# Online Appendix to: Mining and Quality Assessment of Mashup Model Patterns with the Crowd: A Feasibility Study

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## A. DESIGN OF TASK PAGES FOR PATTERN MINING

Figure 12 is a screen shot of the *questionnaire* used to assess workers' knowledge of Yahoo! Pipes and to decide which worker to reward. The same questionnaire is used inside CrowdFlower to assess workers in each of the crowd task designs used in the pattern mining and assessment experiments described in this article.

Figures 13 and 14 illustrate the screen shots of the *Ramdom*3 and *ChooseN* task designs for pattern identification described in Section 4.1. Like the task design shown in Figure 4, these two design are implemented as external web pages executed on our own web server and linked from within CrowdFlower.

We acknowledge one limitation pointed out by one reviewer regarding two questions included in the task ("have you ever seen this pattern?" and "have you ever used this pattern?"). For the scale we used for these questions (5-point Likert scale), it would be more correct to rephrase these questions as "how often have you seen this pattern?" and "how often have you used this pattern?"

## B. DESIGN OF TASK PAGES FOR QUALITY ASSESSMENT

Figure 15 illustrates the details of how we assessed the quality of identified mashup model patterns. The form shows one model pattern and asks the user (both workers in the crowd experiment and us in the expert assessment) to rate the pattern in terms of understandability, usefulness, reusability, and novelty.

Figure 16 explains the design of the pairwise pattern quality assessment task. The core idea is to provide the worker with two patterns and to ask him or her to choose which pattern is better in terms of understandability, usefulness, reusability, and novelty.

## C. EXAMPLES OF MINED MODEL PATTERNS

Figure 17 discusses, for each of the four assessment criteria, examples of good and bad patterns as identified by the crowd in the *Naive* pattern mining experiment.


