

Detection of Anti-patterns in Mobile Applications

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Detection of Anti-patterns in Mobile Applications

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Motivations

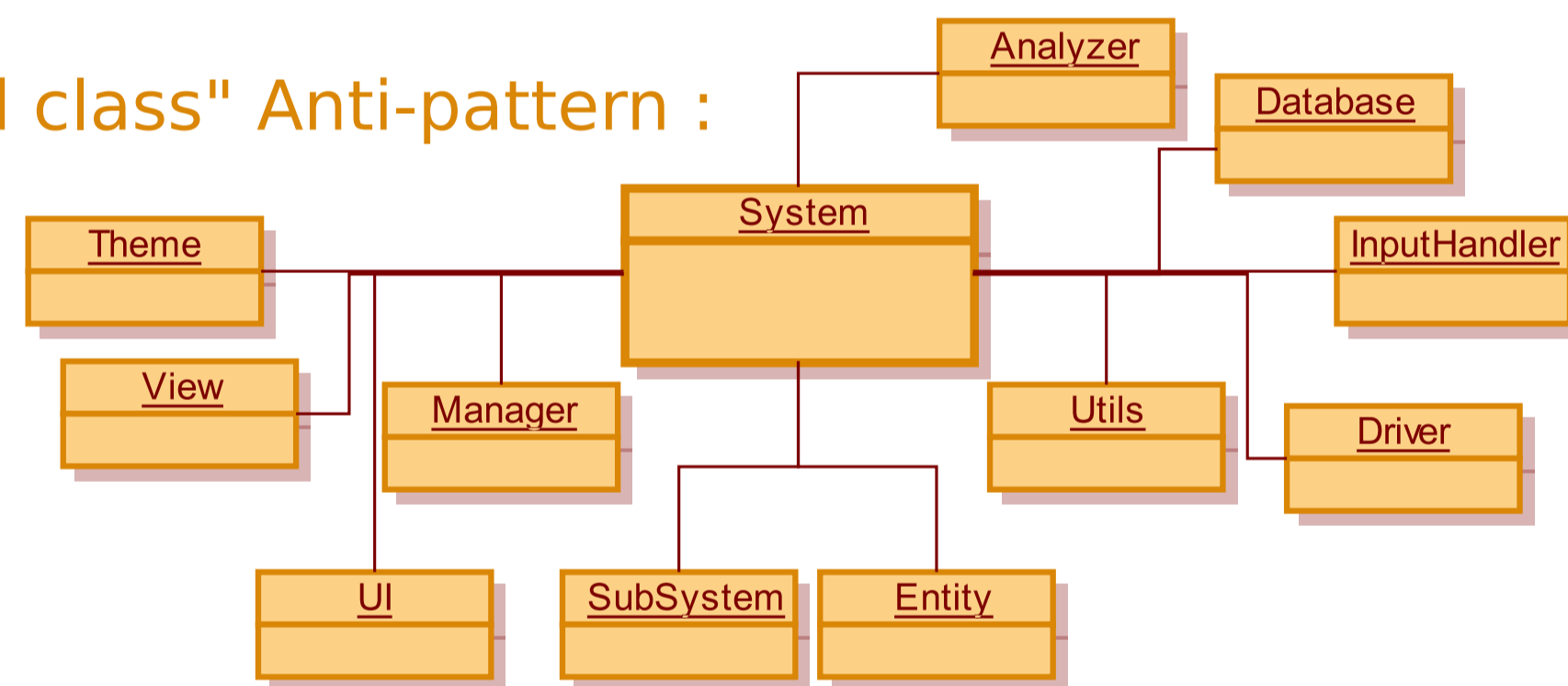
Lack of studies on Android Anti-patterns :

- Influence of the framework on common anti-patterns,
- Android specific anti-patterns,
- Patterns related to applications categories,
- Correlation with application ratings ,
- Evolution along updates ?

