Understanding through Code Visualisation

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Outline

1. Background
2. Importance
3. Progress
4. Remaining time
5. What will be achieved
6. What to take away

Background

- Code comprehension
- Usefulness of visualisations
- Application of visualisations to live coding
- Creating meaningful visualisations

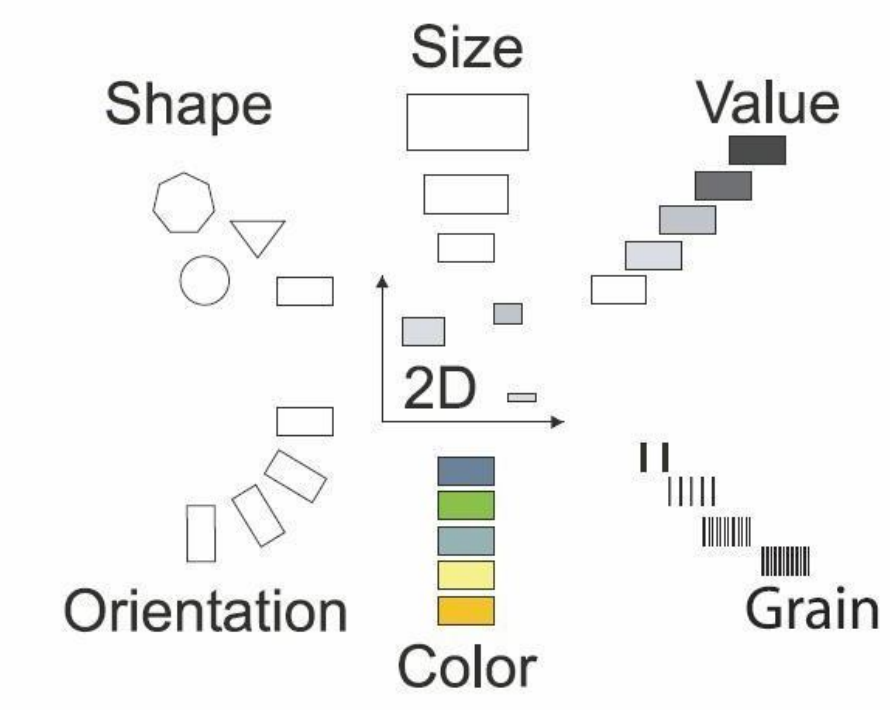
Importance

- Educational implications
- Software engineering implications
- Application within live coding
- Application beyond live coding

Progress

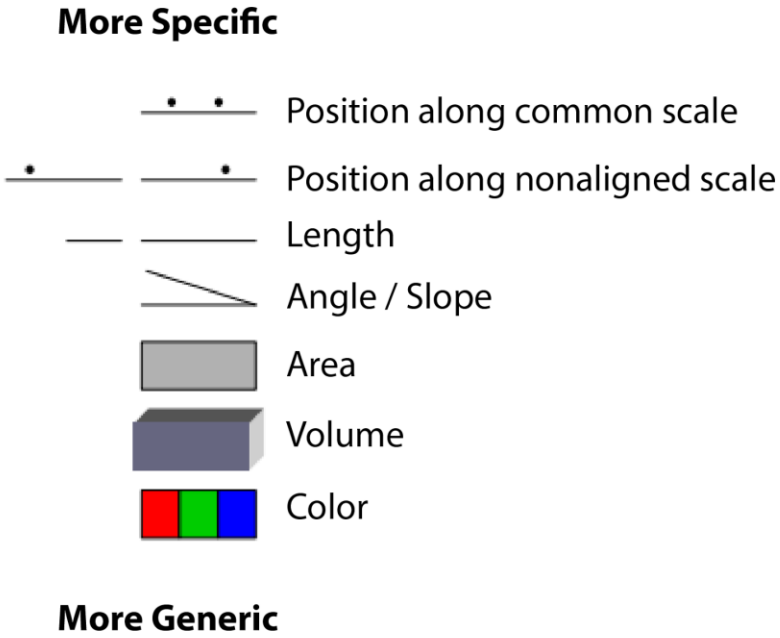
- Field study and lab study conducted
- Interviews conducted
- Requirements gathered
- Visualisations prototyped and tested
- Visualisation analysis model developed

