Ministry of Education of the Republic of Belarus
Educational Institution

Belarusian State University of Informatics and Radioelectronics

The Department of Cross-Cultural Professional Communication

Part-Time Course (Master's Degree)
Foreign Language (English)

Assignment

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Assignment

I. Choose the correct option to complete the sentences. **Points: 8**

1. I _a_ the research for two years under the adviser's supervision.
   (a) have been conducting
   b) was conducting
   c) had been conducted

2. At the moment amongst all students enrolled in postgraduate courses the largest
   group _b_ for a qualification in business.
   a) has studied
   (b) is studying
   c) studies

3. Mr. Brown _a_ in the laboratory for seven years before he got promotion.
   (a) had been working
   b) has been working
   c) is working

4. At the end of the century the system of higher and further education in Belarus
   _c_ a process of great reforms.
   a) has undergone
   b) undergoes
   (c) underwent

5. Your research topic _b_ in an interdisciplinary area so far.
   a) is
   (b) has been
   c) was

6. We _c_ some minor changes to the program every year.
   a) have made
   b) are making
   (c) make

7. Currently we _a_ a worldwide shortage of PhD degree holders.
   (a) are witnessing
   b) witness
   c) have witnessed

8. Every academic year the universities also _b_ their cooperation with such
   authoritative international organisations as UNESCO and the Council of Europe.
   a) were expanding
   (b) expand
   c) has expanded

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II. Complete the sentences choosing the correct verb forms in the Active or Passive Voice. Points: 9

1. A great number of scientists from different countries, as well as from Belarus, **are involved** / **involve** into the realisation of different international projects sponsored by numerous international organisations and funds.
2. Adults with advanced degrees as a rule **earn** / **are earned** four times more than those with less than a high school diploma.
3. Research activity at the BSUIR **conduct** / **is conducted** at numerous research institutes, laboratories and University departments.
4. This idea **will be put** / **will put** forward in the future.
5. Progress **began** / **was begun** only when man started to search for natural laws and principles, and produced theories, applying to scientific methods, such as: observation, analysis, synthesis, induction, deduction, hypothesis and experimentation.
6. Recent discoveries in all sciences **have been assisted** / **have assisted** by the developments in contemporary research techniques dealt with in the last section of this book.
7. Now the results of this experiment **are being used** / **are using** in many practical situations.
8. In 1913 Bohr **proposed** / **was proposed** the solar theory of the atom, giving rise to still greater activity in both theoretical and experimental nuclear physics.
9. Scientific knowledge **has been led** / **has led** to remarkable innovations.

III. Choose the correct option to complete the sentences. Points: 10

1. After two years of studies and a thesis defense, students are awarded the Master of Science degree and __a__ continue their research towards the Candidate of Science degree in engineering.
a) can
b) must
c) shall

2. Are there any options available for students who __c__ study full-time?
a) needn't
b) mustn't
c) can't

3. Because a large part of IT incorporates offering support to others, courses __c__ also focus on communication, cooperation, or management.
a) need
b) may
c) should
4. Similarly, as with all academic writing, you __c__ remain objective throughout

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the report unless you have been specifically told to include your own opinions and thoughts.
a) mustn't
b) can
c) should

5. With the knowledge obtained, I believe I __a__ offer valuable contributions to any company I work with.
a) can
b) must
c) shall

6. Research articles __b__ meet the presentation criteria outlined in the journal's style guide for authors.
a) can
b) must
c) shall

7. Scientists __b__ be extremely cautious not to create more problems in an attempt to solve a few.
a) can
b) have to
c) might

8. International cooperation is essential if we __c__ find solutions to global issues like climate change and combating emerging infectious diseases.
a) can
b) may
c) are to

9. A goal of case studies is to make other researchers aware of the possibility that a specific phenomenon __a__ occur.
a) might
b) should
c) must

10. Science is sometimes misconstrued as an elite endeavor in which one __b__ be a member of "the club" in order to be taken seriously.
a) can
b) has to
c) might

