

# Software Behaviour Analysis Based on the Human Perception Systems

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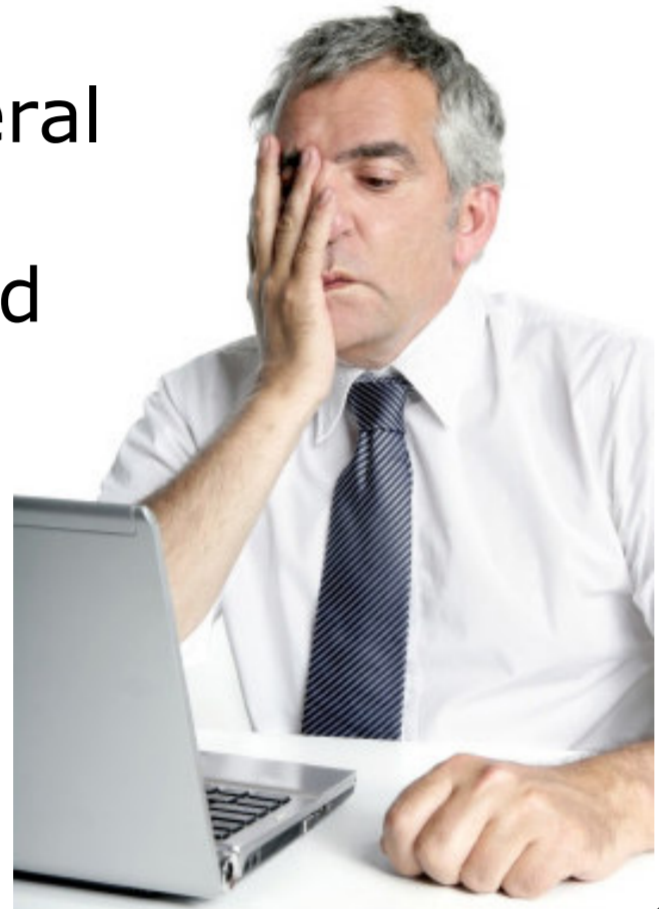
## Introduction

### Software maintenance

- Up to 90% of software development effort
- Up to 70% of effort spent on comprehension process

### Software engineers need to explore traces

- When an unexpected behaviour occurs.
- To help build a general understanding of the system, fix a bug, add a new feature.



- Traces tend to be **excessively large and hard** to understand

## Idea

### Challenges

- Traces are extremely large (millions of lines long).
- Limited human working memory makes navigating through the content of a trace challenging.
- The need to interpret (understand) the content of a trace in a relatively short time.

### Human Perception

Processes proposed in psychology explain how the human brain and the perception system

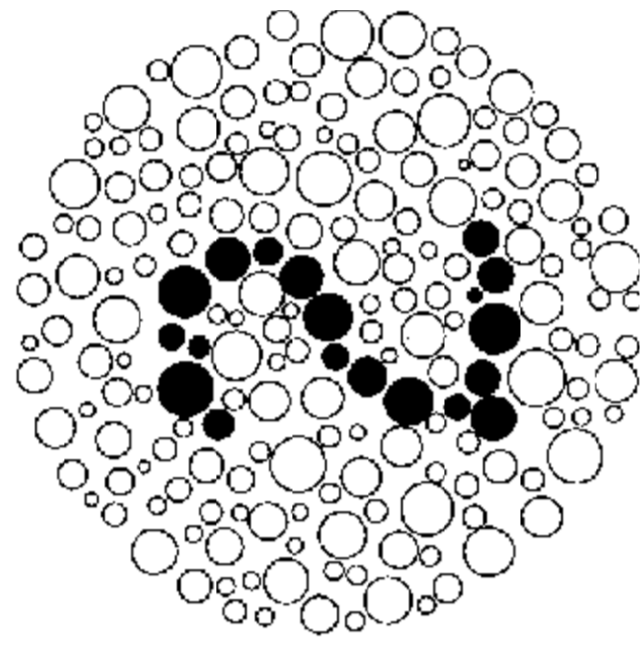
- automatically (not voluntarily)
- deals with huge volume of visual data
- considering limited short-term memory
- and necessity of a short response time.



... yet the brain can quickly identify parts of a scene, group them into shapes, and interpret the shapes

- Learn from these techniques and to build similar mechanisms that can help process large traces.

