Abstract: An increasing amount of mobility data is being collected every day by different means, such as mobile applications or crowd-sensing campaigns. This data is sometimes published after the application of simple anonymization techniques (e.g., putting an identifier instead of the users' names), which might lead to severe threats to the privacy of the participating users. Literature contains more sophisticated anonymization techniques, often based on adding noise to the spatial data. However, these techniques either compromise the privacy if the added noise is too little or the utility of the data if the added noise is too strong. We investigate in this paper an alternative solution, which builds on time distortion instead of spatial distortion. Specifically, our contribution lies in: (1) the introduction of the concept of time distortion to anonymize mobility datasets; (2) Promesse, a protection mechanism implementing this concept; (3) a practical study of Promesse compared to two representative spatial distortion mechanisms, namely Wait For Me, which enforces k-anonymity, and Geo-Indistinguishability, which enforces differential privacy. We evaluate our mechanism practically using three real-life datasets. Our results show that time distortion reduces the number of points of interest that can be retrieved by an adversary to under 3 %, while the introduced spatial error is almost null and the distortion introduced on the results of range queries is kept under 13 % on average.

Bio: Lionel Brunie is full professor at the National Institute of Applied Sciences (INSA) of Lyon, France, since 1998. After he received his PhD in computer science in 1992 from Joseph Fourier University, Grenoble, France, Lionel Brunie joined Ecole Normale Supérieure of Lyon, France as assistant professor. In 1999, Lionel Brunie created INSA e-learning department that he led until 2002. From 2002 to 2006, he headed the Lyon doctoral school in computer science (300+ registered PhD students). In 2003, Lionel Brunie co-founded the LIRIS lab in which he acted as deputy director in 2006-2007. In 2007, along with Pr Harald Kosch (University of Passau, Germany) and Pr Ernesto Damiani (University of Milan, Italy), Lionel Brunie created the International Doctoral College in "Multimedia Distributed and Pervasive Secure systems (MDPS)". MDPS proposes both a framework for international co-supervised PhDs and a federative research institute that develops a joint research agenda. MDPS involve ~40 researchers and PhD students. Lionel Brunie leads the LIRIS DRIM research team he founded in 2008 (10 permanent researchers and 15+ PhD students).Over the last 10 years, Lionel Brunie has been involved in 10 EU-funded projects and more than 15 bilateral and international projects. He has been invited to give lectures in Austria, Italy, USA, Germany, Tunisia, Syria and, Ethiopia. Lionel Brunie is the (co-)author of over 180 research papers; he has been member of over 70 scientific conference and workshop committees.