IV. Match the words with the corresponding definitions. Points: 8

1. observation *e*	a) a formal set of ideas that is intended to explain why smth happens or exists; **8**
2. induction *c*	b) the process of studying or examining something in an organised way to learn more about it, or a particular study of something; **4**
3. deduction *f*	c) a method of discovering general rules and principles from particular facts and examples; **2**
4. analysis *b*	d) an idea or explanation of smth that is based on a few known facts but has not yet been proved to be true or correct; **6**
5. synthesis *g*	e) the act of watching smth carefully for a period of time, esp. to learn smth; **1**
6. hypothesis *d*	f) the process of reaching a decision or answer by thinking about the known facts, or the decision that is reached; **3**
7. experiment *h*	g) the act of combining separate ideas, beliefs, styles; a mixture or combination of them; **5**
8. theory *a*	h) a scientific test that is done in order to study what happens and to gain new knowledge. **7**

V. Complete the sentences with the appropriate words from the box. Points: 10

prospects ✓	joint ✓	approaches	develops ✓	requirement ✓
degree ✓	extension ✓	researchers ✓	academic ✓	responsibility

Why Do We Choose Postgraduate Studies?

What does choosing the postgraduate course mean for a person? It is going up the level higher than the first 1) _degree_ . What are the reasons for taking postgraduate studies?

The first one is the stimulus of the intellectual challenge: working with concepts, 2) _approaches_ , methods and ideas, developing skills of analysis and research among the 3) _researchers_ and academics.

The second reason is the personal challenge. What is the difference between the undergraduate and the postgraduate level? Undergraduate level 4) _develops_ study skills and the ability of independent studies, and the postgraduate course specifies skills perfection, 5) _responsibility_ , independence in one's own learning, ability to work with complex ideas and concepts and developing them.

Next, there is the serious problem of career 6) _prospects_ , more interesting and highly paid jobs. PhD degree or degree of Doctor of Science can be an obligatory 7) _requirement_ for entering the career, the researcher career or securing promotion to higher levels. In some professional fields the 8) _joint_ programs of universities and employers are undertaken both at

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undergraduate and postgraduate level and these programs are defined as the first stage of learning for the trainees.

For a number of postgraduates entering 9) __academic__ career as the university teacher and researcher is important. Besides, with rapid 10) __extension__ of higher education in some countries high-status academic position is available only with the Doctorate. It means the increase of the demand for people educated to Doctorate level.

VI. Make nouns from the following verbs. Points: 10

1. to enhance – enhancement
2. to clarify – clarification
3. to commit – commitment
4. to automate – automation
5. to maintain – maintenance
6. to allocate – allocation
7. to acknowledge – acknowledgment
8. to deny – denial
9. to assure – assurance
10. to acquire – acquisition

11. to correspond – correspondence
12. to confirm – confirmation
13. to achieve – achievement
14. to identify – identification
15. to contradict – contradiction
16. to occur – occurrence
17. to persist – persistence
18. to predict – prediction
19. to presume – presumption
20. to recover – recovery

VII. Match the synonyms. Points: 5

1. to complete f	a) preliminary 5
2. a field d	b) an effort 7
3. knowledge j	c) an investigation 9
4. to represent h	d) a branch 2
5. preparatory a	e) to collect 10
6. to enhance i	f) to finish 1
7. an endeavour b	g) collaboration 8
8. cooperation g	h) to report 4
9. a research c	i) to enlarge 6
10. to gather e	j) awareness 3

VIII. Match the antonyms. Points: 5

1. complicated h	a) to differ 9
2. rapidly c	b) a tradition 7
3. to accompany f	c) slowly 2
4. additional j	d) similar 6
5. theoretical e	e) practical 5
6. diverse d	f) to abandon 3
7. an innovation b	g) to refute 8
8. to prove g	h) simple 1

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| 9. to correspond a | i) remarkable 10 |
| 10. ordinary i | j) fundamental 4 |

IX. Translate the abstract "Science" into Belarusian/Russian in a written form. Use a dictionary, if needed. Points: 15

Science

Science is an enterprise that builds and organises knowledge in the form of testable explanations and predictions about the world. An older and closely related meaning still in use today is that of Aristotle for whom scientific knowledge was a body of reliable knowledge that can be logically and rationally explained. Since classical antiquity, science as a type of knowledge was closely linked to philosophy. In the early modern era the words "science" and "philosophy" were sometimes used interchangeably in the English language. By the 17th century, natural philosophy (which is today called "natural science") had begun to be considered separately from «philosophy» in general, while, "science" continued to be used in a broad sense denoting reliable knowledge about a topic, in the same way it is still used in modern terms such as library science.

