2022 年度
大学院理工学研究科【環境共生工学専攻】博士後期課程
一般選抜試験(第Ⅱ期)問題

英　　語

開始時刻　午前 10 時 00 分
終了時刻　午前 11 時 00 分

【注意事項】

１．答案用紙には、氏名を必ず記入してください。

２．配布された答案用紙は試験が終了したら、必ず提出してください（問題用紙は提出しなくてよい）。

[1] Answer all questions following a passage on the basis of what is stated or implied in that passage, either in Japanese or English.

Google Maps is incredibly useful. It tells you how to get places without arguing with somebody sitting next to you with a gigantic map. It's even put an end to endless conversations with family about which roads you took to get home. I followed the satnav like everybody else DAD, I have no idea which roads anymore because nobody does, Jesus Christ.

It's a reliable tool that – generally quite accurately – tells you how to get to where you want to go quickly, and how to avoid traffic along the way. But it turns out it's quite simple to hack. All you need is a shitload of phones and a bad attitude. This is how artist Simon Weckert "hacked" Google Maps for a project, causing fake traffic jams to follow him around wherever he went.

To do the "hack", Weckert hired out 99 phones and bought sim cards for them online, Vice reports. He then put the sim cards in the phones and loaded up Google Maps on all of them, and loaded them into his wagon. It really was then just a matter of walking around town.

The opened Google Maps were telling Google that whatever street he was walking down was rammed full of traffic in a very small area. They had failed to take into account it might be an artist making a point, something the programmers probably hadn't anticipated during the planning phase of Google Maps.

"By transporting the smartphones in the street I'm able to generate virtual traffic which will navigate cars on another route," Weckert told Motherboard. "Ironically that can generate a real traffic jam somewhere else in the city." He'd spend an hour or two walking back and forth in the same area in order to generate a traffic jam, probably sending other people using Google Maps on other routes to avoid the "traffic".

The project, like his other work, he told Motherboard, was intended to make people think about the data we rely on. "Data is always translated to what they might be presented. The images, lists, graphs, and maps that represent those data are all interpretations, and there is no such thing as neutral data," Weckert writes on his website. "Data is always collected for a specific purpose, by a combination of people, technology, money, commerce, and government." It's certainly got people talking, as well as devising ways to use this information for evil.

Google has since confirmed to 9to5Google that they do use a large number of devices running in a small area as an indication that there's a traffic jam.

"Traffic data in Google Maps is refreshed continuously thanks to information from a variety of sources, including aggregated anonymized data from people who have location services turned on and contributions from the Google Maps community," they said, adding that they're grateful for the "hack" as it helps them improve Google Maps.

"We've launched the ability to distinguish between cars and motorcycles in several countries including India, Indonesia and Egypt, though we haven't quite cracked traveling by wagon. We appreciate seeing creative uses of Google Maps like this as it helps us make maps work better over time."

modified from source: James Felton 4th Feb., 2020, IFL Scicence!
/www.iflscience.com/technology/man-creates-traffic-jams-by-wheeling-around-99-cell-phones-in-a-trailer/

(1) What did Mr. Simon Weckert walk around with?
(2) What was resulted in by the walking of Mr. S.Weckert?
(3) How was the Google Map 'hacked' technically?
(4) What was the response on this event from Google company?

2 Answer all questions following a passage on the basis of what is stated or implied in that passage, either in Japanese or English.

Northern Somalia's economy relies heavily on livestock. About 80 percent of the region's annual exports are meat, milk and wool from sheep and other animals. Yet years of drought have decimated the region's grazing lands. By zeroing in on a few villages that have defied the odds and maintained healthy rangelands, an international team is asking if those rare successes might hold the secret to restoring rangelands elsewhere.

Answering this question requires turning traditional data processing on its head. Statistically speaking, success stories like those Somali villages with sustainable grazing are the outliers, says Basma Albanna, a development researcher at the University of Manchester in England. "The business as usual is that when you have outliers in data, you take them out."

Yet those outliers can hold vital information, say Albanna and others who use the "positive deviance" approach. They sift through data to find signals in what many deem noise. The researchers search for "deviants" — outliers in big datasets — to uncover why some individuals or communities succeed when others facing near-identical circumstances fail. Then, armed with these insights, the researchers develop strategies that help those in the languishing majority attain positive results.

Positive deviance has the potential to address a nagging problem, says Megan Higgs, a statistician and independent consultant in Bozeman, Mont. "In research in general we have an overemphasis on quantifying averages," Higgs, the editor of the International Statistical Institute's blog Statisticians React to the News, says. She notes that few people in a research pool may actually fit the average. Sometimes, averages obscure vital information.