Visual Variables



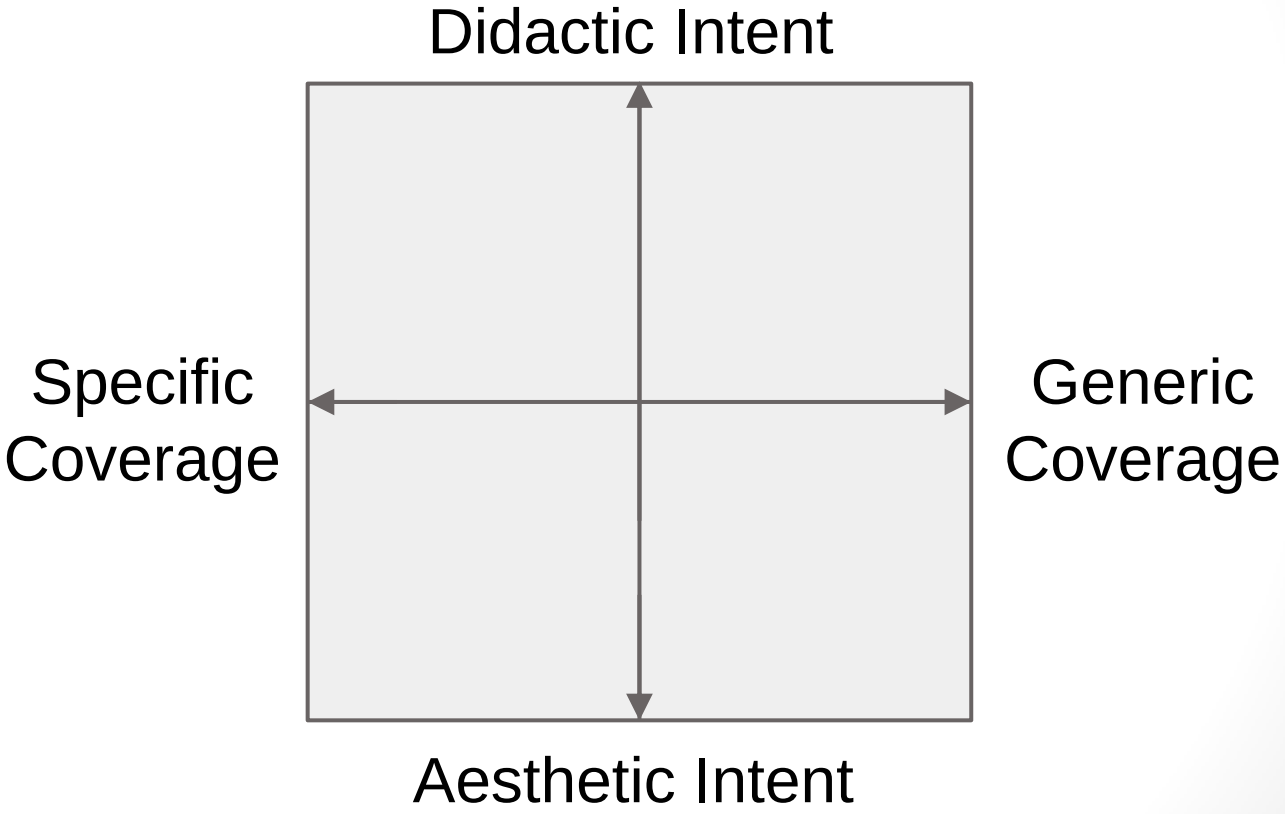
Bertin, 1984

Hierarchy of Graphical Elements

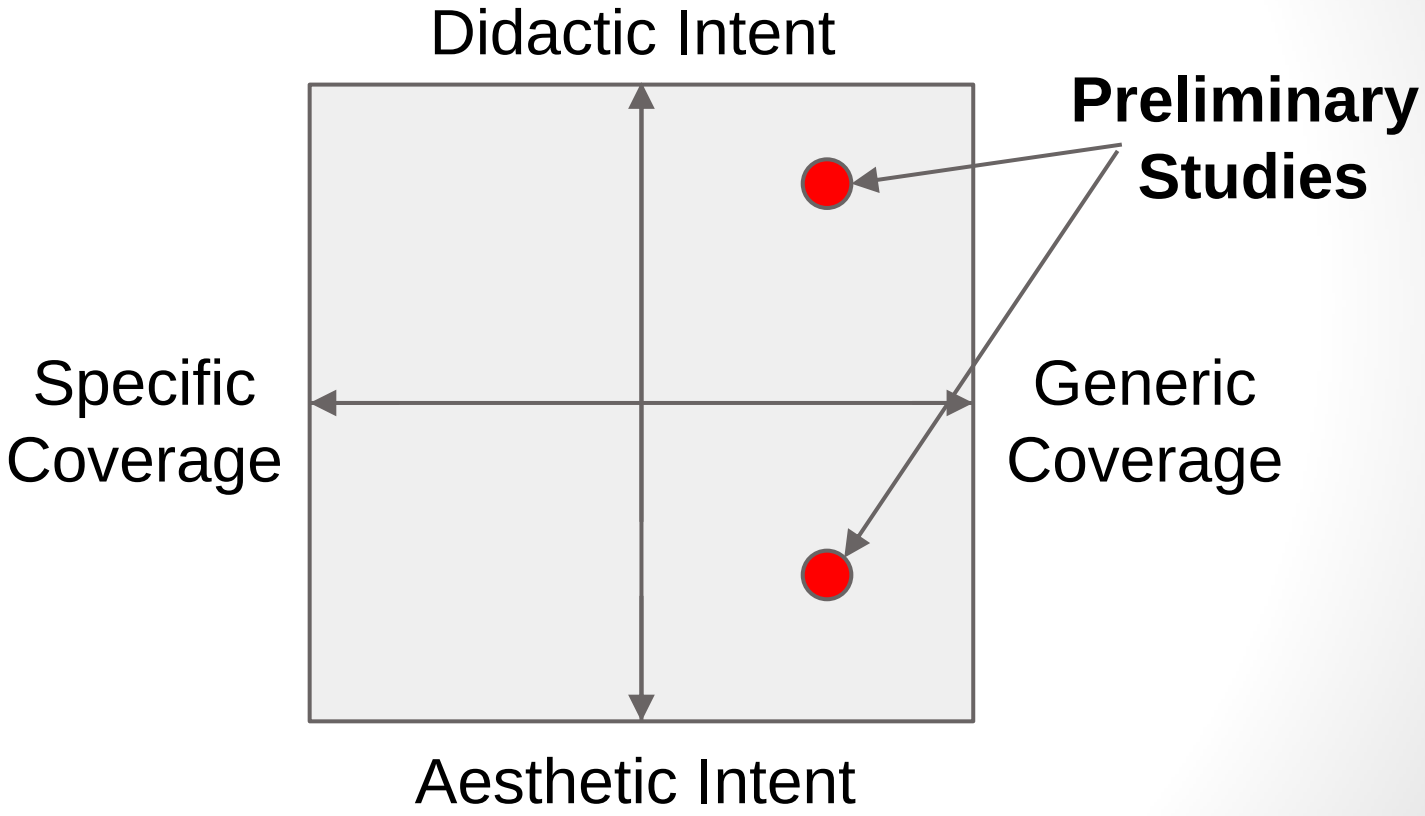


Cleveland, 1994

Visualisation Analysis Model



Visualisation Analysis Model



