Tomorrow: even more revolutions?
or
Anticipating revolutions with help from artificial intelligence

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Businesses and investment companies constantly have to gamble on the future. But we endlessly have to anticipate the future in our private and professional lives as well. Young adults deciding what to study gamble on the usefulness of their skills in the next ten years. A family that moves to a given region, builds up a network of acquaintances and buys a house gambles on the attractiveness of the locality in terms of quality of life and economic opportunities. The key to a successful life is closely linked with our ability to imagine the future and assess the consequences of our choices.

For a long time, people just had to look at the successes and failures of their close circle to predict the future. At the start of his autobiography, Stefan Zweig describes yesterday's world – that of his textile industrialist father – as one dominated by stability: the social, economic and cultural stability of the Austro-Hungarian Empire at its height. Today's world, with its continual economic, social and political revolutions, provides a strong contrast to this nostalgic picture. In the turbulent world we now live in, doing as our parents did is more than ever a losing strategy.

Our abilities to see into the future now come up against the fallibility of intuitive judgement. An ocean of literature on behavioural economics discusses the systematic biases of economic players when forming their expectations. More recent literature based on business and consumer surveys shows that players tend to simultaneously overreact to available news while perpetuating these errors for a relatively long time, as though it would be psychologically damaging to acknowledge their mistakes. For the moment, this work is focused on economic expectations (GDP, inflation, business results) and laboratory experiments. But generally speaking, it confirms writings on economics that go back a long way and have won several Noble prizes, which state that intuitive forecasts are false because they are systematically biased. The second challenge for intuitive forecasters is the optimum use of all the information available. In the age of Big Data, there are multiple sources of information – considerably more than the human brain can assimilate: macro and sector-based public data, verbal descriptions on Internet forums, micro-commercial data from financial institutions and professional associations, etc.

To exploit this bountiful information and ensure an unbiased intuitive judgement, recent advances in the algorithmic field and the management of large databases can be brought into play. In this sphere, the finance sector is ahead of the game. Information processing has always been central to financial activities, ever since

Nathan Rothschild's carrier pigeons. In the 1980s, banks were the first to seize on developments in IT to predict customers' defaults on payments. In the 1990s, market finance saw the emergence of quantitative techniques based on the statistical predictions of stock market yields and optimised risk control. Accumulated data on merger-acquisitions, venture capital, bond trading and derivative transactions have made the fortunes of numerous investment companies and funds. In all these cases, the stakes were the same: predicting the future as objectively (without bias) and accurately (by minimising error) as possible, while, of course, remaining cognisant of the inherent imprecision of the exercise, particularly long-term forecasts – something we will come back to later.

There are countless ways of applying artificial intelligence to individual decision-making. For example, we can imagine the combined use of administrative data on wage statements, data from the French employment agency and macroeconomic trends to provide students with a forecast of wage developments for each profession in each sector. We could even assess the value of individual skills (computer programming, writing, foreign cultures and languages, statistics, medical diagnosis, public speaking and so on), to encourage students to build up skills portfolios rather than rely on initial turnkey training. In the same line, we could imagine signals forecasting living conditions, from the price of property, to labour pools or even in neighbourhoods. These forecasts could also be targeted according to the individual qualifications or objectives of the people interested.

In this type of application, man and machine do not replace but complement each other. These more effective forecasts could be based on a combination of "hard" signals, i.e. data-driven, with "soft" signals based on the intuitive judgement of informed players. Rich though they are, data do not contain all the information used by humans. An optimal predictor must thus statistically combine information that comes from data and information that comes from players in the field. For example, we could imagine calibrating a model for forecasting job offers in each sector on economic information, wage data and intuitive forecasts made by experts in employment offices and the HR departments of large companies. We could even envisage incorporating into these predictors long-term scenarios established by industrial and governmental decision-makers on the main sector trends.

While modern IT can help us anticipate the future more effectively, it can do nothing about the uncertainty of the world. On the other hand, it can help us to adapt to it. Firstly, because it places a value on the uncertainty of forecasts: moving to Lyon today is maybe a good idea on aggregate, but forecasts are perhaps so riddled with uncertainty that you might prefer the less-well "ranked" Dijon if you like Burgundy better for other, non-quantifiable reasons. Statistics make it not only possible to assess the best possible predictor given the information available, but also its limits. Intuitive judgement, in contrast, is not only biased but also poorly calibrated, as the psychologists say: generally, intuition pushes us to overestimate the reliability of our forecasts, and in this area

is a very poor counsellor. The other asset of quantitative predictions is that they enable us to anticipate turnarounds in scenarios – the moments where our initial estimates turn out to be false. Forecasting also involves adapting.