Without approaches such as positive deviance that look at groups and individuals in the margins, "I just worry that we are missing a hugely important part of the picture," Higgs says.

The term "positive deviance" first appeared in the mid-1970s, but the approach did not gain traction until nearly two decades later. In 1990, Monique Sternin and her late husband Jerry Sternin, then aid

workers with the humanitarian organization Save the Children, piloted a positive deviance project in Vietnam to address the country's soaring rates of childhood malnutrition. Vietnamese government officials asked the couple to help communities without resorting to food handouts or other common, yet unsustainable, aid practices.

Instead, the Sternins sought to identify children in impoverished communities who remained well fed against tremendous odds. Working in four villages in Thanh Hoa province, which combined had 2,000 children under age 3, the Sternins trained villagers to weigh the children. The effort revealed that almost 70 percent of the children were malnourished; about half were at risk of death.

The couple then asked the villagers to identify children with healthier weights among the poorest families. Each village had a handful of families that fit the bill. "We went to talk to those people," says Monique Sternin, now a positive deviance consultant in Boston.

The Sternins discovered that kids with healthier weights came from families who fed their children tiny shrimp and crabs that lived in rice paddies and potato greens found along roadsides. Village wisdom regarded these foods as "taboo," or dangerous, Sternin says. The families with healthier kids also fed their children three to four meals per day instead of the customary two meals.

On the surface, the solution seemed simple: Get more families to feed their children these taboo foods. But implementing this solution was not at all easy. "The positive deviants are outliers, rebels," Sternin explains. The Sternins could not ethically "out" families that were bucking social norms and traditions.

Instead, they promised villagers free rice. In exchange, villagers attended cooking sessions with their kids, facilitated by aid workers and taught by village women. Those sessions provided villagers with an extra meal every day for 12 days. But to participate, the villagers had to bring and take turns preparing the tiny shrimp and crabs, along with wild greens. Over those 12 days, parents and caregivers saw for themselves that the foods made the children healthier, not sicker.

Although their work was not based on a formal study, "what we found quickly was children were putting on weight," Sternin says. And the children stayed healthy thanks to their altered diets — after a year, more than a thousand children in the villages were no longer malnourished.

The couple went on to establish similar programs around the country. Others adopted this method, and today, similar nutrition programs exist worldwide.

The Sternins' work was inspirational, but required a personalized approach to gather data. Albanna wondered if big data, such as satellite images and social media content, coupled with qualitative research, could get the job done with lower start-up costs.

Big data offers several benefits, Albanna explains. The datasets already exist, so the process is initially less labor intensive than going door to door. Identifying outliers at the level of villages or neighborhoods instead of individuals reduces privacy concerns.

Plus the larger the dataset, the more positive deviants you would be able to identify, Albanna notes. "Positive deviants are very rare to find. We're talking 2 to 10 percent of whatever sample you are investigating," she says.

In 2020, Albanna and several international partners cofounded the Data Powered Positive Deviance initiative. Pilot projects in the collaboration are identifying the safest public spaces for women in Mexico City and mapping communities producing the most millet in Niger. A project locating districts that were best at stopping the spread of COVID-19 in Germany reported its findings in September in the International Journal of Environmental Research and Public Health. The collaboration also conducts the Somalia healthy rangeland project.

In Somalia, the team first had to find successful villages. "We started, hoping that we would be able to identify communities that are able to sustain and maintain the numbers of their livestock after the 2016-2017 drought," Albanna says. That drought was severe, leaving more than half the country with food shortages.

Counting livestock directly proved tricky. So the team focused on a different metric: rangeland health. Healthy vegetation likely makes for healthier livestock, Albanna explains.

The team then zoomed in on 314 villages in northern Somalia's mountainous West Golis region and looked at three sets of data. The researchers grouped similar villages together using rainfall and land cover data. Earth-observing satellite data from 2016 to 2020 provided a gauge of vegetation density. That process helped them identify 13 potential positive deviants, villages that had maintained healthier vegetation despite the drought.

Detailed satellite images of those outliers revealed unique conservation techniques that helped preserve nearby rangeland. For instance, some villages used shrub barriers around settlements to limit erosion or carved half-moon-shaped basins into landscapes to retain water, the researchers reported online December 24 in Development Engineering.