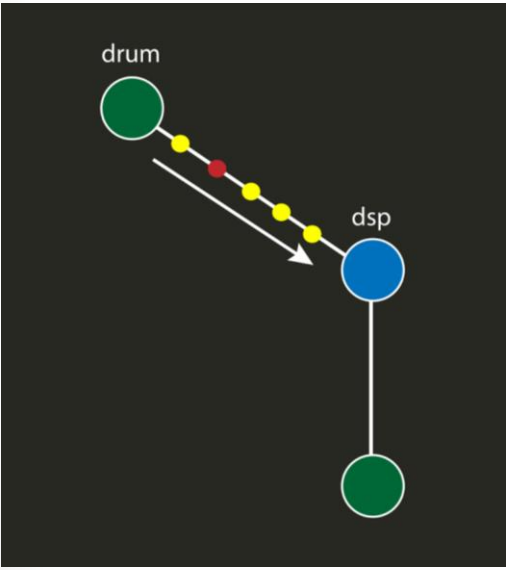
Study 1

- Field study with a survey
- 14 respondents
- Generated user requirements
- Conducted follow-up interviews
- Enjoyment vs understanding
- Link between code changes and music changes

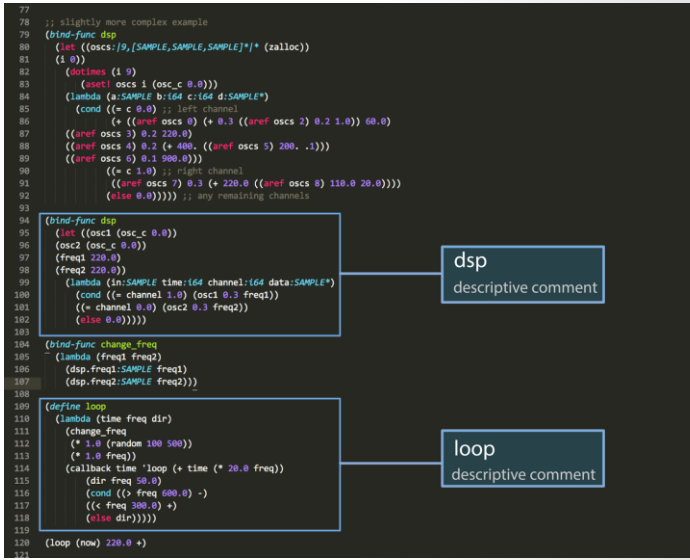
Study 2 - Background

- Lab study with survey
- Testing two sets of visualisations:
  - Aesthetic Intent
  - Didactic Intent
- Goal to see if visualisations heading in the right direction

