Centro Federal de Educação Tecnológica Celso Suckow da Fonseca - CEFET/RJ

Programa de Pós-Graduação em Ciência da Computação

PROCESSO SELETIVO 2019.3

PROVA DE LÍNGUA INGLESA

INSTRUÇÕES GERAIS AOS CANDIDATOS

- O tempo total para realização das provas é de **1 hora e 30 minutos**.
- Ao término da prova, o candidato deverá devolver o cartão resposta.
- É imprescindível verificar no cartão resposta o número de inscrição do candidato no espaço reservado para tal.

  A IDENTIFICAÇÃO DOS CANDIDATOS EM TODAS AS PÁGINAS DEVERÁ SER FEITA **APENAS** PELO NÚMERO DE INSCRIÇÃO.
- As respostas deverão ser transpostas para o cartão resposta com caneta de tinta azul ou preta. Não serã consideradas as respostas que não estiverem transcritas no cartão resposta, bem como não serão consideradas respostas rasuradas.
- A Prova de Língua Inglesa é constituída por 9 questões objetivas.
- Cada questão objetiva tem somente uma resposta correta.
- A prova deve ser feita sem consulta e sem empréstimo de material.
- Verifique se sua prova contém 9 questões, assim como o cartão de respostas.
- **Não** é permitido o uso de calculadora, celular ou qualquer outro aparelho durante a realização da prova. É vedado o empréstimo de qualquer material entre os candidatos.

Boa Prova !

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CARTÃO DE RESPOSTAS

INSCRIÇÃO Nº: ___

Questão	Alternativa			
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D

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TEXT 1

In 2018, researchers at MIT and the auto manufacturer BMW were testing ways in which humans and robots might work in close proximity to assemble car parts. In a replica of a factory floor setting, the team rigged up a robot on rails, designed to deliver parts between work stations. Meanwhile, human workers crossed its path every so often to work at nearby stations.

The robot was programmed to stop momentarily if a person passed by. But the researchers noticed that the robot would often freeze in place, overly cautious, long before a person had crossed its path. If this took place in a real manufacturing setting, such unnecessary pauses could accumulate into significant inefficiencies.

The team traced the problem to a limitation in the robot's trajectory alignment algorithms used by the robot's motion predicting software. While they could reasonably predict where a person was headed, due to the poor time alignment, the algorithms couldn't anticipate how long that person spent at any point along their predicted path — and in this case, how long it would take for a person to stop, then double back and cross the robot's path again.

Now, members of that same MIT team have come up with a solution: an algorithm that accurately aligns partial trajectories in real-time, allowing motion predictors to accurately anticipate the timing of a person's motion. When they applied the new algorithm to the BMW factory floor experiments, they found that, instead of freezing in place, the robot simply rolled on and was safely out of the way by the time the person walked by again.

To enable robots to predict human movements, researchers typically borrow algorithms from music and speech processing. These algorithms are designed to align two complete time series, or sets of related data, such as an audio track of a musical performance and a scrolling video of that piece's musical notation.

Researchers have used similar alignment algorithms to sync up real-time and previously recorded measurements of human motion, to predict where a person will be, say, five seconds from now. But unlike music or speech, human motion can be messy and highly variable. Even for repetitive movements, such as reaching across a table to screw in a bolt, one person may move slightly differently each time. But the MIT graduate student Przemyslaw Lasota says algorithms that predict trajectories based on distance alone can get easily confused in certain common situations, such as temporary stops, in which a person pauses before continuing on their path. While paused, dots representing the person's position can bunch up in the same spot.

The same goes with overlapping trajectories — instances when a person moves back and forth along a similar path. Lasota says that while a person's current position may line up with a dot on a reference trajectory, existing algorithms can't differentiate between whether that position is part of a trajectory heading away, or coming back along the same path. It's all in the timing.

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As a solution, Lasota and Julie Shah, associate professor of aeronautics and astronautics at MIT, devised a "partial trajectory" algorithm that aligns segments of a person's trajectory in real-time with a library of previously collected reference trajectories. Importantly, the new algorithm aligns trajectories in both distance and timing, and in so doing, is able to accurately anticipate stops and overlaps in a person's path.

