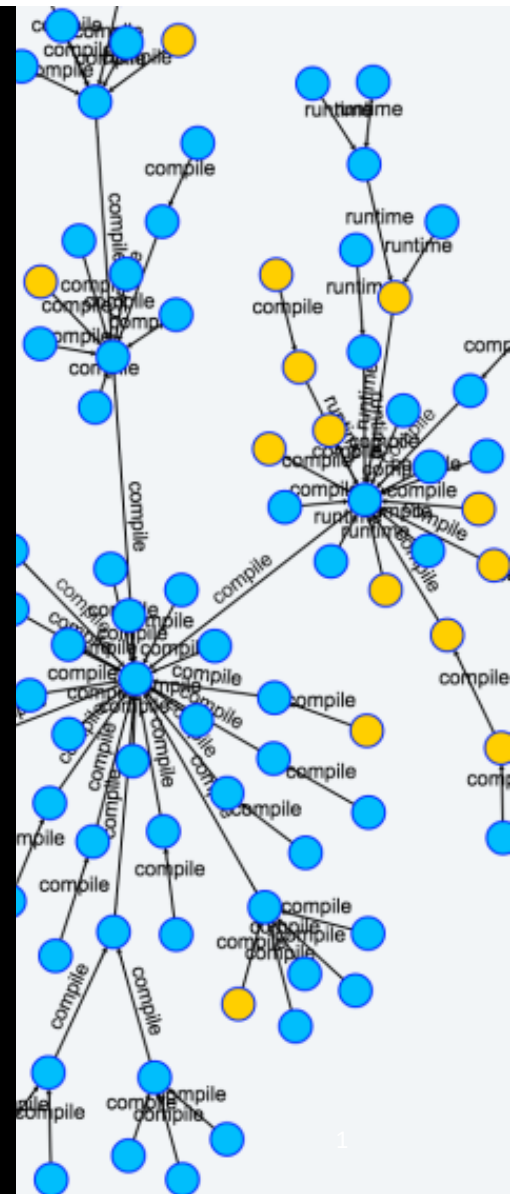# Effect of project dependencies on the Health of the software project.

vg588, au282, kv582, sv799, ma3924

Research Problem

Effect of project dependencies on the Health of the software project

Motivation

Developers rely on packages to build their projects.

Improper maintenance of dependencies affect project health.

Importance of Dependency management.

Evidence of Research Problem

Removal of left pad package.

Release of incompatible version of package "underscore".

Semantic versioning.

Research Questions

RQ1: Does deprecated packages affect the health of a software project?