Anti-Patterns

- Bad solutions to solve problems
- Hard to maintain and update
- Source of bugs

"God class" Anti-pattern :



Metrics

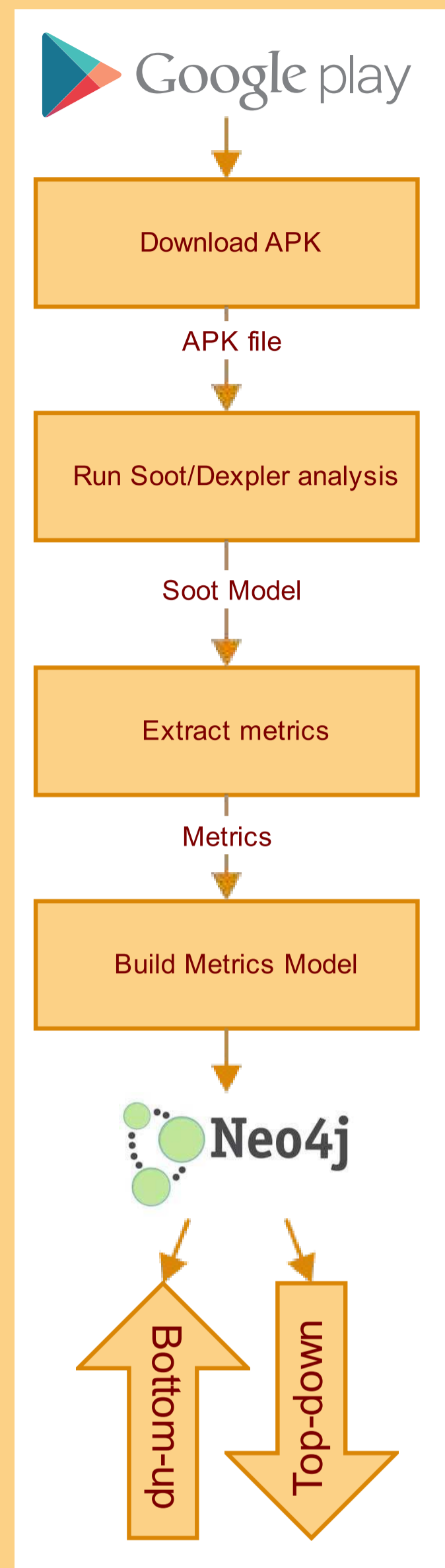
Main metrics :

- Lines of Code
- Cohesion of a class
- Coupling between classes
- Cyclomatic complexity
- Depth of Inheritance

