

# PreCog Recruitment Task 1

**Paper:** Signals Matter: Understanding Popularity and Impact of Users on Stack Overflow

## Summary

The paper analyzes what social qualities are signalled by reputation scores and badges on the Stack Overflow platform along with their extent to do the same.

The theoretical framework focuses on main three elements:

- **Adverse Selection:** The differences in how users choose the questions they want to answer, the differences in their understandings of the topic and expertise, etc.
- **Digital signalling:** Upvote and downvote buttons as positive and negative signals respectively
- **Gamification:** The use of game elements in a non-game context of Stack Overflow through reputation points and badges.

It should also be noted that the study took into consideration only the “active users” which refers to the users who have written at least one answer or have asked at least one question.

One of the means to arrive at the hypothesis was to conduct an online survey of 2,740 users who had their email IDs voluntarily shared on their profile pages of Stack Overflow. Out of these, the 56 responses which were received were used to help frame a hypothesis.

The two hypotheses framed on the basis of survey insights were:

- Reputation scores and Badges are positively correlated with popularity as well as impact of users.
- Reputation scores are better indicators of popularity as well as impact compared to Badges.

To analyze the same, numerous non-linear regression models were tested to get an idea of the correlation between reputation points and badges and how well they signal popularity and impact. One point to notice here is that not all badges have the same extent. They have a differing effect in popularity and impact based on their category, type, if it is a tag specific badge or not, etc.

The study concludes with the impact of these game elements in the Stack Overflow context and how they can lead to the issue of adverse selection by users who might tend to answer more but questions where a very less expertise is required. Apart from these, certain badges do signal a correlation with high reputation points.

### **Valuable Contributions**

- The survey conducted by the team to help frame the hypothesis
- Investigation on the set of 3,831,147 users through their data of Stack Overflow history
- Non-linear Regression models used to get quantitative data for the study
- The correlation between popularity and impact of Stack Overflow users

### **Critique and Future work/improvements**

- According to me, to analyze the impact of these game elements in a non-game context of Stack Overflow, we could also look at the career pages of Stack Overflow users at [<https://stackoverflow.com/cv/<user>>]. This can be analyzed in terms of how many users have this page vs their reputation points and/or badges. This might give an insight into how many users personally feel the need to display their Stack Overflow profiles to potential recruiters.
- Since the survey conducted wasn't used to generalize it for the Stack Overflow populace, and only to help frame the hypothesis, I think using this, or any other survey with a significantly big sample size can give us an insight into the perception of Stack Overflow users about reputation points and badges.