RQ2: How does the project's health get affected if the dependencies are not upgraded to their latest versions?
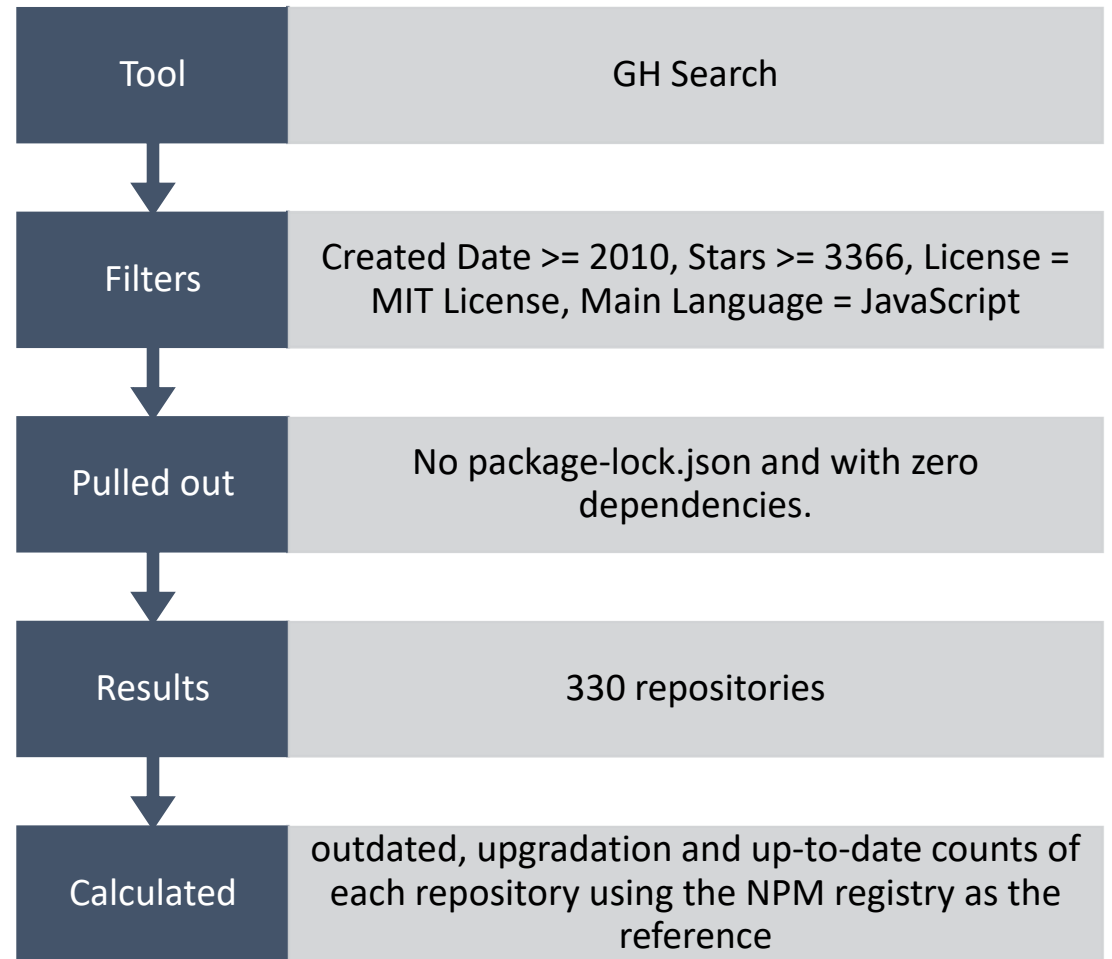
Research method

Data Collection

Data Analysis

Data Collection

Tool	GH Search
Filters	Created Date >= 2010, Stars >= 3366, License = MIT License, Main Language = JavaScript
Pulled out	No package-lock.json and with zero dependencies.
Results	330 repositories
Calculated	outdated, upgradation and up-to-date counts of each repository using the NPM registry as the reference

Data Analysis
(Descriptive Analysis)

- Calculated mean
  - outdated count(11.5)
  - upgradation count(348.2)
  - up-to-date count(210.7)

- Calculated correlation and found strong correlation between
  - upgradation count - total dependency
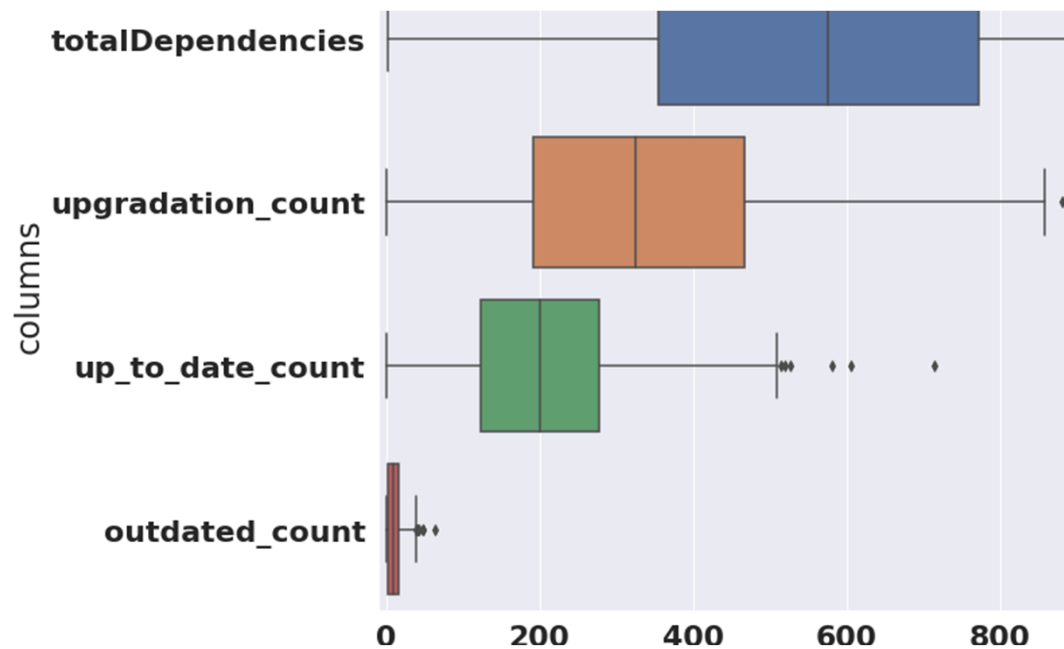 - outdated count - total dependency