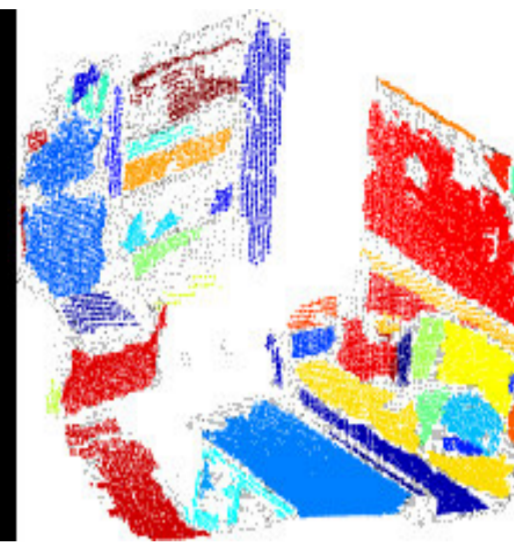
## Framework and Methods



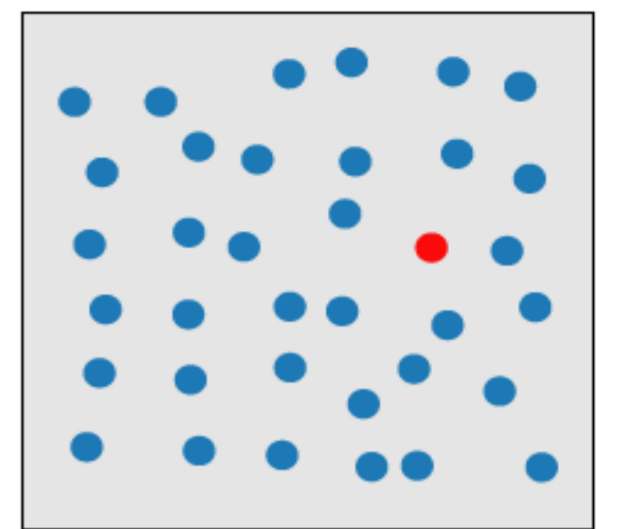
Our perceptual system segments local elements against their context and integrates them as objects and regions [Bowers 90].