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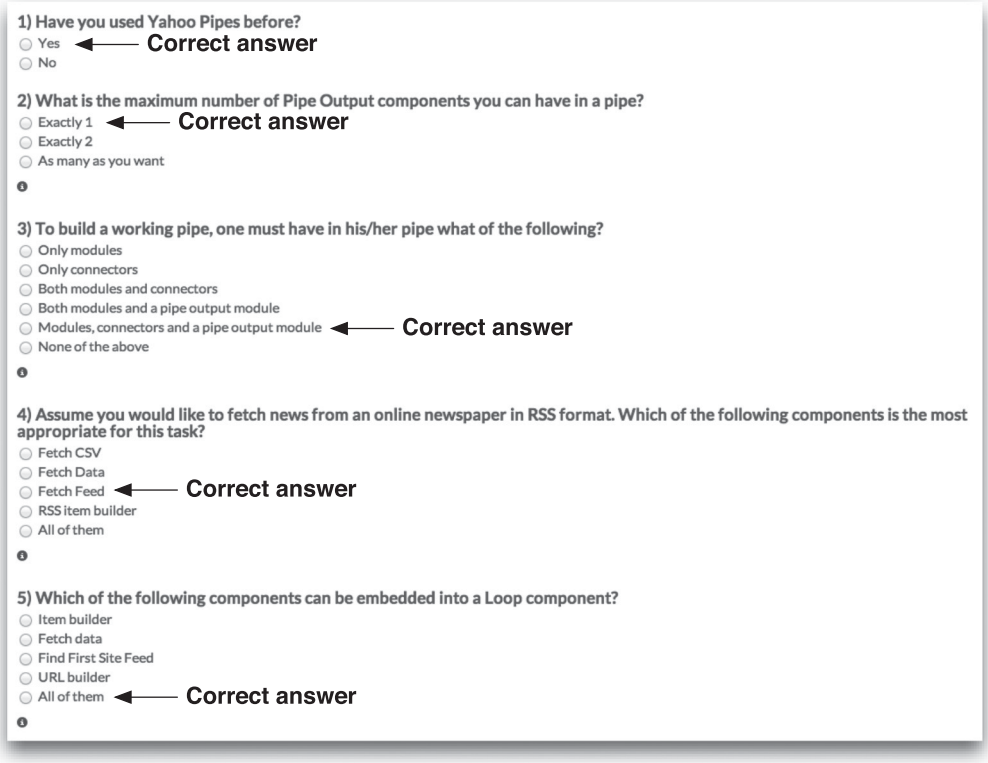
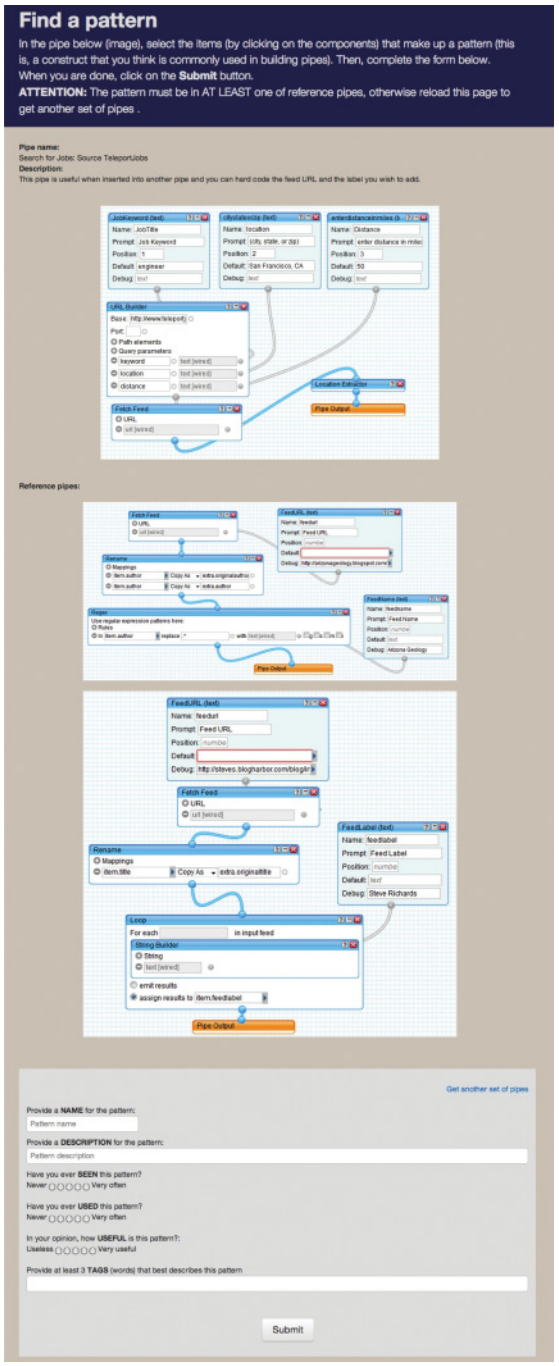



Fig. 12. Screen shot of the questionnaire used to assess workers' acquaintance with Yahoo! Pipes. The figure also highlights the correct answer of each question.




Short description of task with **instructions** for the worker

Main pipe of the task. Here workers can **select the components** of the identified pattern (if any).

Two randomly chosen pipes complementing the main pipe of the task. Workers are asked to compare the main pipe with these two to **identify similarities**.

Input form asking for additional **metadata**.

Fig. 13. Screen shot of the *Random*3 task UI implemented for the identification of mashup model patterns from a set of three different pipes models.

