Five ways to ensure that models serve society: A manifesto

Description

Tweet

Saltelli, A., Bammer, G., Bruno, I., Charters, E., Fiore, M. D., Didier, E., Espeland, W. N., Kay, J., Piano, S. L., Mayo, D., Jr, R. P., Portaluri, T., Porter, T. M., Puy, A., Rafols, I., Ravetz, J. R., Reinert, E., Sarewitz, D., Stark, P. B., â?¦ Vineis, P. (2020). Five ways to ensure that models serve society: A manifesto. *Nature*, *582*(7813), 482â??484. https://doi.org/10.1038/d41586-020-01812-9

The five ways:

1. Mind the assumptions
    - *â??One way to mitigate these issues is to perform global uncertainty and sensitivity analyses. In practice, that means allowing all that is uncertain â?? variables, mathematical relationships and boundary conditions â?? to vary simultaneously as runs of the model produce its range of predictions. This often reveals that the uncertainty in predictions is substantially larger than originally assertedâ?•*
2. Mind the hubris
    - â??*Most modellers are aware that there is a tradeoff between the usefulness of a model and the breadth it tries to capture. But many are seduced by the idea of adding complexity in an attempt to capture reality more accurately. As modellers incorporate more phenomena, a model might fit better to the training data, but at a cost. Its predictions typically become less*â??
3. Mind the framing
    - *â??Match purpose and context. Results from models will at least partly reflect the interests, disciplinary orientations and biases of the developers. No one model can serve all purposes. accurateâ?•*
4. Mind the consequences
    - â??*Quantification can backfire. Excessive regard for producing numbers can push a discipline away from being roughly right towards being precisely wrong. Undiscriminating use of statistical tests can substitute for sound judgement. By helping to make risky financial products seem safe, models contributed to derailing the global economy in 2007â??08 (ref. 5).â?•*
5. Mind the unknowns
    - â??*Acknowledge ignorance. For most of the history of Western philosophy, self-awareness of ignorance was considered a virtue, the worthy object of intellectual pursuitâ?•*

â??Ignore the five, and model predictions become Trojan horses for unstated interests and valuesâ?•

â??Modelsâ?? assumptions and limitations must be appraised openly and honestly. Process and ethics matter as much as intellectual prowessâ?•

â??Mathematical models are a great way to explore questions. They are also a dangerous way to assert answers. Asking models for certainty or consensus is more a sign of the difficulties in making controversial decisions than it is a solution, and can invite ritualistic use of quantificationâ?•

Category

1. Journal article

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