Analysis of Software Design Principles under Complex Network Theory

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Contents

1 Introduction

One of the most well known Software Design principles in **Software Engineering** is High Cohesion (High Cohesion) and Low Coupling (Low Coupling), which is well described here [You79].

As this two principles states a *robust Software* should be design with Low

Coupling between their modules and High Cohesion inside it.

In other words, a Software that fullfil this characteristics should be very connected in their minimum functional units (Functions inside same file, Methods inside a class, etc), and with few connections between their coarse grained functional units (a.k.a Modules or Packages).

In this work, we are going to formulate some hypothesis which we believe it can been empirically proved and shown the relationship between these principles and how to measure with **Complex Network Theory (Complex Network Theory)**. At the same time, we are going to analysis different kinds of software of different sizes and build under different language paradigms to see if the tool set that Complex Network Theory provides are suitable for the general case.

2 Preliminaries

2.1 Context

2.2 Hypothesis

- Que si escribes un programa, las métricas de su grafo deben estar más o menos parecidas .95 percentil al avarage de las que hemos calculado.
- Que los OOP programs estan mejor modularizados que los FP programs
- Que la modularización de un programa mejora cuantas más lineas de código tiene

3 Results

3.1 Experiments

3.2 Metrics

4 Discussion and Analysis

5 Conclusions

References

[You79] E. Yourdon. *Structured Design Fundamentals of a Discipline of-Computer Program and Systems Design*. Prentice-Hall Inc, Reno, 1979.

A Organization

- **code**: Under this folder you are going to find *C++* code for simulating and generating the different networks using the different strategies: Growth + Preferential Attachment (G Pref Attachment), Growth + Random Attachment (G Random Attachment) and No Growth + Preferential Attachment (NG Pref Attachment), as well as the *R* scripts for generating plots and doing graph analysis.
- **code/data**: Data Generated for each strategy
- **report**: This report in Latex and PDF format.