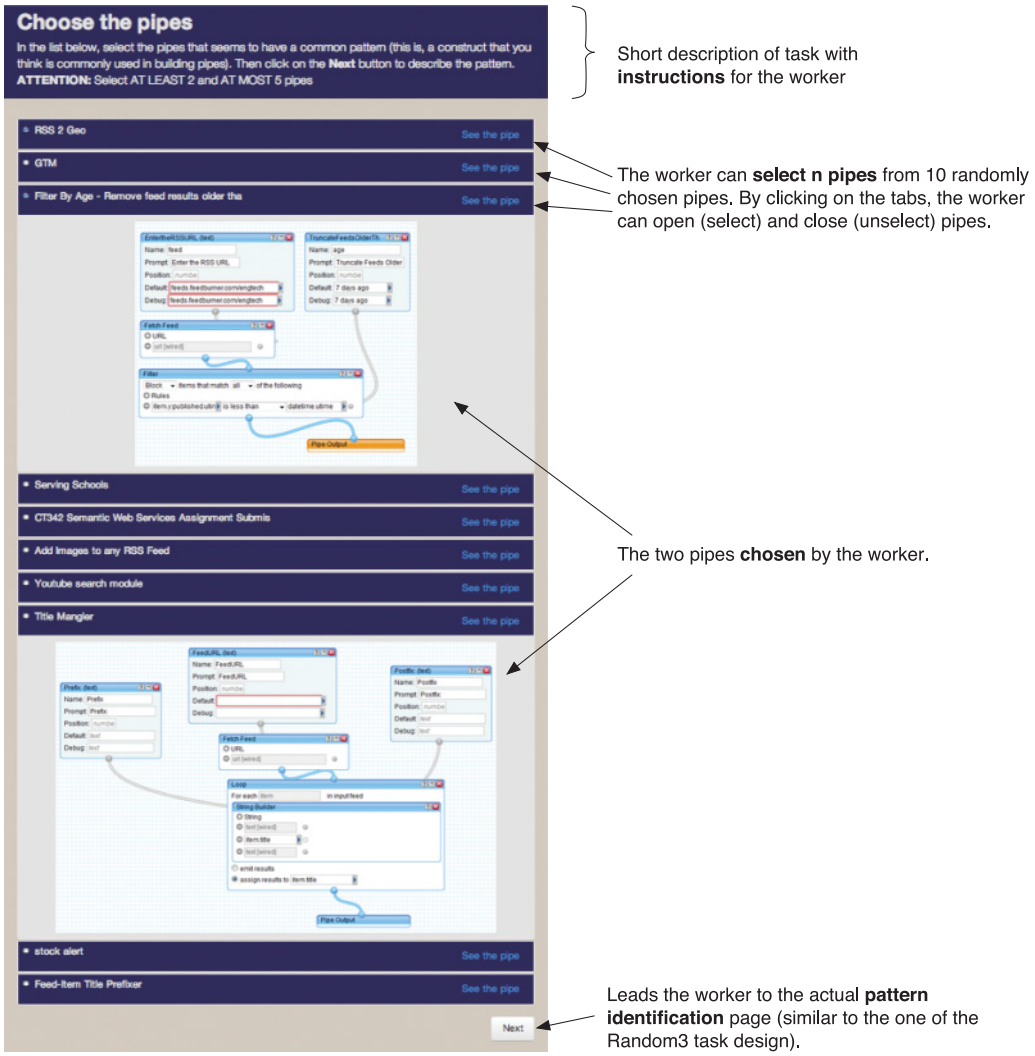



Fig. 14. Screen shot of the *ChooseN* task UI implemented for the identification of mashup model patterns from a set of three different pipes models freely chosen out of 10 available models.

