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EDITORIAL

The Recursive Loop of AI-Generated Content

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In recent years, generative artificial intelligence (AI) based on large language models (LLMs) has started to produce a lot of online content, but can AI models be trained on data produced by other AI models? In this recursive loop, algorithms consume their own outputs, blurring the line between human-generated knowledge and machine-generated text. Training a new model based on AI-generated data can cause irreversible defects—this phenomenon is called *model collapse*. As a consequence, the model might begin to forget the nuances of genuine human language as it is trained on its own outputs. In other words, the model loses diversity and converges to a narrow and repetitive state. Unless new human-generated data are introduced to break the cycle, each generation of AI may perform worse. This recursive loop not only threatens the performance of future AI systems but also raises alarms about the integrity of the results produced by AI.

One implication of the AI recursive loop is the potential degradation of the quality of the content on the Internet. Some analyses of model collapse indicate that there is a reduction in the diversity and novelty of the outputs of AI models, which provide homogenized and repetitive responses, recycling the same ideas and compromising the richness of genuine human expression.

From another point of view, this recursive loop might introduce ethical concerns, among which misinformation is particularly sensitive. The output of generative AI based on LLMs usually sounds well-structured and looks as though it was produced by an authority in the field, even when the result is false. If such false results go online, they will be available for use by other generative AI systems, which will treat them as true facts. This may lead to an increasing generation of false information (*fake news*). Unfortunately, the misinformation caused by this recursive loop is very hard to correct.

Another ethical concern is transparency. Typically, human authors are responsible for the content they produce, but the content produced by generative AI systems does not have clear authorship. Thus, many AI-generated articles are published with hidden or misleading authorship. For instance, there are various news websites made up of AI-generated posts with anonymous authors or fake author profiles.

All in all, the recursive loop provoked by generative AI systems hinders the human ability to preserve truthfulness and responsibility in the digital environment. The aforementioned ethical issues highlight the need for robust guidelines regarding online content. This has a

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direct impact on the scientific community, which now faces the challenge of reorganizing academic tasks such as publications, peer-review, and authorship.

In conclusion, AI systems trained based on artificially generated content generate an unprecedented recursive loop in the knowledge ecosystem, degrading the performance of the models as well as the quality of the information accessible to human beings. In the near future, we might find a large number of websites with generic and homogenized text that lacks accuracy, depth, and originality. This will erode public trust in news and science, among other fields. To avoid this, many challenges must be overcome. From a technical standpoint, developers must determine which data can be used by these systems to avoid AI-generated outputs. From an ethical point of view, there is a need for new policies, including the labeling of AI-generated text through specific metadata.