

Towards Intelligent Analysis Techniques for Object Pretenuring

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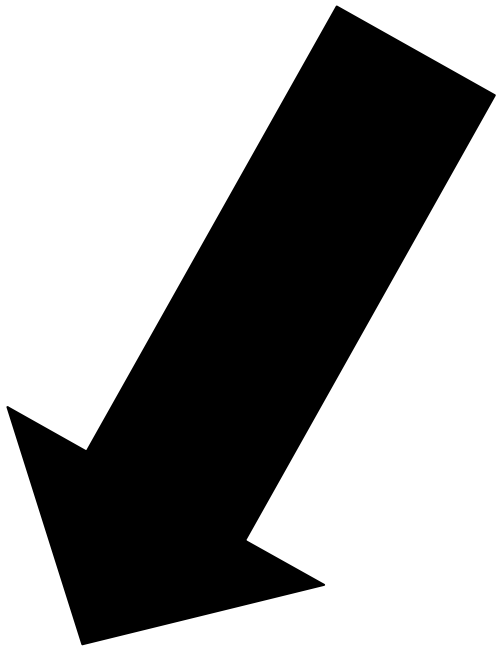
the heap



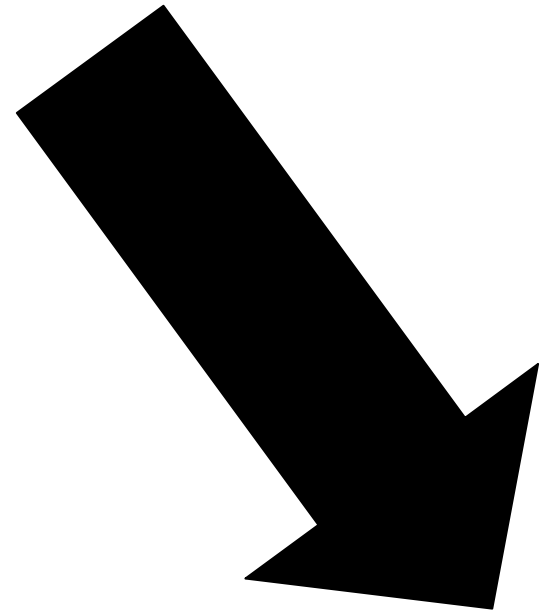
Generational GC

- “*Most objects die young*” [Ungar]
- Split heap into nursery and mature spaces
- Allocate in nursery, collect frequently
- Promote to mature, collect infrequently

nursery



mature



Pretenuring Optimization

- Identify long-lived objects at or before their dynamic allocation, and place such objects immediately in the mature space
- Saves processing and copying time in nursery

Object Features

- object type
- allocation site
- calling context

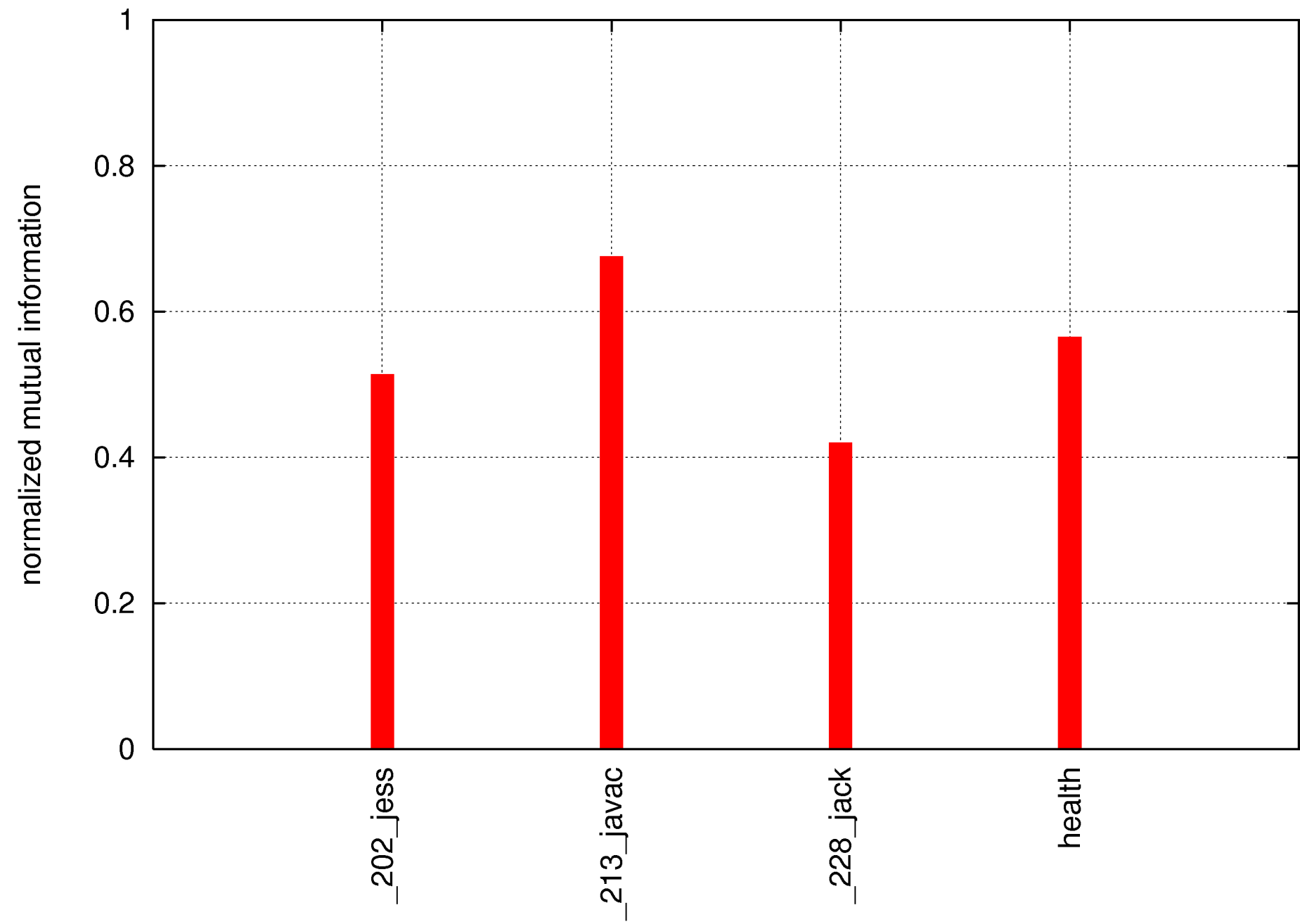
- object metrics (generalize over programs etc)

