes (rapa)
- ▶ Thema: Incremental sorting for arrays with highly redundant classes
- ▶ Current Status: A paper, initial tests finished.

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Conferences > 2015 34th International Conference on Systems, Man, and Cybernetics (SMC)

### Worst-case optimal incremental sorting

Publisher: IEEE

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**Abstract**

Document Sections

1. Introduction
2. Incremental Quicksort
3. Sketch of Our Proposal
4. Known Solutions and Issues
5. Introduction on IQS

**Authors**

**Figures**

**Abstract:**

We present an online algorithm to, given a fixed array  $A$ , retrieve its  $k$  smallest elements in optimum time for the worst case, that presents fast response in practice. For this, we devise an introspective version of the Incremental Quicksort (IQS) algorithm, which controls the size of the auxiliary stack of the IQS algorithm via an introspective criteria.

**Published in:** 2015 34th International Conference of the Chilean Computer Science Society (SCCC)

**Date of Conference:** 9-13 Nov. 2015

**Date Added to IEEE Xplore:** 25 February 2016

**ISBN Information:**

**INSPEC Accession Number:** 15000127

**DOI:** 10.1109/SCCC.2015.7416566

**Publisher:** IEEE

**Conference Location:** Santiago, Chile

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Published: 2010

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ORGANIZATION 1

ORGANIZATION 2

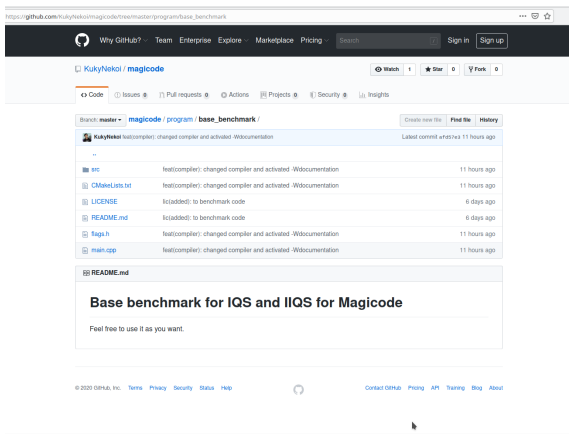
ORGANIZATION 3

ORGANIZATION 4

Figure: IIQS implementation changes the partition method in order to guarantee a partition of linear time and at the same time guarantee a reduction on the search space. (10.1109/SCCC.2015.7416566).

Current scope is limited as an experimental algorithm design to extend (I)IQS usage for haplotype plot generation, which is an instance of the worst case for IQS but on a discrete space when  $C \ll n$ .

- ▶ Modification 1: Add incremental version of BFPRT algorithm
- ▶ Modification 2: Change rules for introspective step
- ▶ Modification 3: Bias the three-way-median returned index
- ▶ Modification 4: Store the three-way-median result on the stack



**Figure:** Implementation for the tests available under GNU GPL license at GitHub

- ▶ Scope: Experimental design, setup and experimentation
- ▶ Part of magicode, a personal research on FPGA implementation of hardware accelerators for similarity search (the original thema).
- ▶ Got someone interested on using this algorithm for solving haplotype plots

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