To find out what propelled the villagers to adopt those successful practices, the team sent a local pastoralism and rangeland consultant, Mohamed Jama Hussein, to sleuth around. Hussein compared 10 of the potential positive deviant villages with two villages showing average levels of vegetation density and eight hard-hit, low-vegetation villages — the negative deviants. He discovered that the leaders of positive deviant villages had aggressively blocked private citizens from enclosing communal lands for personal use. By contrast, "squatting" on public lands remained common in the other villages.

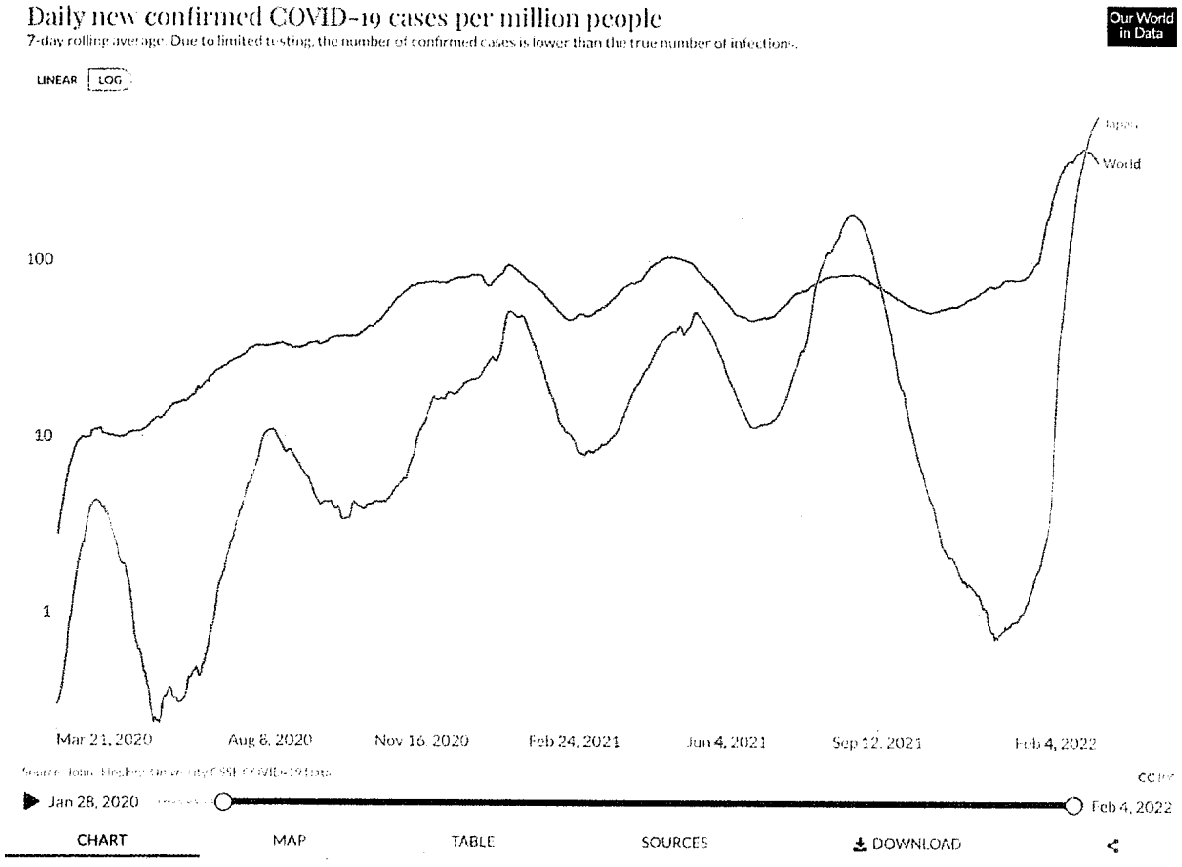
Hussein also observed that farmers in the successful villages were moving away from the purely pastoral life to diversify their sources of income. Some villagers had started growing their own crops and even livestock feed. Many women, meanwhile, had started keeping bees, which offered an unexpected perk, Albanna says. The bees' presence deterred people from cutting down rangeland shrubs and trees for fuel.

modified from source: Sujata Gupta, 6th Jan., 2022, ScienceNews
/www.sciencenews.org/article/success-fail-why-outliers-people-communities-nudges/

(1) What is the merit of using big dataset?
(2) What is the conventional method to analyze a big dataset? Then what approach did this article suggest to address a big dataset?
(3) What was the issue in Northern Somalia, and what did the outliers act against it?
(4) What was the issue in Vietnam, and what did the outliers act against it?

3 Answer the questions below in English.

1. Describe what facts are displayed in the figure, in details.
2. Give free discussion based on the information in the figure.



source: /ourworldindata.org/covid-cases