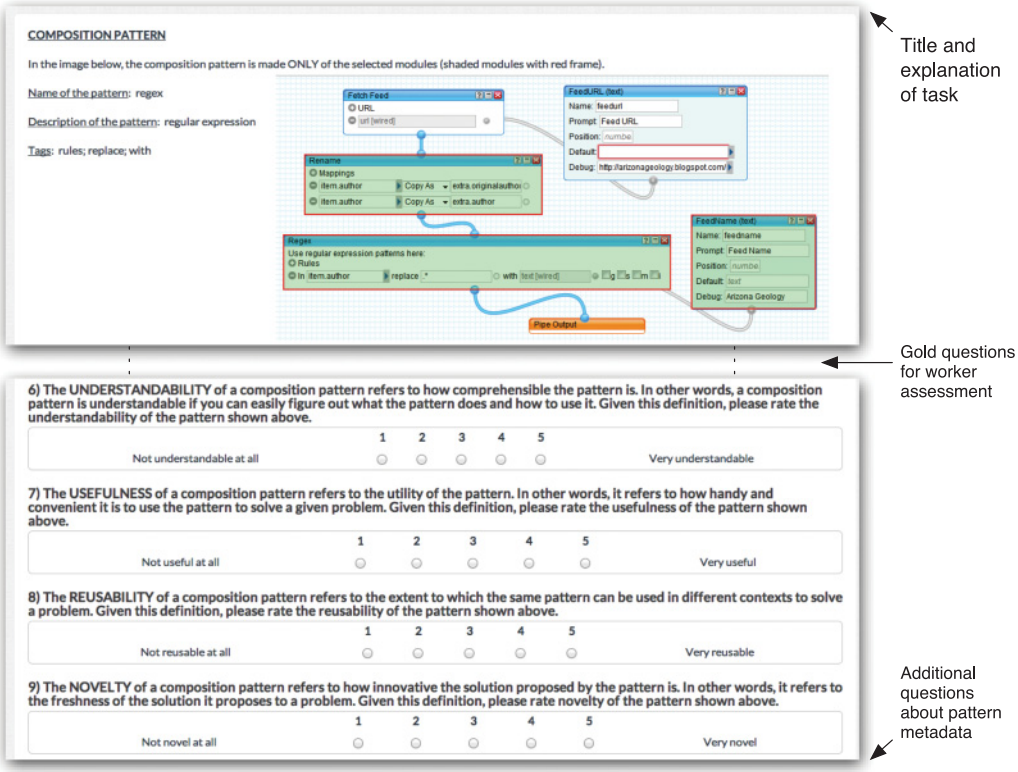



Fig. 15. Screen shot of the task implemented for the assessment of pattern quality. Both the experts and the crowd in the *Individual* setting use the same task design to perform their evaluation.

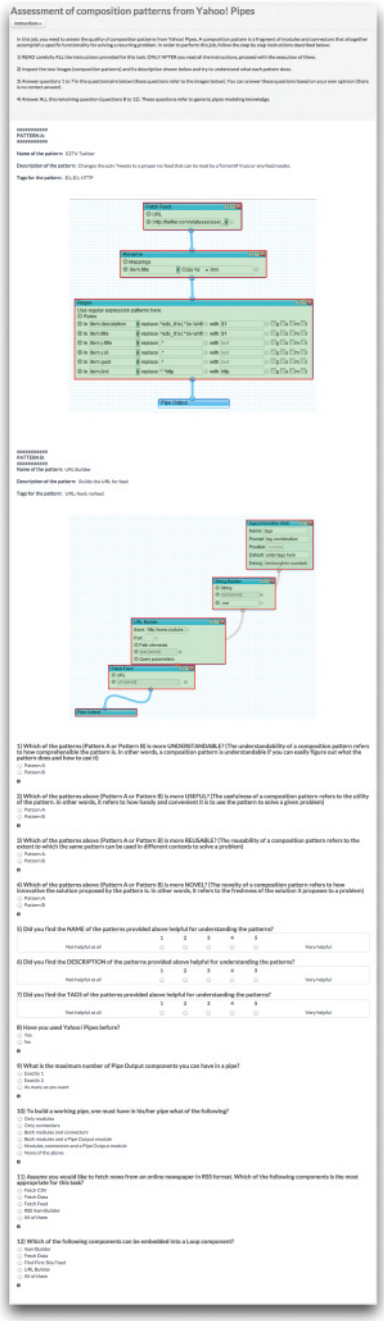



Fig. 16. Screen shot of the task UI implemented for the pairwise comparison and ranking of identified model patterns.

