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**#1. Provide your responses to the following questions**

* What characterizes science?

Науку характеризует точность описания изучаемого предмета, постоянное обновление и систематизация фактов, критический анализ.

Science is characterized by the accuracy of the description of the subject, constant updating and systematization of facts, critical analysis.

* What is not science?

Наукой нельзя назвать то, что имеет размытое определение и не однозначное толкование.

Science cannot be called something that has a vague definition and not an unambiguous interpretation.

* How can aspiring researcher achieve scientific progress?

Начинающий исследователь может достичь научного прогресса изучая накопленные знания и общаясь с учёными и обучаясь у них.

A novice researcher can make scientific progress by studying and communicating with scientists and learning from them.

**Explain the meaning of these terms:**

**Paradigm** - is a set of generally accepted scientific fundamental concepts

Парадигма — это набор общепринятых научных фундаментальных понятий

**paradigm shift** - is a change in basic concepts within the framework of science theory

Смена парадигмы — это изменение базовых понятий в рамках теории науки

**limits of science** – is the technological and scientific level of possible human knowledge.

Пределы науки — это технологический и научный уровень возможных познаний человека.

**value judgment** - is a judgment about the correctness or incorrectness of something in comparison with something or relative to something.

Оценочное суждение — это суждение о правильности или неправильности чего-либо в сравнении с чем-то или относительно чего-то.

**scientific method** – is a system of principles and methods of justification that guide the scientific community.

Научный метод — это система принципов и методов обоснования, которыми руководствуется в своей деятельности научное сообщество.

**Pseudoscience** - is an activity presented by supporters as scientific, but not scientific.

Псевдонаука – деятельность, представляемая сторонниками как научная, но таковой не являющейся.

**scientific evidence** - a combination of ways to gain new knowledge and methods of solving problems within a science.

Научное доказательство – совокупность способов получения новых знаний и методов решения задач в рамках какой-либо науки.

**scientific controversy** - is significant disagreements between scientists.

Научные споры – существенные разногласия между учёными.

**unbiased assessment** - is an assessment based on objective evidence and facts.

Объективная оценка – это оценка, основанная на объективных доказательствах и фактах.

**replication of studies** - is a re-examination aimed at determining whether the findings of the original study can be summarized and extended to other circumstances.

Репликация исследований – это повторное исследование, цель которого заключается в том, чтобы определить, могут ли выводы оригинального исследования быть обобщены и распространены на другие обстоятельства.

**2.A. Complete the chart that summarizes the distinction between positivist and constructionist approaches to research. To make a good comparison, use the captions from the list.**

|  |  |
| --- | --- |
| POSITIVIST approach | CONSTRUCTIONIST approach |
| Facts can have an objective reality. | Facts are subjective constructs. |
| Data validity and reliability are sought. | Reliability and validity are irrelevant concepts since the data are not judged in terms of any external notion of truth. |
| Understanding is emergent, and explanation can emerge after data are collected. | Hypotheses should be explicit and pre-date data collection. |
| Prediction is an objective. Falsification of hypotheses is an objective | Description is an objective. Usefulness of interpretation is an objective. |

**2B. Read a science article on scientific research in your field of interest. Use the questions from the focus text to evaluate its scientific character. Make a record of your notes in the following format. Indicate the examples in the text of the article.**