However, in modern use, "science" is still mainly treated as synonymous with "natural and physical science", and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws, sometimes with implied exclusion of pure mathematics. This is now the dominant sense in ordinary use. The word "science" became increasingly associated with the disciplined study of physics, chemistry, geology and biology. This sometimes left the study of human thought and society in a linguistic limbo, which was resolved by classifying these areas of academic study as social science. In its turn the term "humanities" or "arts" refers to the subjects of study that are concerned with the way people think and behave, for example literature, language, history and philosophy (as it understood nowadays).

Science is often distinguished from other domains of human culture by its progressive nature: in contrast to art, religion, philosophy, morality, and politics, there are clear standards or normative criteria for identifying improvements and advances in science. For example, the historian of science George Sarton argued that "the acquisition and systematisation of positive knowledge are the only human activities which are truly cumulative and progressive," and "progress has no definite and unquestionable meaning in other fields than the field of science". However, the traditional cumulative view of scientific knowledge was effectively challenged by many philosophers of science in the 1960s and the 1970s, and thereby the notion of progress was also questioned in the field of science.

Debates on the normative concept of progress are at the same time concerned with axiological questions about the aims and goals of science. The task of philosophical analysis is to consider alternative answers to the question: What is meant by progress in science? This conceptual question can then be complemented by the methodological question: How can we recognise progressive developments

in science? Relative to a definition of progress and an account of its best indicators, one may then study the factual question: to what extent, and in which respects, is science progressive?

X. Render the article devoted to the use of artificial intelligence (AI) in a written form. Points: 20.

Using AI to Understand Human Brains

Predictive text models might offer insight into how humans actually process language.

August 6, 2022
By Cameron Voisey

Simple artificial intelligence models that aim to replicate how humans speak may provide clues to how humans actually process language.

Work published in *Proceedings* of the National Academy of Sciences has shown that a range of models that are optimised to predict the next word from previous text, just like those used for predictive text on smartphones, have shown remarkable similarities to human brains.

The models in question are known as 'neural networks'. Though their basic structure is based loosely on the neurons within the brain, they have been developed without trying to closely imitate the brain's computations, not least because these computations are not well understood. These simple models are formed of a collection of nodes, or neurons, which are interconnected with varying degrees of strength. Information can be passed through these networks and they can be optimised to perform certain tasks, like predicting the next word in a string.

In this study, researchers measured the neural patterns produced by such artificial neural networks when presented with strings of text. These responses were then compared to patterns in the human brain as subjects underwent brain scans.

Researchers performed this comparison for 43 state-of-the-art language models and found that the best next-word prediction models exhibited patterns that closely resembled those seen in the brain. Models that were not optimised for next-word prediction did not show this similarity, suggesting that next-word prediction may play a special role in the underlying computations present in the brain.

Ev Fedoronko from MIT, a senior author of the study, expressed their surprise at the findings, "Just a few years ago, I would not have predicted that we would get here. Even just a few years ago, if you remember trying to translate something with Google Translate, it was pretty abysmal. Suddenly, within the last 5 years, these tasks are being done really, really well. So, they're good enough to the point where I, as a language scientist, think "OK, this model is capturing

something really useful about language statistics. Let's see if we can leverage them somehow to try to understand how human brains might solve language."

While these links are exciting, these models are unlikely to include the right model of the brain. As Ev pointed out, they are all overly simplistic. However, by comparing many different models, the researchers could ask what makes some better than others, and make inferences about the brain's underlying mechanisms. The hope is that this could push the boundaries of the understanding of how the brain works.

