Everyone has their own daily rhythm of digital activity, shows study

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Over the past decade, there has been a surge of scientific studies on the digital activity of people, such as making mobile calls, texting, e-mailing, and posting on social media. Because nearly all human behavior leaves a digital footprint, scientists can use such digital activity as a proxy to track human activity in general, for example to study differences between cultures or communities in sleep patterns, work schedules, and leisure activities.

In a new study in the open-access journal *Frontiers in Physics*, researchers from Finland and Denmark use a radically new approach to study digital rhythms. In contrast to previous studies that focused on general patterns across large numbers of people, they search for pronounced, long-term differences in rhythm between individuals. They show that people tend to have their personal rhythm of digital activity—almost like a personal signature.

"Each individual follows their own distinctive and persistent daily rhythm", says Doctoral Candidate Talayeh Aledavood, who performed the research together with Jari Saramäki, Associate Professor at Aalto University, and Sune Lehmann, Associate Professor at the Technical University of Denmark.

These personal rhythms could be detected in multiple datasets, and to a similar extent for e-mail, phone calls, and text messages.

"In almost every case, the individual patterns differ strongly from the

average behavior, for example by increased calling frequency during mornings, mid-days, or evenings," says Aledavood.

What drives these individual differences is not yet clear. Geographical and cultural differences clearly play a role. The researchers believe that there could also be an effect of physiology, for example caused by the difference between morning and evening persons, or by highly individual patterns of alertness during the daylight hours.

"We see this research as a first step of the way to understanding how activity patterns and chronotype are related to other personal characteristics, such as personality or mobility behavior," says Sune Lehmann.

Aledavood et al. further show that these personal digital rhythms persist in time, meaning they are truly characteristic for each individual. This finding could also have medical applications: digital rhythms could be selectively monitored for patients with mental health problems, suggest the authors. Sudden changes in patients' digital rhythms could be a sign that medical intervention may be necessary.

"Combining this research with Big Data may also open new avenues of research in sleep studies," concludes Saramäki.

More information: Digital daily cycles of individuals, *Frontiers in Physics*, Aledavood T, Lehmann S and Saramäki J. DOI: 10.3389/fphy.2015.00073 , journal.frontiersin.org/articl … .2015.00073/abstract

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