▶▶ UHASSELT

Can we visualize how developers collaborated by applying process mining to VCS logs?

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Research Problem

Many software projects = A lot of code

⚠ Lose overview of who knows which code

⚠ Code at risk of becoming unknown to any programmer

Proposed Solution

Tool that generates social network graph of how software developers collaborated

- Size shows importance
- Colour shows collaboration type

Data source = version control system logs

Business Relevance

- Better overview of the core teams
- Discover valuable & indispensable resources
- Take precautions against '*brain drain*'

Inspiration

Idea of extracting social network graph from VCS log

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Rationale of applying process discovery to process event logs

🏃 No clear process notion in VCS !

💡 **Fuzzy miner algorithm** = process discovery technique for logs of unstructured processes

Adaptation

Combination of metrics from **fuzzy mining** & **graph theory**

Calculation of weight that represents the importance of

👤 Programmer :
- Unary frequency significance
- Betweenness centrality
- Eigenvector centrality
- Degree centrality

🤝 Collaboration relationship :
- Binary frequency significance
- Proximity correlation

Graph simplification approach:

1. Filter out weak relationships

2. Cluster less important but strongly connected programmers

3. Abstract insignificant programmers that are weakly connected to the graph

● Regular node
● Cluster node

Programming:
Pair
Disjunct
Pair & Disjunct
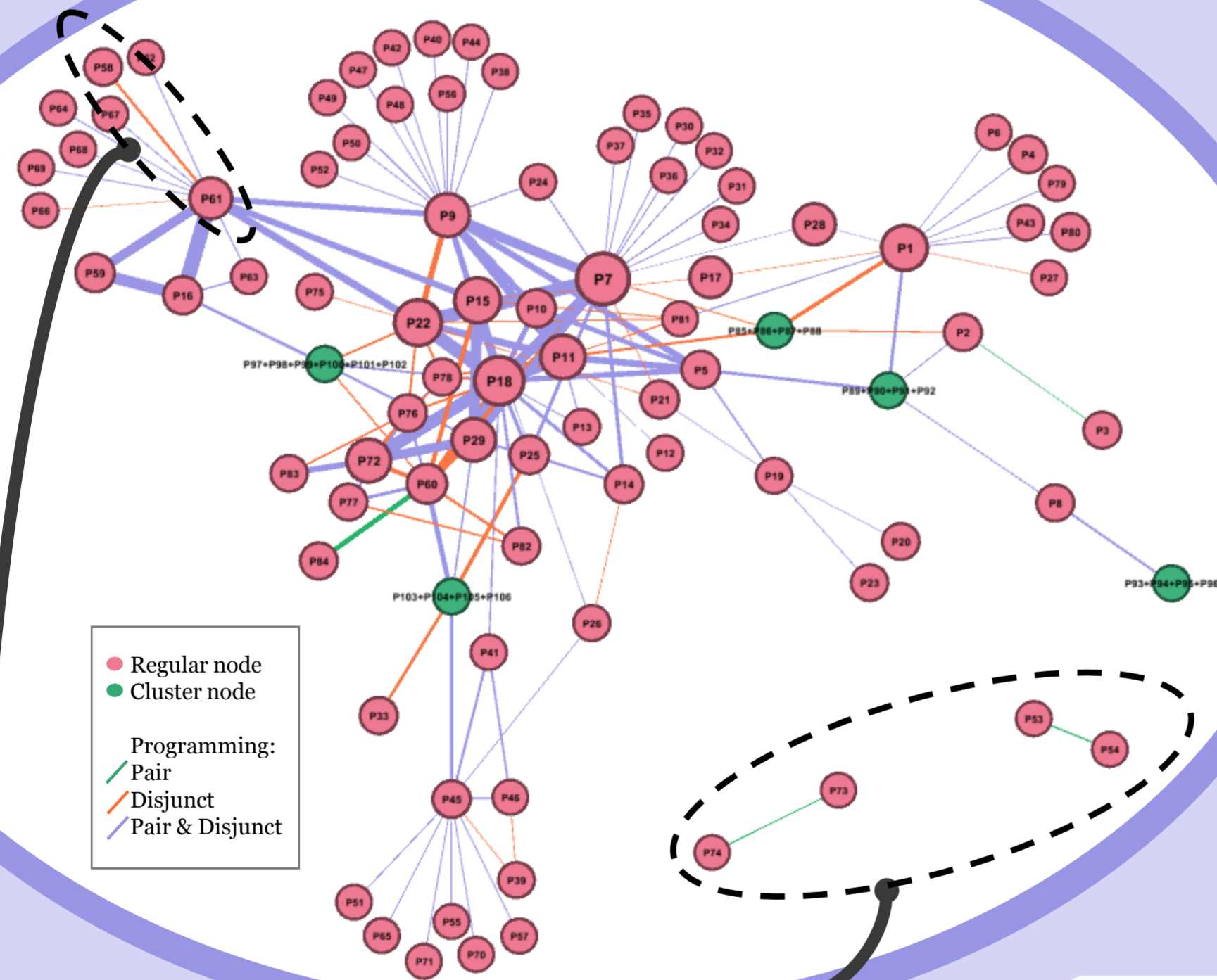
Results

This strong disjunct programming relation

The only ones working on a specific aspect of the code

Mitigate risk by:
- Pair programming
- Entrusting another programmer with the same task

Isolated groups

Risky if:
- Few members
- Members have a large importance

Why?
Valuable sources of knowledge & not easily replaced

Most important programmers

Important contribution but weak collaboration

Risk of '*brain drain*' if:
- Illness
- Leaving the company