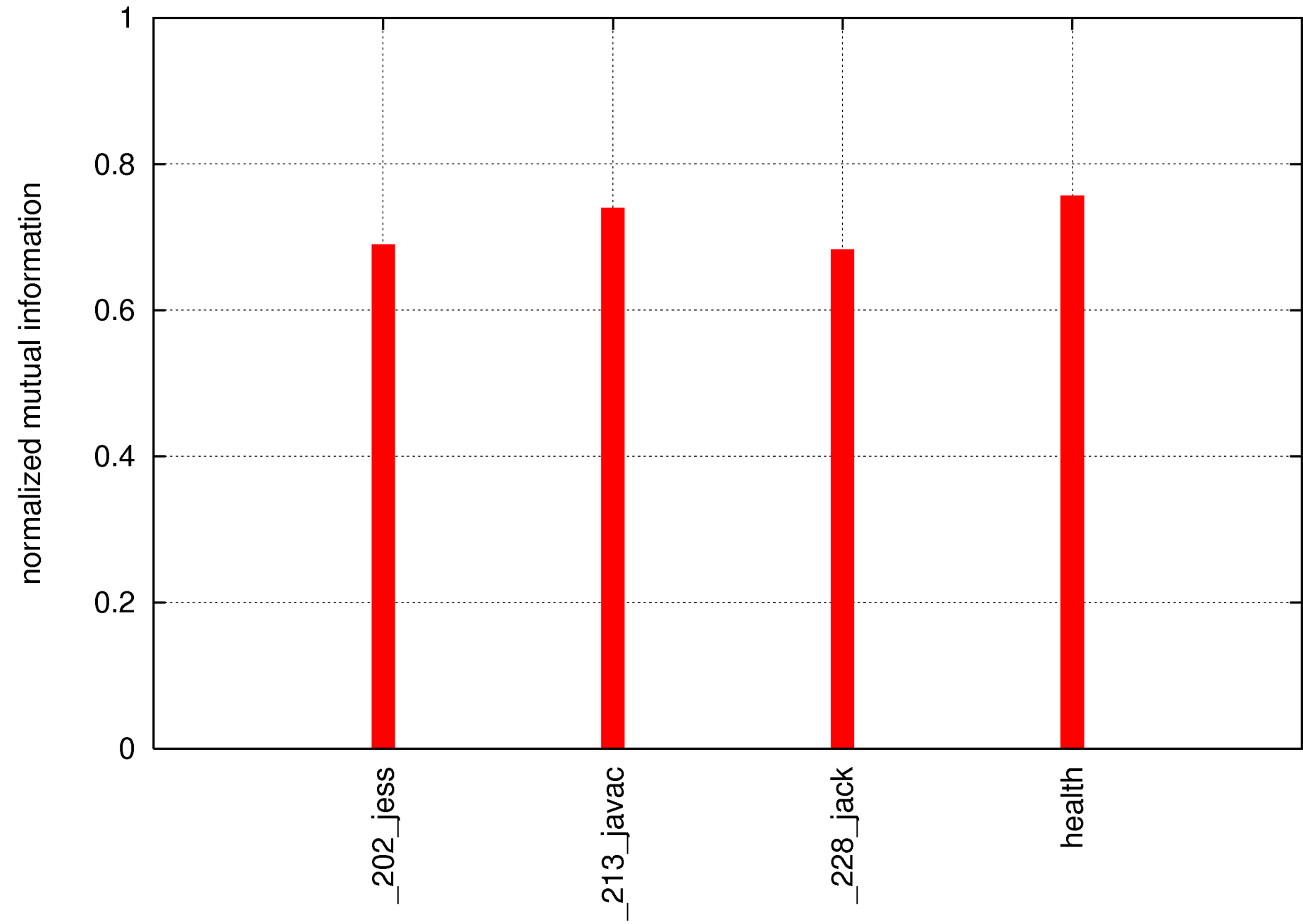
Measuring Correlation

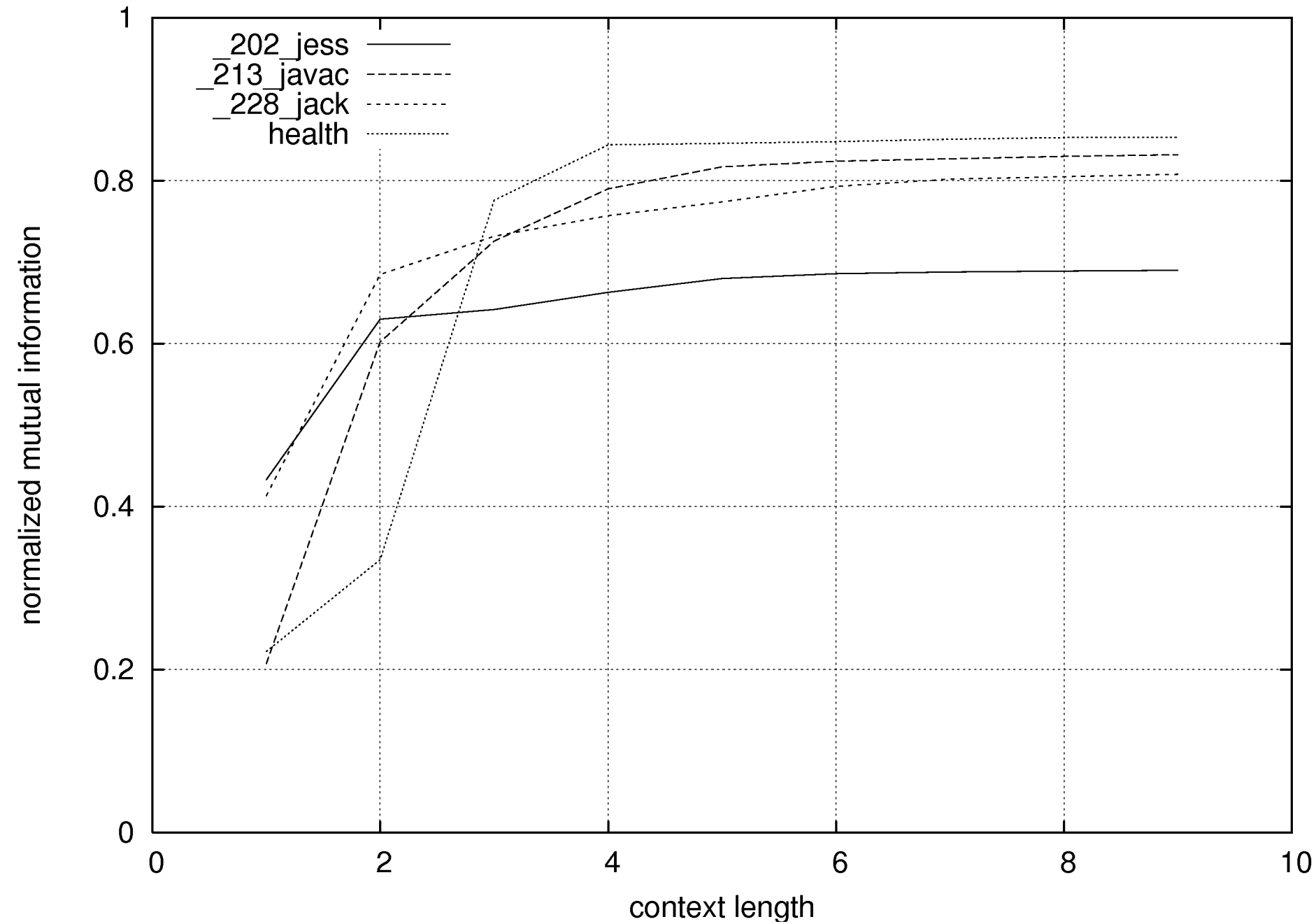
- which object features are good indicators of long-lived objects?
- use *Information Theory* to measure this
- *Normalized Mutual Information* can detect arbitrary correlations. Score between 0 (no correlation) and 1 (perfect correlation)