Data Analysis (Qualitative Analysis)

➢ Collected packages used in each repository.

➢ Analyzed 111 packages manually

➢ Out of which we found two interesting packages :
   ➢ mkdirp
   ➢ fsevents

Results

- All the repositories are using the dependencies in the range between 300 and 700.

- Average(upgradation count) > Average(up-to-date count).

Package 'mkdirp'

- Latest version : 1.0.4

- Deprecated version : 0.5.1 (security vulnerability)

- 108/330 repositories are depending on 0.5.1.

- Other package dependencies on 0.5.1 - minimist, beautify-web/js-beautify, extract-zip.
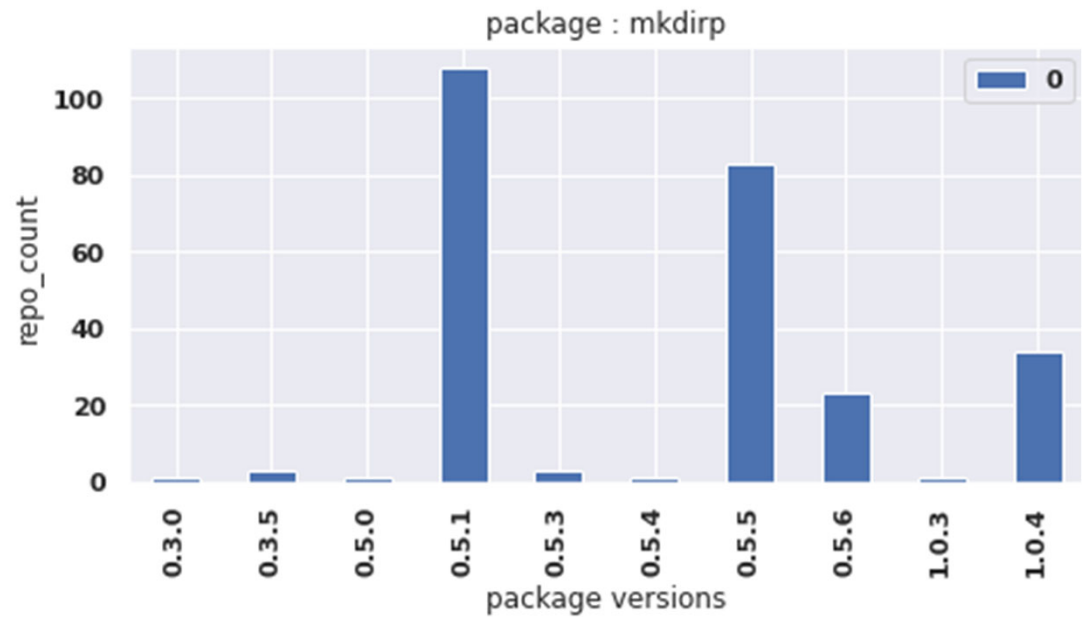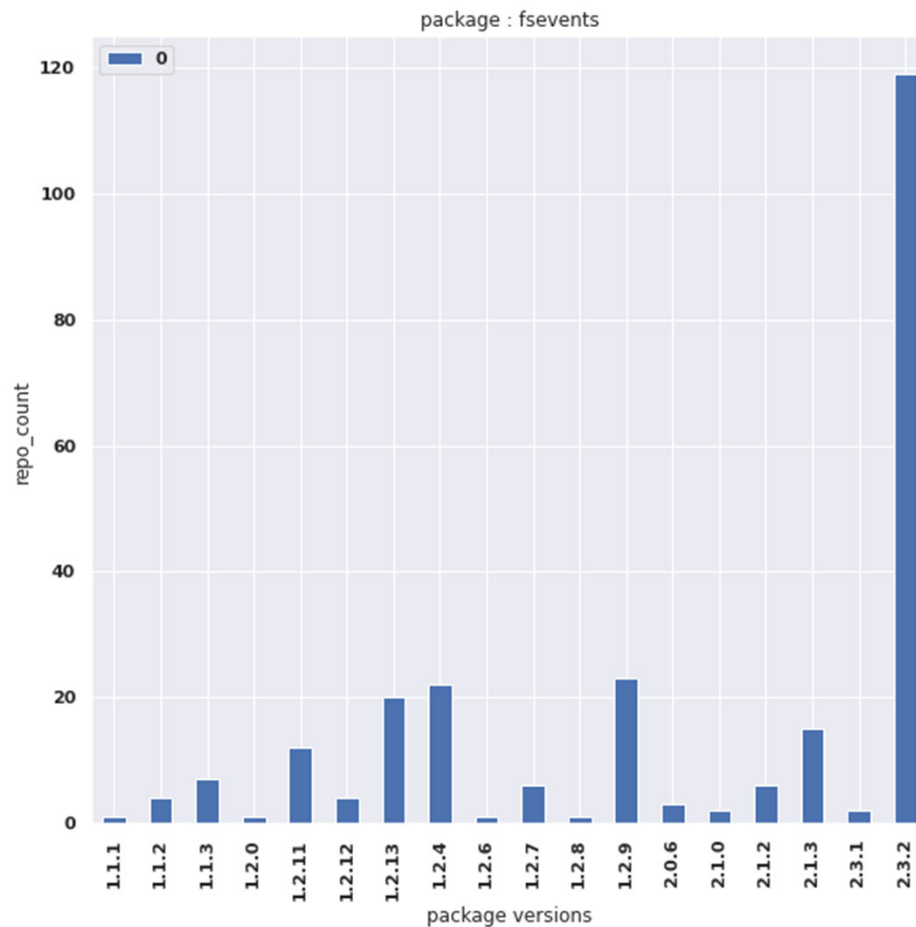
package : fsevents

Package 'fsevents'

- Latest version : 2.3.2

- 130/330 repositories are not having the latest version.

- Latest version support for the Native access to MacOS FSEvents in Node.js.

Answers to our Research Questions

RQ1: Does deprecated packages affect the health of a software project?

Yes !!

RQ2: How does the project's health get affected if the dependencies are not upgraded to their latest versions?

Missing of important features

Threats to validity

Certain threats which might disprove our results:

- Repositories in between (2010 – present) may have missed dependency issues present in the past years.

- Confining to JavaScript language

- MIT license

- Considering projects with package-lock.json.

- Manual check of 111 packages might lead to bias in results due to human error.

Conclusion

- Objective - to identify the project dependency effects on the health of the project.

- A study on 330 repositories to check for deprecated and upgradable package dependency.

- Manually analyzed 111 packages as qualitative analysis.

- Failure to remove deprecated dependencies might raise issues in the project health (mkdirp)

- Failure to update packages to latest versions - loose support for the important features(fsevents).

- Future work: GitHub Plugin

Questions

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Thank you