|  |  |  |
| --- | --- | --- |
| **Title** Containerized A/B Testing | | |
| **Subject** K.6.3 [Management of Computing and Information Systems]: Software Management—Software selection;  H.5.2[Information Interfaces and Presentation]: User Interfaces—Evaluation/methodology;  D.2.9 [Software Engineering]: Management—Software Management | | |
| **Scientific field** Software Quality Analysis with Monitoring | | |
| **Criteria** | **Indication** | **Example** |
| Is the scientific method used? | Yes | For our research we created two versions of a simple website with different title and headlines clearly indicating which version we are looking at using our web browser. Both versions have a link. |
| Are hypotheses  -constructed  -carefully tested? |  | We propose an approach for A/B testing of web applications in Docker containerized way. This approach takes advantage of Docker, Nginx server, ELK stack and GrayLog. We have developed a script for controlling the A/B testing. This script is written in Python.  We have developed an approach and related tools for executing A/B testing in Docker containerized environment. Our proof of concept implementation is working and has fulfilled our expectations but there is a lot of work to do and a numerous of choices to make before it becomes production ready. One of our goals were to keep the stack and the implementation simple to leverage the understanding of the conception. |
| Are any mechanisms proposed that explain the phenomenon? | Visitor behaviour | As visitors are served either the control or variation, their engagement with each experience is measured and collected. It can be determined whether changing the experience had a positive, negative, or no effect on visitor behavior from the collected info. |
| Did statistical methods and analyses provide  - evidence of patterns or estimates of certainty  or  -is the idea presented as dogma and unchangeable? | Statistical methods and analysis in the article prove the possibility of using docker containers for a/b testing | A/B testing is a powerful method to improve software quality and user experience. It gains feedback from two akin versions of the same product (software, search ad, newsletter email, etc.) and it measures the end-user engagement |
| Were alternative explanations considered and evaluated? | Scalability of the model is considered | Of course, when it comes down to scalability, we have to use DockerSwarm or Kubernetes client libraries, etc for managing version replacement on a multi-host system. |
| Your commentary   * Conclusion * How useful is it for your research * Other matters | This article shows the wide possibilities of containerization in the field of software testing. |  |

**3A. Read a science article on scientific research in your field of interest. Consider if the article has the following features of a peer-reviewed paper. Make a record of your notes in the chart in the following format. Indicate the examples in the text of the article.**

|  |  |  |
| --- | --- | --- |
| **Title** Containerized A/B Testing | | |
| **Subject** K.6.3 [Management of Computing and Information Systems]: Software Management—Software selection;  H.5.2[Information Interfaces and Presentation]: User Interfaces—Evaluation/methodology;  D.2.9 [Software Engineering]: Management—Software Management | | |
| **Scientific field** Software Quality Analysis with Monitoring | | |
| **Criteria** | **Indication** | **Example** |
| Been published in a scholarly journal (Is the journal in which you found the article describe itself as a peer-reviewed publication?) | No |  |
| More than 10 pages in length | 8 pages |  |
| An abstract (summary) on the first page | Yes |  |
| Citations throughout and a reference list at the end | No, only references. |  |
| Credentialed authors usually affiliated with a research university | Yes | AD ́AM R ́EV ́ESZ and NORBERT PATAKI, E ̈otv ̈os Lor ́and University, Faculty of Informatics |
| Is the topic of the article narrowly focused and explored in depth? | Article narrowly focused on A/B testing and docker containers | In this paper we deal with a new approach for A/B testing via Docker containers. |
| Is the article based on either original research or authorities in the field (as opposed to personal opinion)? | It’s original research |  |
| Is the article divided into sections with headings such as those listed below? | Introduction and Conclusion |  |
| Is the research sound and evidenced? | Yes | Our proof of concept implementation is working and has fulfilled our expectations but there is a lot of work to do and a numerous of choices to make before it becomes production ready. |
| Does it help to expand or further research in this subject area? | Yes | There are great configuration management software toolslike Puppet or Chef [Spinellis 2012]. Of course, when it comes down to scalability, we have to use DockerSwarm or Kubernetes client libraries, etc for managing version replacement on a multi-host system. |

**3B. Provide your responses to the following question. Does the peer-review process slow down advances in scientific knowledge?**

Да, процесс рецензирования замедляет прогресс, но при этом он повышает качество получаемых научных знаний. Например, рецензирование научной статьи позволяет оценить её с разных сторон разными людьми, выявить недостатки исследования и отсеять псевдонаучные работы.

Yes, the peer review process slows down progress, but it improves the quality of scientific knowledge. For example, the review of a scientific article allows to evaluate it from different angles by different people, to identify the shortcomings of the study and to weed out pseudo-scientific works.