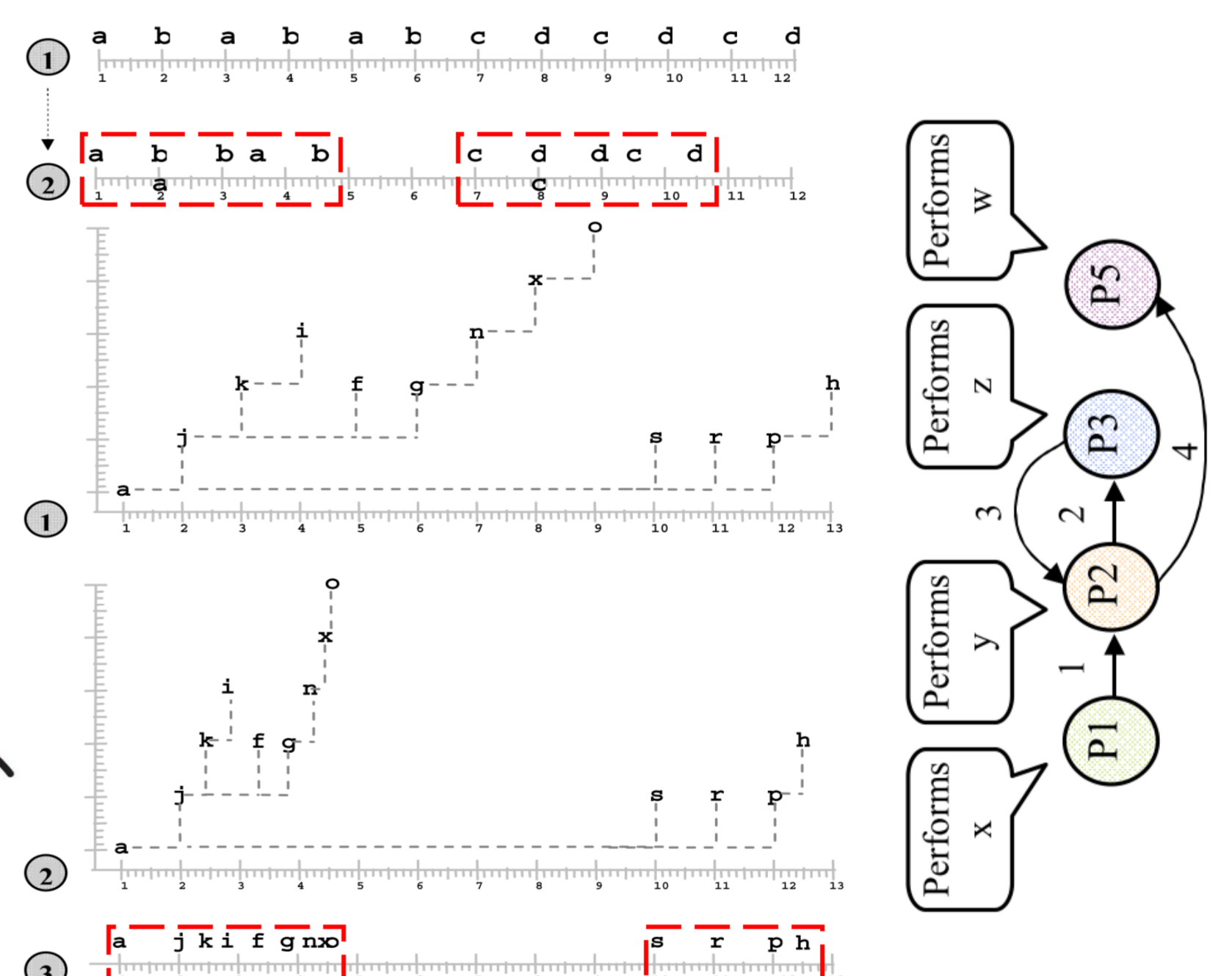
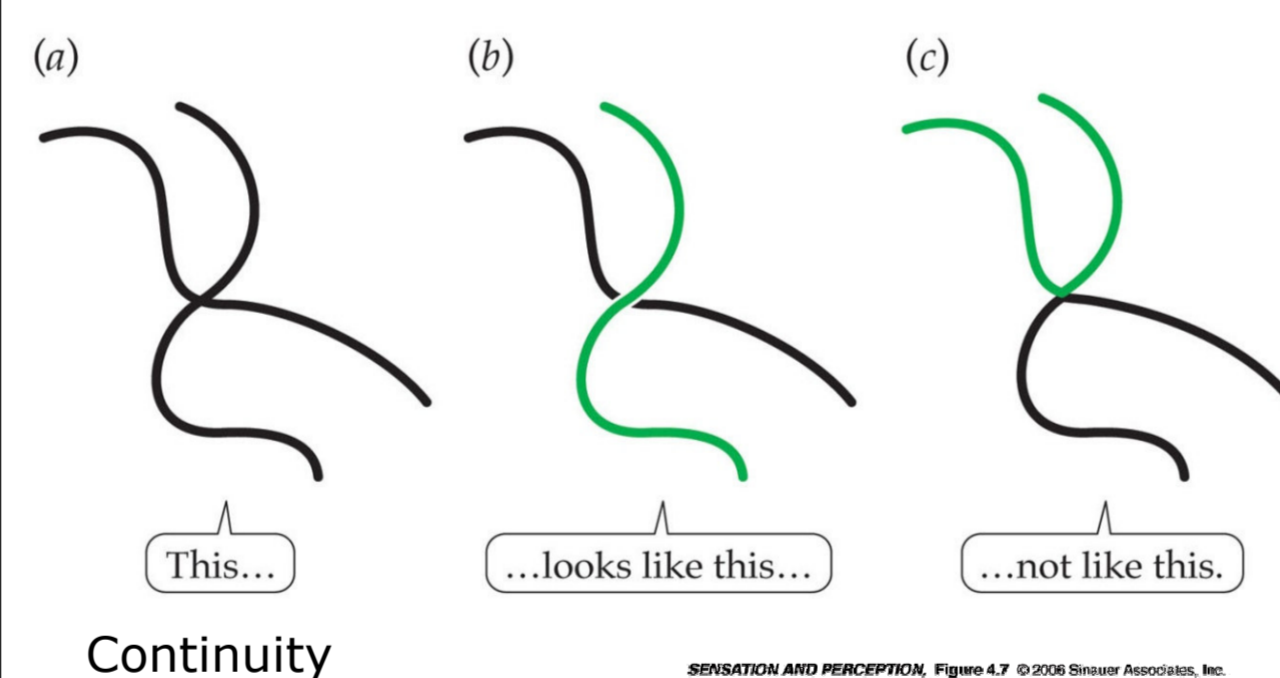
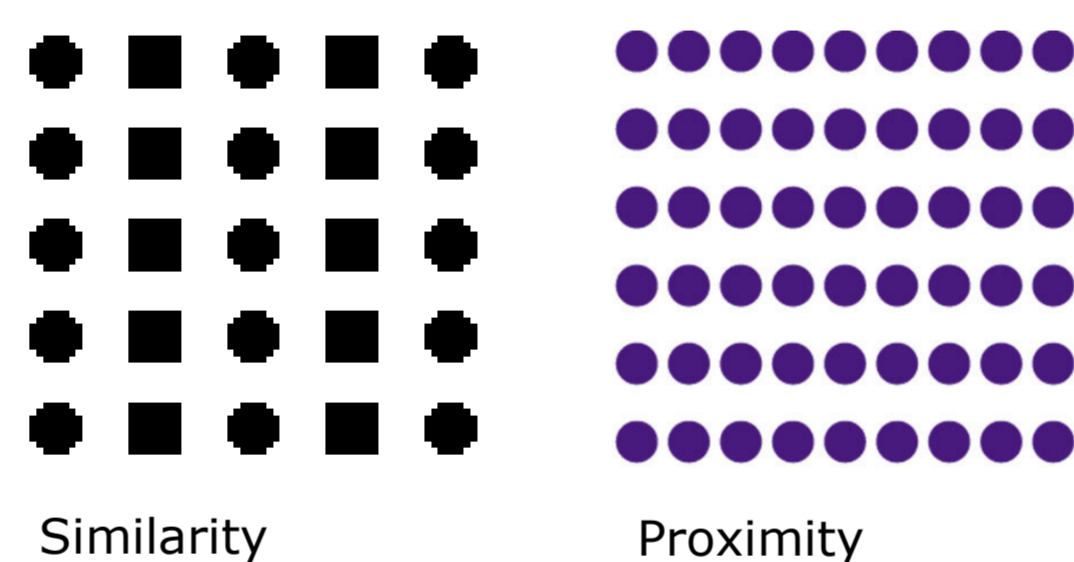
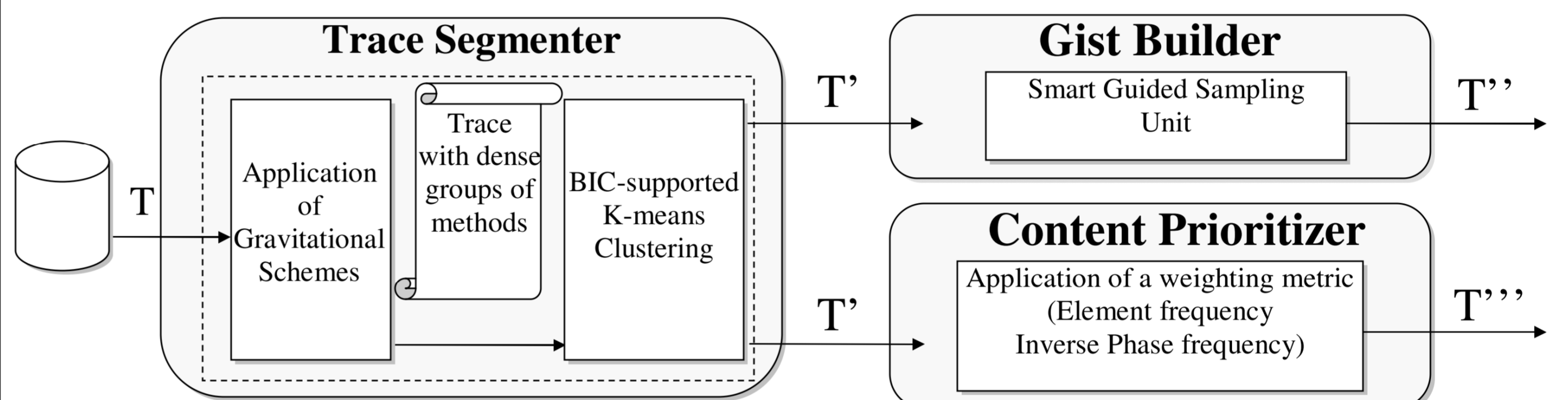
The segmented scene is then quickly scanned with eye movements so as the brain obtains an overall impression of it [Uchida et al. 06].



Swadzba et al 2010 Universität Bielefeld



The scene is analyzed in more detail by visiting the regions in a certain order. The pop-out effect is an important factor [Grabowecky 99].



## Results