Anti-patterns = Combination of metrics

"God class" = low cohesion, numerous lines of code, a high coupling

Application Analysis

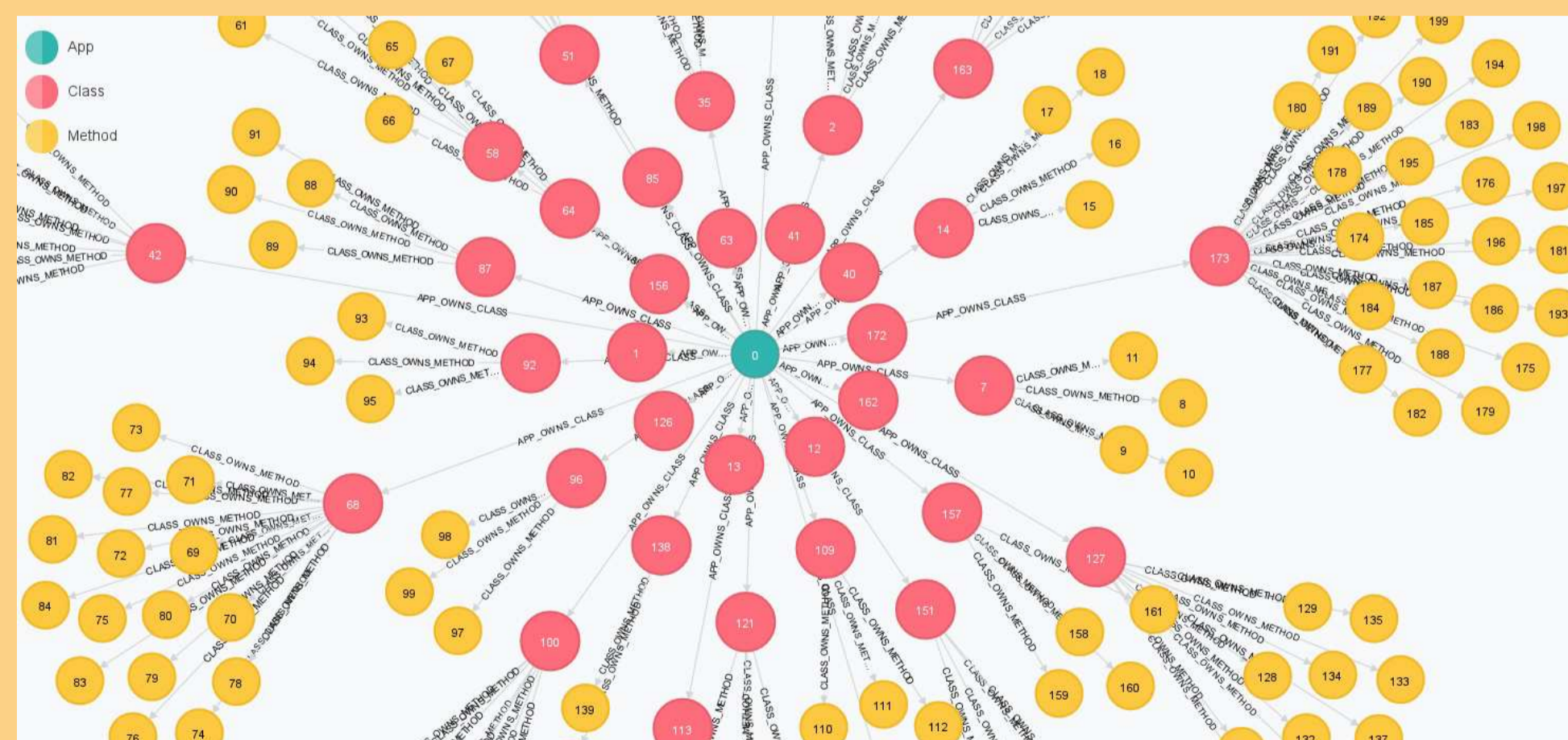


Analysis on **Android package**

Analyze of **binary code** with Soot and dexpler submodule

Metrics are extracted from Soot model to build a new one

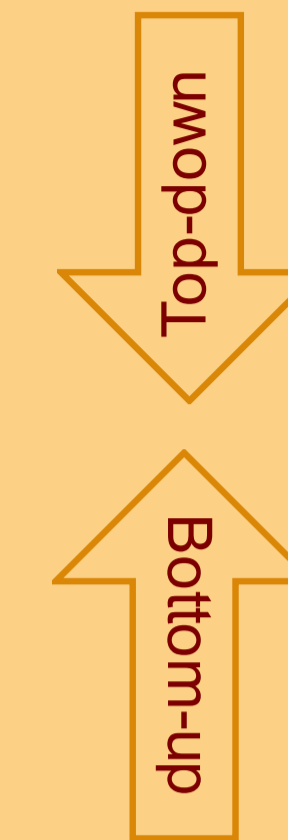
This model is then stored in a **graph database**



Nodes = app, method or class
Edges = relation
Properties = metrics

Anti-Patterns Detection

Study on **3500+ apps** with an average of 7 versions



Top-down approach : Common anti-patterns with **thresholds** on metrics

Bottom-up approach : **Machine-learning** algorithms to detect new anti-patterns

Anti-Patterns Fixing

- Increase maintainability and understandability
- Reduce energy consumption
- Improve responsiveness
- Decrease package size
- Less bugs

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