**4A. Complete the following statements with the words from the pool.**

* Science is the search for truth that is the effort to understand the world: it involves the rejection of bias, of dogma, of revelation, but not the rejection of morality (Linus Pauling)
* No great advance has been made in science, politics, or religion without controversy (Lyman Beecher)
* Science is the father of knowledge, but opinion breeds ignorance (Hippocrates)
* Science has everything to say about what is possible. Science has nothing to say about what is permissible (Charles Krauthammer)
* Science is a wonderful thing if one does not have to earn one's living at it. (Albert Einstein)

**4B. Give your interpretation to the quotes and discuss your stance on the matter. Use the following sample sentence starters:**

No great advance has been made in science, politics, or religion without controversy.

I think the author is trying to say that without discussion and contradictions in science, politics and religion, truth cannot be achieved. As in disputes, people evaluate the issue from different perspectives. And the contradictions show that perhaps in the statement there is an error or inaccuracy.

**4C. Find examples of newspaper articles where scientific controversies are mentioned. Discuss the validity of the claim of controversy. Discuss the benefits of true scientific controversy.**

I think that the claims in this article are justified. So how to transplant one organ to a person causes major problems with its rejection in a person. When a head transplant, even with success, will cause big problems for a person.

**4.D. Writing a Position Paper**

**TITLE:** Friendly artificial intelligence

**AUTHOR:** Fedor Sadaev

**INTRODUCTION:**

A friendly artificial intelligence is a hypothetical artificial general intelligence (AGI) that would have a positive effect on humanity. It is a part of the ethics of artificial intelligence and is closely related to machine ethics. While machine ethics is concerned with how an artificially intelligent agent should behave, friendly artificial intelligence research is focused on how to practically bring about this behaviour and ensuring it is adequately constrained.

**PRO-SIDE OF THE ARGUMENT:**

Создание «зародыша ИИ», в систему мотивации которого будет изначально встроена забота о человечестве.

ASSERTION: Creation of "embryo AI", in which the incentive system will initially be integrated concern for humanity.

Если в ИИ будет закладываться добрые намерения к человечеству с самого начала, то в итоге получится добрый искусственный интеллект.

EVIDENCE: If the AI will be laid good intentions for humanity from the beginning, you will eventually get a good artificial intelligence.

**CON-SIDE OF THE ARGUMENT:**

Первый ИИ может быть создан только мощными частными корпорациями, и эти транснациональные корпорации не будут иметь никаких побуждений реализовать дружественность.

ASSERTION: The first AI can only be created by powerful private corporations, and these transnational corporations will not have any incentive to realize friendliness.

Разработка ИИ требует огромных вложений, которые имеются у крупных корпораций, и они могут пренебречь дружественностью, если это повлечёт убытки.

EVIDENCE: AI development requires huge investments which are available for large corporations and they can be neglected friendly, if it will entail losses.

**POSSIBLE COMPROMISES:**

Компромиссом может быть повышенный контроль за разработкой ИИ и обеспечение использования ИИ в благих целях.

Compromise may be increased control over the development of AI and ensuring the use of AI for good purposes.

**PERSONAL OPINION:**

I agree with the argument about creating the “germ of AI”. If you lay in the AI goodwill to the person and care about him, then it is quite possible to get an AI that will help people.

**5. Describe 3 different trends in science and technology.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **What’s trending?** | **What’s this trend a result of?** | **What impact do you think it will have?** | **Advantages** | **Disadvantages** |
| Clouds | More and more applications are hosted on cloud services. | Increase the number of cloud services | Availability of services anywhere, service scalability, increased productivity of personal computers. | Requires constant access to the Internet. You need a fast and high-quality Internet. Not every program is available for remote access. |
| Machine learning | It is designed so that the computer can learn on similar tasks. Machine learning allows you not to write a bunch of programs that perform a specific action. | Neural networks are used to solve problems, the algorithm for solving which is unknown. | Resistance to noise input. Adaptation to change. Resiliency. | Neural networks are not able to give accurate and unambiguous answers. Neural networks cannot solve the problem step by step. |
| Voice technology | Replacing standard device control with voice control. | More friendly controls and reverse interaction. | Convenience. Understandable. | Accurate understanding of voice. Security. |