Computational Reproducibility in the Life Sciences and Research in Computer Science: Round Trip

lundi 27 janvier 2020 10:00 (50 minutes)

With the development of new experimental technologies, biologists are faced with an avalanche of data to be computationally analyzed for scientific advancements and discoveries to emerge. Faced with the complexity of analysis pipelines, the large number of computational tools, and the enormous amount of data to manage, there is compelling evidence that many (if not most) scientific discoveries will not stand the test of time. Increasing the reproducibility of computed results is of paramount importance.

While several elements of solutions are currently available, ensuring reproducible analyses relies on progress made in several areas of research in computer science including fundamental aspects.

After an introduction to the problem of computational reproducibility, we go on to discuss the challenges posed by this domain and describe the remaining opportunities of research in computer science.

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