The team tested the algorithm on two human motion datasets: one in which a person intermittently crossed a robot's path in a factory setting, and another in which the group previously recorded hand movements of participants reaching across a table to install a bolt that a robot would then secure by brushing sealant on the bolt. For both datasets, the team's algorithm was able to make better estimates of a person's progress through a trajectory, compared with two commonly used partial trajectory alignment algorithms. Furthermore, the team found that when they integrated the alignment algorithm with their motion predictors, the robot could more accurately anticipate the timing of a person's motion. In the factory floor scenario, for example, they found the robot was less prone to freezing in place, and instead smoothly resumed its task shortly after a person crossed its path.

While the algorithm was evaluated in the context of motion prediction, it can also be used as a preprocessing step for other techniques in the field of human-robot interaction, such as action recognition and gesture detection. Shah says the algorithm will be a key tool in enabling robots to recognize and respond to patterns of human movements and behaviors. Ultimately, this can help humans and robots work together in structured environments, such as factory settings and even, in some cases, the home. "This technique could apply to any environment where humans exhibit typical patterns of behavior," Shah says. "The key is that the [robotic] system can observe patterns that occur over and over, so that it can learn something about human behavior. This is all in the vein of work of the robot better understand aspects of human motion, to be able to collaborate with us better."

(Abridged and adapted from `https://news.mit.edu/2019/robots-predict-human-movement-0611`)

1. Which of the following is an appropriate title for text 1?

A. Is Artificial Intelligence capable of working together with humans?

B. Algorithm tells robots where nearby humans are headed.

C. Humans and robots working in peace.

D. Robots can create algorithms to help humans.

2. What is the main idea of text 1?

A. Robots can be programmed to freeze when humans start working on the processes of a factory floor.

B. Researchers and industries can work together for a better world.

C. Robots have a fundamental role in our lives, being more and more common the products that use robotics concepts to work.

D. A new tool for predicting a person's movement trajectory may help humans and robots work together in close proximity.

3. For the situation displayed in text 1 it is necessary that

A. robots become familiar with patterns of human behavior concerning motion.

B. robots do not work in factories, but in libraries.

C. robots help our companies or organizations on a number of different services.

D. robots crawl the Web on a regular cycle searching webpages to find enough data for the project.

4. About text 1, it is right to say that

A. Scientists were not be able to create up to now an algorithm to predict humans movement.

B. Robots that typically freeze in the face of anything that resembles a person are going to be extinct.

C. The algorithm developed by MIT has to deal with distance and timing of a human being's motion.

D. Both MIT and BMW are interested in the creation of an assembly line facilitated by both humans and robots.

5. Mark the option that DOES NOT have an idea contained in text 1.

A. Before the algorithm, robots could not predict if a person that was coming its way could stop a little.

B. It's not very easy to predict human movements to use them in an algorithm.

C. The algorithm tested by MIT and BMW intends to cut inefficiencies in an assembly line where humans and robots work together.

D. Robots work better than humans in car parts assembly.

TEXT 2

How Computation is Changing Journalism

Nicholas Diakopoulos grew up being exposed to journalism, as his father was a journalist. The younger Dikopoulos decided he wanted to study computer science and completed a Ph.D. in the field at the Georgia Institute of Technology (Georgia Tech). Midway through his doctorate, he started to think about combining journalism and computation into a new field: computational journalism. Today, Diakopoulos is an assistant professor in communication studies and computer science at Northwestern University; he also serves as director of the university's Computational Journalism Lab. In his new book Automating the News: How Algorithms Are Rewriting the Media, Diakopoulos explores the new field of computational journalism, which he has been helping to establish since 2007. The book makes clear how algorithms are changing the journalistic production pipeline from information gathering to sense-making, story-telling, and finally news distribution. Artificial intelligence (AI) already is used to personalize article recommendations, summarize articles, mine data in documents, transcribe recorded interviews, automate content production, moderate comments, and to eliminate (but unfortunately, also to produce) fake news.

What should all journalists know about your book?
A lot of journalists who don't understand how AI works might feel threatened: 'oh, AI bots are going to write all our stories. We will be out of work'. In my book, I show over and over again that the cognitive labor of journalists is very difficult to completely automate. There are, of course, bits and pieces that can and will be automated, but more important will be the hybridization of AI with journalists. Jobs in journalism will not disappear, but instead will change.