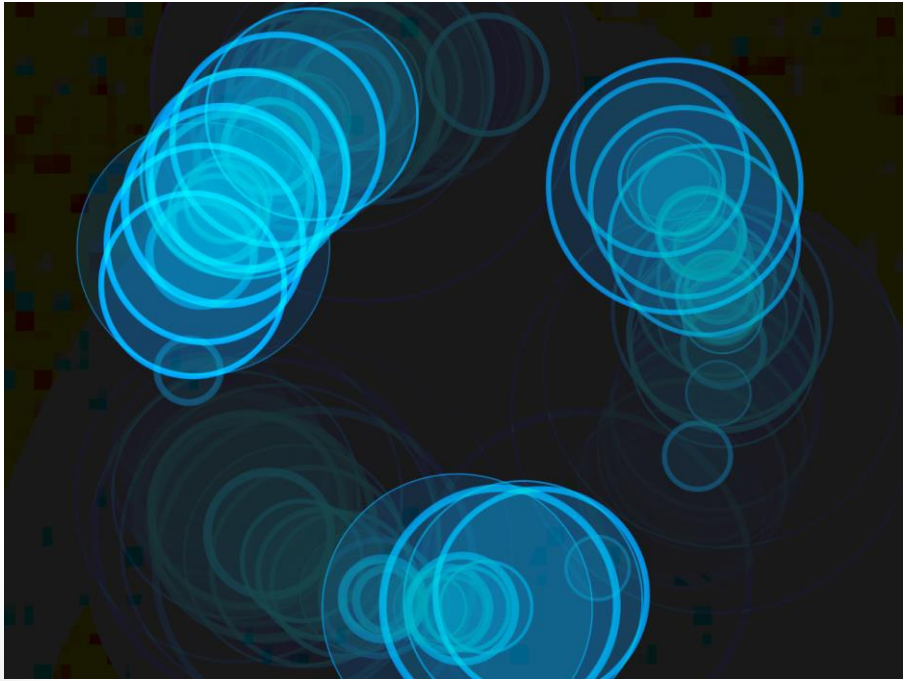
Prototypes


drum
dsp

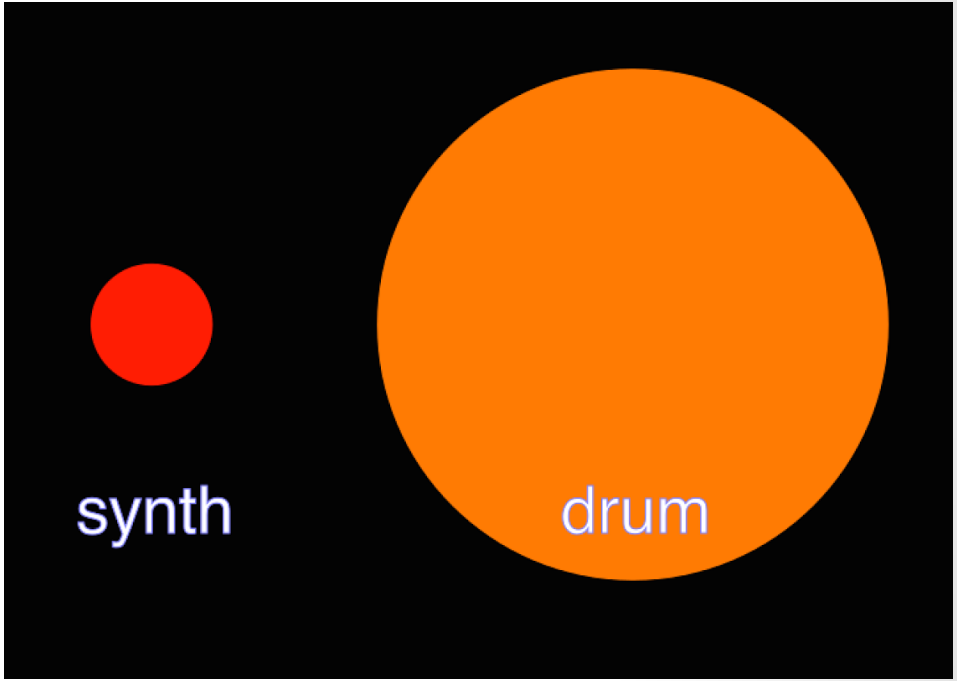

dsp
change_freq
loop


dsp
descriptive comment
loop
descriptive comment

Study 2 - Visualisations



Aesthetic Intent



Didactic Intent

Study 2 - Results

- Still in the process of analysing data
- 41 respondents
- Provided direction for improvement

Timeline

- Study 1 (field study) - March
- Develop basic visualisations - April
- Study 2 (lab study) - May
- Refine visualisations - June
- Study 3 (lab study) - July
- Further refinement and study 4 - time permitting
- Write-up - September and October

Remaining Time

- One more study planned, another study possible
- Further develop theoretical model
- Further prototyping:
  - Code manipulation visualisations
  - Code structure visualisations
- Further analysis of studies and literature to inform direction of project

What will be Achieved?

- Develop an effective code visualisation
- Indication of visual understanding of code
- Answer how we can better communicate the programmer’s intention

What to Take Away

- Project on track
- Visualisations show potential for influencing understanding and enjoyment
- Focus on linking code to visuals in next study to achieve understanding through visualisation

Questions?