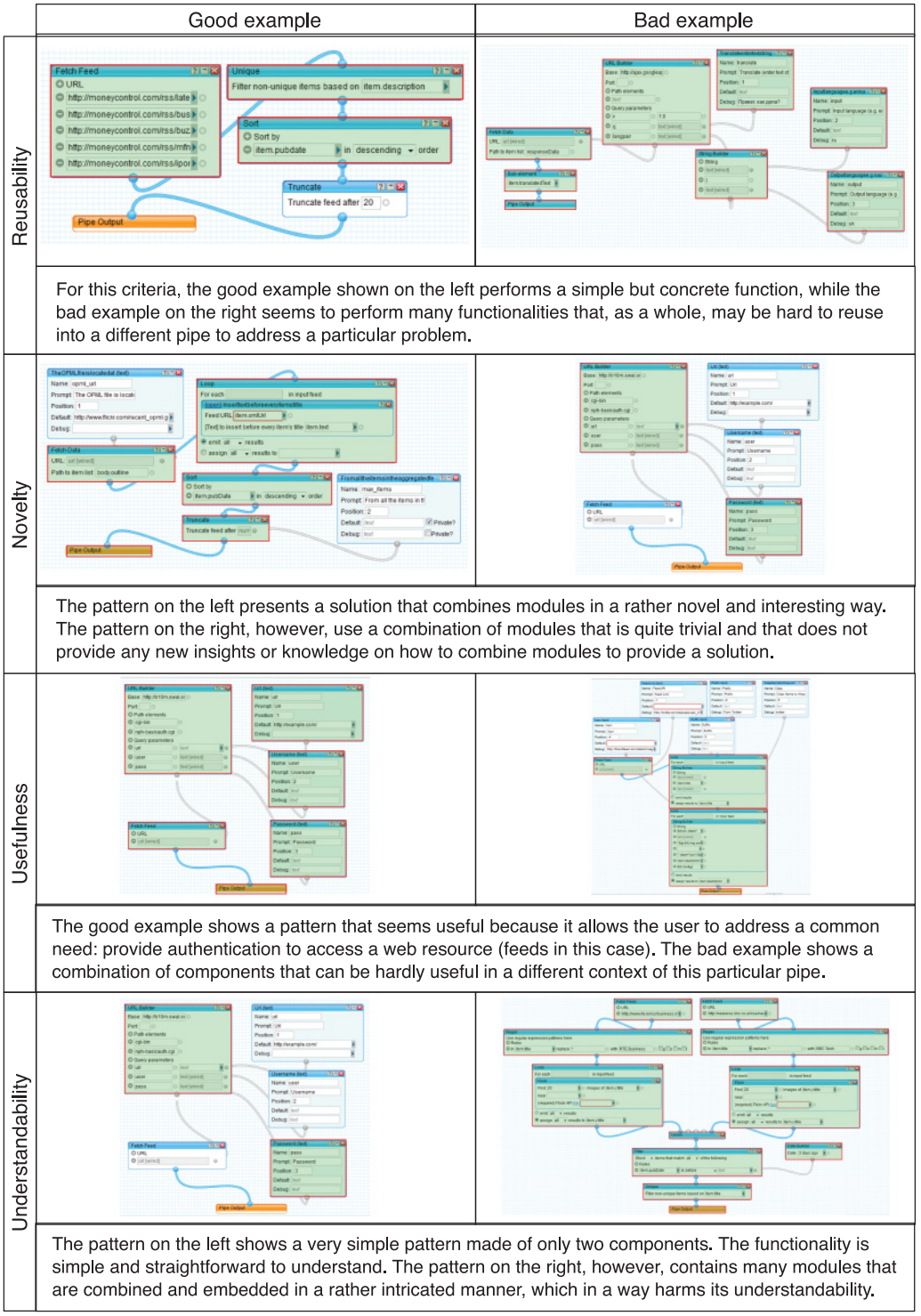



Fig. 17. Examples of mashup model patterns discovered by the crowd.