

Categorization of Warning Statements for Over-the-Counter Medications

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INTRODUCTION

The use of dietary supplements (including vitamin, minerals, fiber acids, *etc.*), a kind of over-the-counter (OTC) drugs, by U.S. adults is significantly increasing nowadays [1]. However, the supplements can cause side effects and interactions with conventional prescriptions. The DailyMed [2] provides OTC drug labels containing black box warnings. The information embedded in narrative is not directly searchable, thus preventing its wide use by clinical decision support system and consumers.

The objective of this research is to develop an automatic program to categorize (e.g., interactions, side effects) warning statements from drug labels. After developing the patterns to extract safety information, we can categorize warning statements with precision of 0.948 and recall of 0.918.

METHODS

DATA:

- 35,000 OTC structured product labels were downloaded from DailyMed

Methods: (Fig. 1)

- Only warning sections (10,000 OTC drugs) were extracted
- Training data set (4,000) and testing data set (80)
- Patterns were summarized through iterate review to classify the categories of statements
- Category: Contents, Interaction, Side Effects, Allergy, Storage, Applicable objects

Evaluation : (Fig. 1)

- Annotations: 80 warnings were randomly selected and annotated to classify the statements/sentences used for evaluation
- precision and recall were used to evaluate the performance of the program

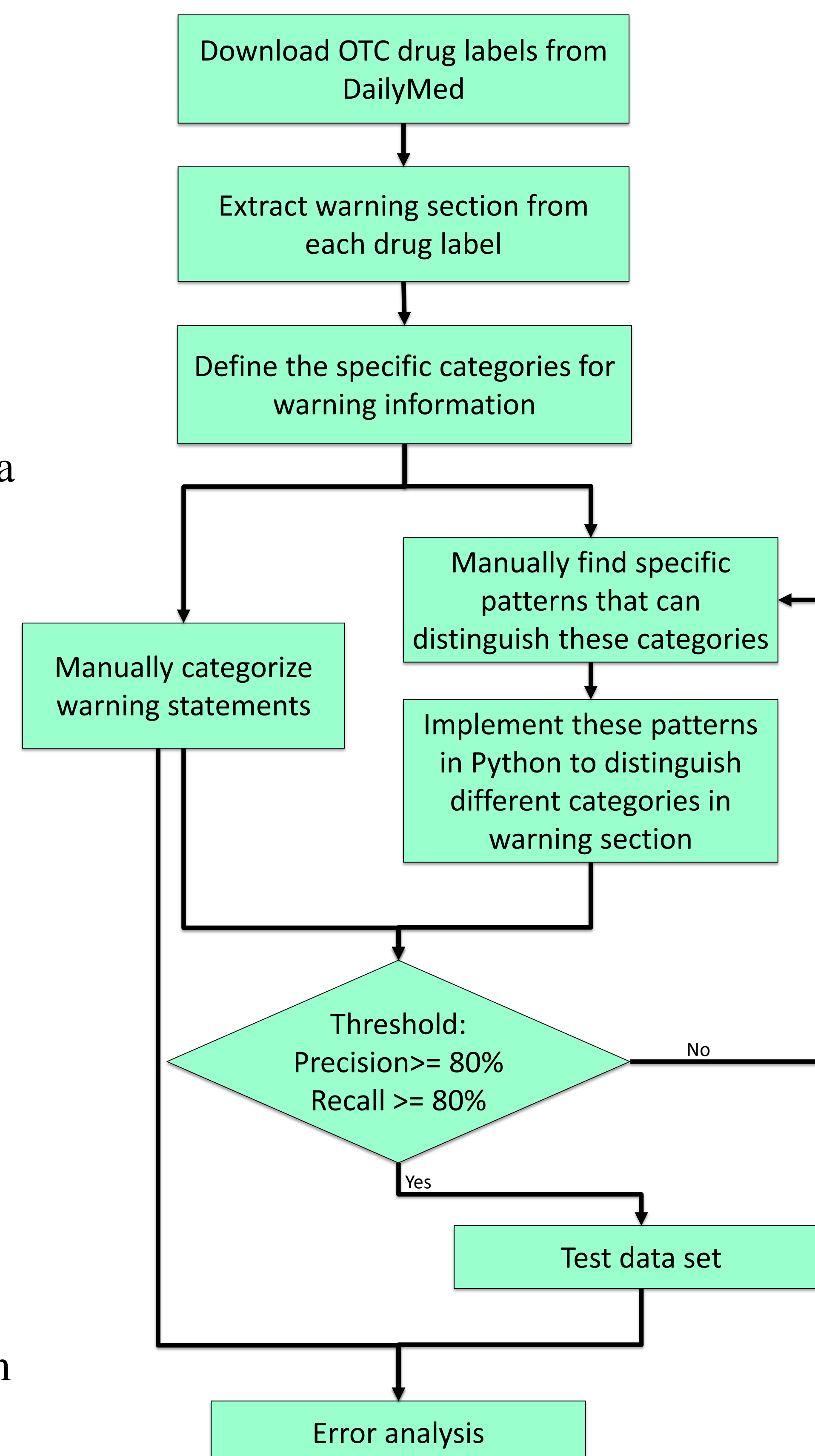


Figure 1. Overview of workflow

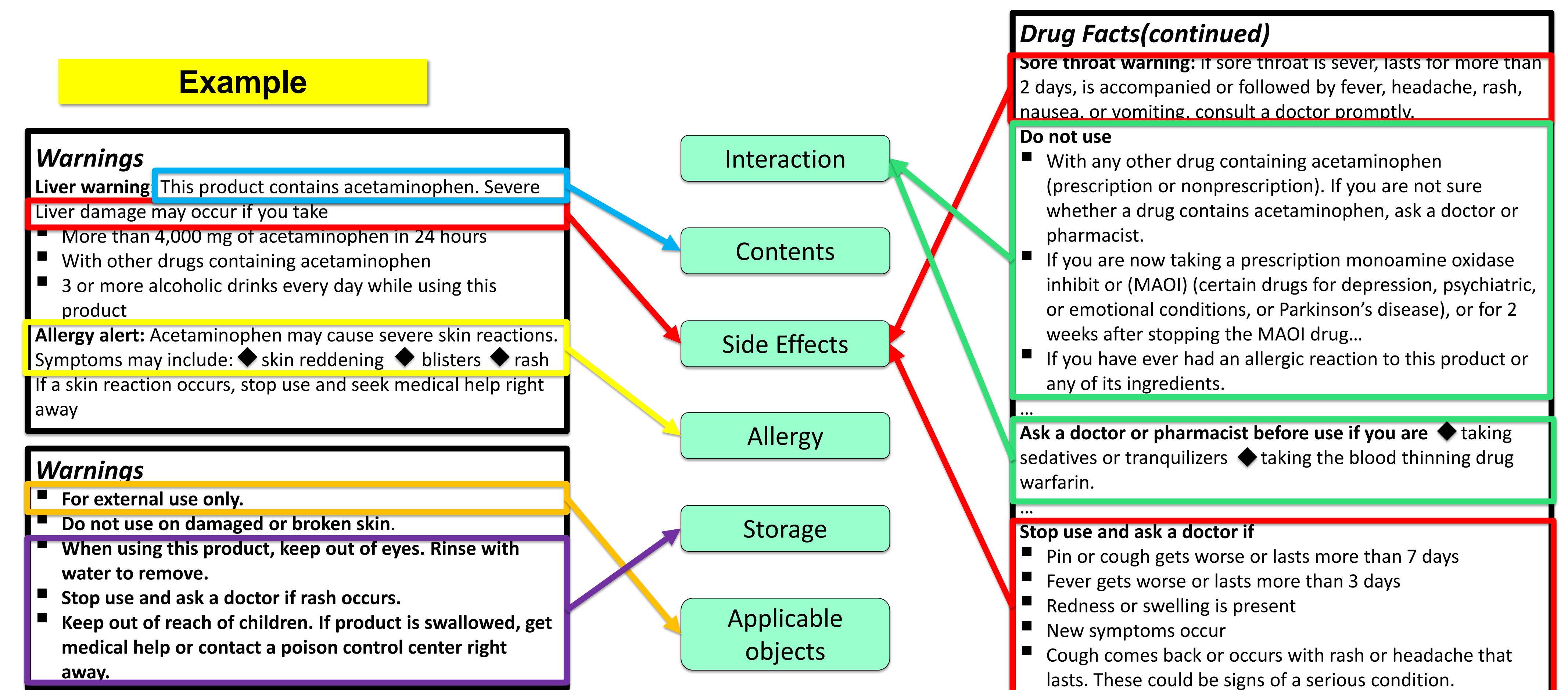


Figure 2. Example of warning statements categorization

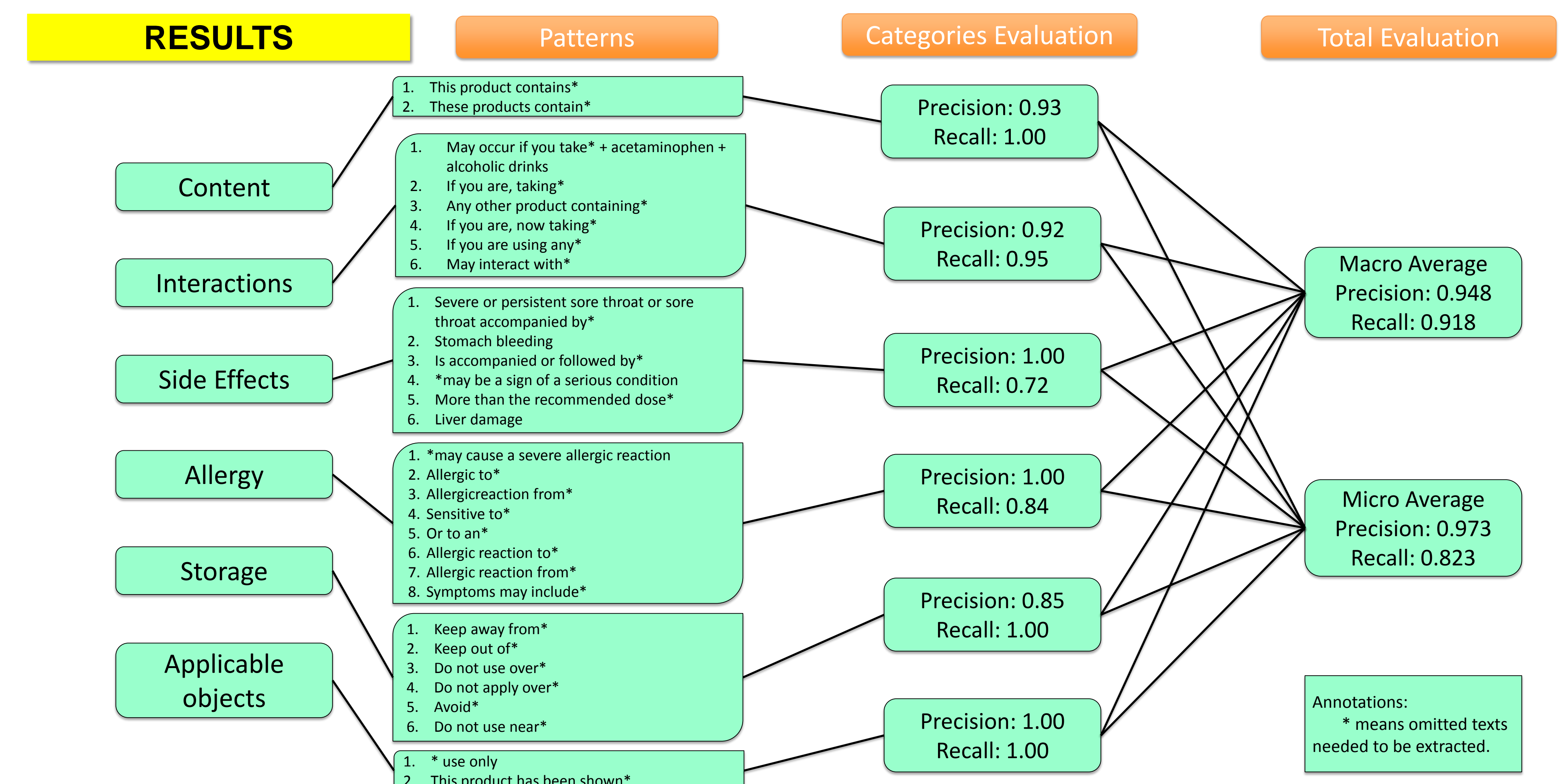


Figure 3. Categories, Categories Evaluation, and Total Evaluation

CONCLUSION

A system to automatically categorize warning statements in OTC drugs was developed and evaluated by comparing with human annotated reference standard, with precision of 0.948 and recall of 0.918 (macro average).

Limitations: ♦ Only one annotate build reference standard ♦ Evaluation sample size is small

REFERENCES

- [1] Park, Madison. "Half of Americans use supplements". *CNN*. Retrieved 3 October 2013.
- [2] DailyMed. Available at <https://dailymed.nlm.nih.gov/dailymed/>