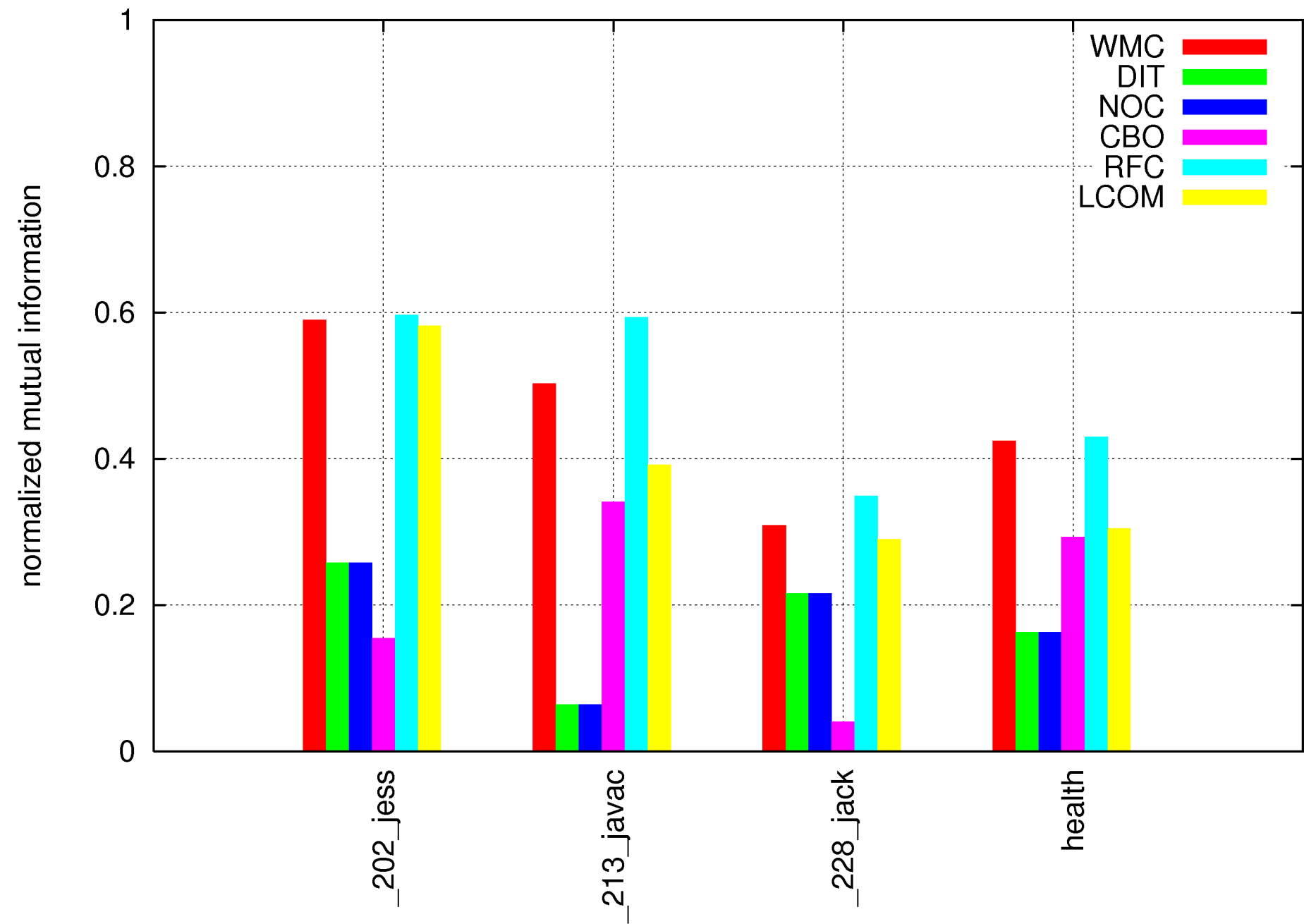
Experimental Setup

- Use standard benchmarks from existing pretenuring papers
- Instrument Jikes RVM with generational GC to collect tenured object information
- Compute NMI for each feature, for each benchmark









Where next?

- Identify and evaluate more object features for pretenuring
- Implement pretenuring optimizations in Jikes RVM
- Static at first, hope to be dynamic eventually