"Before these models came along, we were at a point where we could characterise these language brain regions. We could say, "OK, they're highly specialised for language, they pay attention to both word meanings and structure, to how words combine into larger units, but how do we actually start making guesses about the computations that go on and how would we test it?'. These models provide just the way to do that."

https://www.thenakedscientists.com/articles/science-news/using-ai-understand-human-brains

IX. Перевод на русский язык.

Наука

Наука - это предприятие, которое формирует и организует знания в виде проверенных объяснений и предсказаний о мире. Более древним и тесно связанным с ним значением, все еще используемым сегодня, является значение Аристотеля, для которого научное знание было совокупностью достоверных знаний, которые могут быть логически и рационально объяснены. Со времен классической античности наука, как вид знания, была тесно связана с философией. В ранней современной эпохе слова "наука" и "философия" иногда использовались в английском языке как взаимозаменяемые. К 17 веку натуральная философия (которая сегодня называется "естествознание") начала рассматриваться отдельно от "философии" в целом, в то время как "наука" продолжала использоваться в широком смысле, обозначающем достоверные знания по теме, точно так же, как она все еще используется в современных терминах, таких как библиотечная наука.

Однако в современном употреблении "наука" по-прежнему в основном рассматривается как синоним "естественных и физических наук" и, следовательно, ограничена теми областями знаний, которые относятся к явлениям материальной вселенной и их законами, иногда с подразумеваемым исключением чистой математики. В настоящее время это преобладающее значение в обычном употреблении. Слово "наука" все больше стало ассоциироваться с дисциплинированным изучением физики, химии, геологии и биологии. Иногда это оставило изучение человеческой мысли и общества в лингвистической ловушке, которая была разрешена путем классификации этих областей академических исследований как социальных наук. В свою очередь термины "гуманитарные науки" и "искусство" относятся к предметам изучения, которые связаны с тем, как люди мыслят и ведут себя, например, литературе, языку, истории и философии (в современном понимании).

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Науку часто отличают от других областей человеческой культуры её прогрессивным характером: в отличие от искусства, религии, философии, морали и политики, существуют чёткие стандарты и нормативные критерии для выявления улучшений и достижений в науке. Например, историк науки Джордж Сартон утверждал, что "приобретение и систематизация позитивных знаний — это единственные деятельности человека, которые действительно накопленные и прогрессивные" и "прогресс не имеет определённого и неоспоримого значения в других областях, кроме области науки". Однако традиционный накопленный взгляд на научные знания был практически оспорен многими философами науки в 1960-х и 1970-х годах, и, таким образом, понятие прогресса также было поставлено под сомнение в области науки.

Дебаты о нормативной концепции прогресса в то же время связаны с аксиологическими об целях и задачах науки. Задача философского анализа состоит в том, чтобы рассмотреть альтернативные ответы на вопрос: что подразумевается под прогрессом в науке? Затем этот концептуальный вопрос может быть дополнен методологическим вопросом: как мы можем распознать прогрессивные достижения в науке? Относительно определения прогресса и учёта его лучших показателей, можно изучить фактический вопрос: в какой степени и в каких отношениях наука прогрессивна?

X. Article rendering

The headline of the article I've read is „Using AI to Understand Human Brains". The article is written by Cameron Voisey.

The main idea of the article is to explore parallels between simple artificial intelligence models, especially those optimized for predicting the next word in a text sequence, and patterns observed in the human brain. It describes how these artificial intelligence models, such as neural network show similarities with the processes of understanding language by the brain.

The article begins by explaining that some artificial intelligence models, structured in such a way as to predict the next word in a text sequence, show similarities with patterns observed in the human brain. The study conducted by the researchers involved comparing the responses of 43 different language models to human brain patterns. It was found that models optimized for predicting the next word show similar patterns to the human brain, hinting at the importance of predicting the next word in brain calculations.

The results of the study surprised Ev Fedorenko from MIT, senior author of the study, who highlighted the significant progress in artificial intelligence models over the past few years. These models, which were previously less effective, now collect useful information about language statistics, prompting researchers to consider using them to understand how the human brain can solve language problems.

Although these models are simplistic and unlikely to fully reproduce the complexity of the brain, comparisons between different models allow researchers to understand what makes some models more effective than others. This understading allows us to draw conclusions about the underlying mechanisms of the brain, ultimately pushing the boundaries of understanding how the brain processes language.

I find this article intriguing because it highlights the unforeseen parallels between artificial intelligence models and human brain patterns in language processing. The implications of using artificial

intelligence models as a means to study the language mechanisms of the brain are profound. While these models may not reflect the full functioning of the brain, a comparative approach to identifying effective models offers a promising path to understanding the brain's language computing. The potential of using artificial intelligence models to understand how the human brain processes language is an exciting area for further study.