

Crowdsourcing Quality Assurance: Overview of the Literature and Cases

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Abstract— This paper explores the concept of crowdsourcing and its applications in different domains, including data annotation, content creation, problem-solving, and market research. Quality assurance techniques are essential for maintaining the required level of quality in the end product, and common techniques such as redundancy, gold standard, and objective control groups are discussed. The study proposes a framework for estimating the costs associated with enhancing quality and evaluates its effectiveness through empirical research and case studies. This framework provides valuable guidelines for practitioners, making a defined cost estimation process for quality-related aspects in crowdsourcing and citizen science projects. This research provides valuable insights for practitioners, researchers, and organizations interested in leveraging the collective intelligence of the crowd while ensuring quality and reliability in their projects.

Keywords—crowdsourcing, quality assurance

I. INTRODUCTION

Crowdsourcing has emerged as a popular model for accessing a scalable and cost-effective workforce [1]. It involves harnessing the collective intelligence and efforts of a diverse and distributed crowd to perform various tasks or solve complex problems. In crowdsourcing, individuals, referred to as workers, contribute their skills, time, and expertise remotely through online platforms or communities [2].

Crowdsourcing can be categorized into different types based on the nature of the tasks performed [3]. These types include microtasking, crowdfunding, knowledge-intensive crowdsourcing, and citizen science. Microtasking involves breaking down large tasks into small, manageable units that are easier for the crowd to complete. Crowdfunding, on the other hand, involves raising funds from a large group of individuals to support a project or initiative [4]. Knowledge-intensive crowdsourcing leverages the crowd's expertise to solve complex problems that require specialized knowledge. Citizen science involves engaging citizens in scientific research by allowing them to contribute data collection, analysis, and interpretation.

II. USE CASES

Crowdsourcing has found application in various domains and industries. Some notable use cases include:

A. Data Annotation and Labeling

Crowdsourcing is commonly used for data annotation and labeling tasks, such as image or video tagging, sentiment analysis, and text categorization [5-6]. Workers are provided with guidelines and tasked with labeling or annotating data to

train machine learning models and improve the accuracy of algorithms.

B. Content Creation and Review

Content creation and review, including writing product descriptions, editing articles, and reviewing user-generated content, are other prominent use cases of crowdsourcing [7]. The crowd contributes their creativity, expertise, and perspectives to generate high-quality content or provide valuable feedback.

C. Market Research and Surveys

Crowdsourcing is often employed in market research and conducting surveys. It allows businesses to gather insights, opinions, and preferences of a vast and diverse population, enabling them to make data-driven decisions and understand market trends.

D. Problem Solving and Innovation

The crowd's collective intelligence and diverse perspectives make crowdsourcing a powerful tool for problem-solving and innovation. Companies and organizations can tap into the collective knowledge and expertise of the crowd to overcome challenges, generate ideas, and develop innovative solutions [8]. State of the art problems cover satellite image analysis [11], business process automation [12], and materials science applications [13].

III. QUALITY ASSURANCE

While crowdsourcing provides cost and scalability advantages, ensuring quality can be a challenge due to factors such as loose worker-employer relationships and the variability in the skill levels of participants. To address this, quality assurance techniques are employed to maintain the desired level of quality in crowdsourcing projects.

Common quality assurance techniques in crowdsourcing include:

a. Redundancy

Redundancy involves assigning multiple workers to perform the same task to verify the accuracy and consistency of results. By comparing the outputs of multiple workers, reliable and high-quality outcomes can be achieved [3].

b. Gold Standard

A gold standard refers to a set of pre-labeled or pre-answered instances that serve as a benchmark for evaluating the quality of workers' contributions. Workers' performance is assessed based on their agreement with the gold standard responses.

c. Objective Control Group

An objective control group is a set of instances that have known and pre-determined correct answers. Workers' responses are compared against these known answers to evaluate their accuracy and proficiency.

These quality assurance techniques play a crucial role in mitigating the risks associated with low-quality outcomes and ensuring that the end product complies with the required quality standards.

IV. CONCLUSION

This paper aims to explore the concept of crowdsourcing, its use cases across different domains, and the strategies employed to ensure quality. The goals of this research are as the following.

- To provide a comprehensive understanding of crowdsourcing by examining its different types, applications, and benefits.
- To highlight the challenges and limitations of crowdsourcing in terms of maintaining quality and reliability.
- To discuss and analyze the various quality assurance techniques employed in crowdsourcing projects.
- To propose a framework or methodology for estimating the costs associated with quality assurance in crowdsourcing.
- To evaluate the effectiveness and applicability of the proposed framework through empirical research and case studies.

By achieving these goals, this research aims to contribute to the existing knowledge and understanding of crowdsourcing and provide valuable insights for practitioners, researchers, and organizations interested in leveraging the

power of the crowd while ensuring quality and reliability in their projects.

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