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De Kai's cross-disciplinary work in language, music, artificial intelligence and cognition centers on enabling cultures to interrelate in creative ways. As an AI professor, he is among only 17 scientists worldwide named by the Association for Computational Linguistics as a Founding ACL Fellow, for his pioneering contributions to machine translation that established cross-lingual machine learning foundations of systems like the Google/Yahoo/Microsoft translators. As a musician, he created one of Hong Kong's best known transcultural soul/pop collectives, ReOrientate, whose signature use of cross-cultural cognitive musical illusions draws from the Asian diaspora of Chinese, Indian, middle eastern, southeast Asian, and flamenco music and dance.

De Kai's PhD thesis at the University of California at Berkeley was one of the first to construct probabilistic machines that learn to understand human languages. Recruited directly from Berkeley as founding faculty of the now world-ranked Hong Kong University of Science and Technology, he co-founded HKUST's internationally funded Human Language Technology Center which has been shaping new language and music AI paradigms ever since launching the world's first web translator over twenty years ago.

Translating reality to causality

How are humans able to learn to translate — to interpret, or to re-interpret? This key scientific question in the study of cognition has been the focus of my artificial intelligence research over the past quarter century, which pioneered internet automatic language translation systems and their underlying machine learning models. When we do translation, what we are really doing is taking a representation of some situation, and reframing it into a different representation. Our ability to learn translation between different representations lies at the very center of human intelligence, and the answers to this question will utlimately form a cornerstone for any general model of strong AI.

But these cognitive representations, between which we are translating, are all ultimately metaphorically grounded in our embodied experience. What we conceive of as reality arises from representations of our sensory percepts. And to conceive of concrete processes that we observe, or abstract processes that we imagine, we rely on metaphors of our motor events — that is, on muscular forces that we exert. Because of this, our cognitive representations of temporal processes are heavily framed in terms of agency — in terms of agents who exert force to act upon other entities, thus "causing" effects. "Cause" underlies almost all that we represent cognitively. Thus, to interpret reality as we perceive it, we have an irresistible tendency to impose "causality" metaphors. We translate everything we can into terms of "causality" framings, because motor control has been hardwired by evolution into our cognition and neural architecture at so fundamental a level. Language structures thought, and our languages are built on the metaphor of causality.

While this predisposition to learn to translate all events into representations with causal agents has been one of our key evolutionary advantages, at the same time it has also created an overwhelming cognitive bias to assign credit or blame in every situation, whether real or imagined. In this talk, we consider various effects of this bias to translate all realities into causalities. The association of credit or blame naturally emerges from what frames a culture has given names to — words. Our causality bias explains the appeal of phenomena like "fake news", and in turn the rise of "fake fake news". Even as our ability to translate reality into causality metaphors has been our evolutionary advantage, a widespread understanding of this same causality bias is now rapidly becoming a necessity for survival of our civilization.