them start to land, the bird is also likely to decide in favour of landing. But when exactly do they decide to land? The model further assumes that the birds have different internal-energy reserves and when a bird is on the verge of exhausting its energy, it decides to land. To incorporate this effect, the authors have introduced an additional motivational parameter such that a bird with a lower parameter value would try to land more quickly than the others. The parameter also includes the effect of environmental stimuli like foraging patches over which the flocks fly. The exact moment of collective landing is determined through a competition between the above parameters. A strong motivation in favour of landing can be overridden by the presence of strong propensity to follow the flying neighbours. The authors have shown using computer simulations that, while in the absence of coupling, birds land only due to the individual motivations and independent of each other, and in the presence of coupling, the model results in a realistic dynamics where in spite of having a large variation in motivation, an abrupt collective landing is well possible. A further and more technical description of the model can be found in Box 2.

Bhattacharya and Vicsek[3] have combined the dynamics of collective motion and the process of collective decision-making in a single model. Applications of this model can reach well beyond the regime of animal behaviour. This model can be used to study phenomena like sudden changes in the minds of voters or consumers, emergence of panic in a crowd, sudden outbreak of epidemic or rumour, instantaneous changes of state in robotic groups – spanning fields like sociology, economics, psychology, control theory and crowd management, to name a few. We look forward to many more interesting studies that would unravel other natural or social phenomena with the help of this model.

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ACKNOWLEDGEMENT. I thank Dr Kunal Bhattacharya (Eötvös University, Hungary), Dr Anindita Bhadra (IISER, Kolkata) and Prof. Raghavendra Gadagkar (IISc, Bangalore) for their critical feedback.

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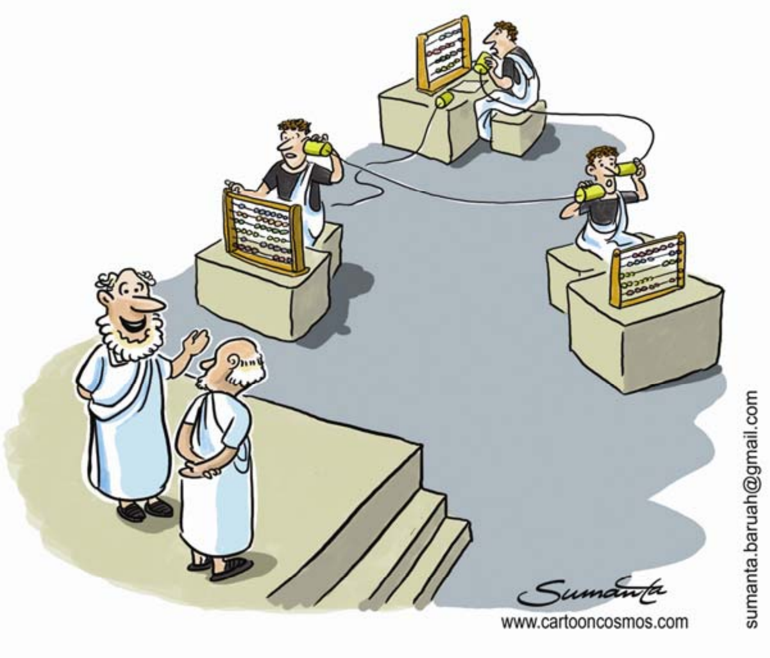
Smile with Science

By - Sumanta Baruah



"I know, one day this will be known as 'Distributed Computing'!"