Can you give an example of what AI can do for journalism that would be impossible without it?
One of the most compelling and important scenarios for AI in journalism is in using data mining to help discover new stories. I really like the example of how the Atlanta Journal Constitution discovered the misconduct of medical doctors by using machine learning to sift through 100,000 documents. In 2016, the newspaper published an investigative report uncovering more than 2,400 doctors across the U.S. who had been disciplined for sexual misconduct in their practice; about half of them still had licenses and were still seeing patients. It would have taken journalists thousands of hours to read all 100,000 documents. Machine learning selected only those documents with the highest chance of containing information about misconduct. Thanks to this, the job became doable for journalists. This is a great example of a story that journalists wouldn't find, at least not at that scale, if they didn't use computational techniques.

You write in your book that classical news organizations need to be more like Google. Why is that?
At their core, both computing and journalism share a focus on transforming and adding

value to information; so, in a way, Google is in the same business as most news organizations. They organize information and knowledge. If news organizations want to compete as information and knowledge producers, they need to be a bit more like Google. We already see that big information companies like Thompson Reuters, Bloomberg, The New York Times, The Washington Post, and BBC get it; they are already deploying a fair bit of AI and automation. A big open question is what will happen to local news media; they are at a disadvantage in terms of resources and their ability to develop new AI tools.

How do we find the right way to hybridize between journalists and AI tools?
It's all about training and education. We need to engender computational thinking and data-thinking in journalists. Let's develop degrees in computational journalism. We also need to work on the transfer of domain expertise between journalists and computationalists. To achieve this, we could introduce computationalists in the newsroom and let them explore which tasks can be automated. Or the other way around, put journalists and editors in a computational environment, allowing them to interact and collaborate in computational work.

What will the new kind of work for journalists look like?
In the hybridization of workflows, more often than not AI technologies actually create new types of work related to things like configuring, updating, tweaking, validating, and generally maintaining and supervising systems. This might include tasks like making sure input data streams are updated, editing knowledge bases or metadata or tweaking any of the rule-sets built into content templates. There will be more work created, but it will be different from traditional editorial work.

In your book, you are optimistic about the hybridization of AI and journalism. Can you explain your optimism?
Technology influences us, but we also shape technology. Journalism and technology will coevolve. I reject the idea of technological determinism, the idea that technology has its own will and humans can only follow. Part of my goal with the book is to empower journalists to see themselves as designers of the future of algorithmic news media. AI is a new medium and journalists will need to learn to express and exercise their ethical and normative journalistic values through the AI systems that they implement.

(Adapted from `https://cacm.acm.org/news/237580-how-computation-is-changing-journalism/fulltext`)

6. De acordo com o texto 2,

A. o trabalho cognitivo dos jornalistas pode estar sendo automatizado por meio da inteligência artificial.

B. é impossível entregar à computação a função e a reputação do jornalista.

C. empregos para jornalistas deixarão de existir com o tempo, sendo substituídos pela inteligência artificial.

D. escritores e jornalistas precisam ter segurança quanto a não serem substituídos pela inteligência artificial.

7. A ideia principal do livro de Diakopoulos é a de que

A. a tecnologia não suplantará o jornalismo, mas sim pode ser usada para melhorar sua prática.

B. os jornalistas devem compreender a ameaça que a inteligência artificial significa.

C. os jornalistas estarão sem emprego em função do uso da computação para produzir notícias.

D. a automação levará a uma situação em que não será mais possível atuar como jornalista.

8. Dentre as opções abaixo, e de acordo com o texto 2, apenas uma NÃO contém exemplos de usos de IA no jornalismo. Qual?

A. eliminar e produzir notícias falsas.

B. reunir e distribuir informações jornalísticas.

C. explorar dados para narrativas.

D. escrever artigos e entrevistas.

9. Em 2016, o Atlanta Journal Constitution

A. utilizou inteligência artificial para selecionar, entre milhares de documentos, dados para publicação a respeito dos mais de 2400 médicos americanos punidos por assédio sexual em seus consultórios.

B. conseguiu, por meio de suas investigações, punir mais de 2400 médicos por má conduta sexual.

C. empregou máquinas para ler 100.000 documentos em milhares de horas para detectar a história dos médicos americanos que praticaram abuso sexual e ainda não tiveram suas licenças caçadas.

D. utilizou técnicas computacionais para selecionar dados que mostraram que o jornalismo feito por humanos será inviável em breve.