UNIVERSITÄT OSNABRÜCK

Modelling and Analysis of Short Message Traffic in Terrestrial Mobile Communication Networks

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24. VDE/ITG Fachtagung Mobilkommunikation

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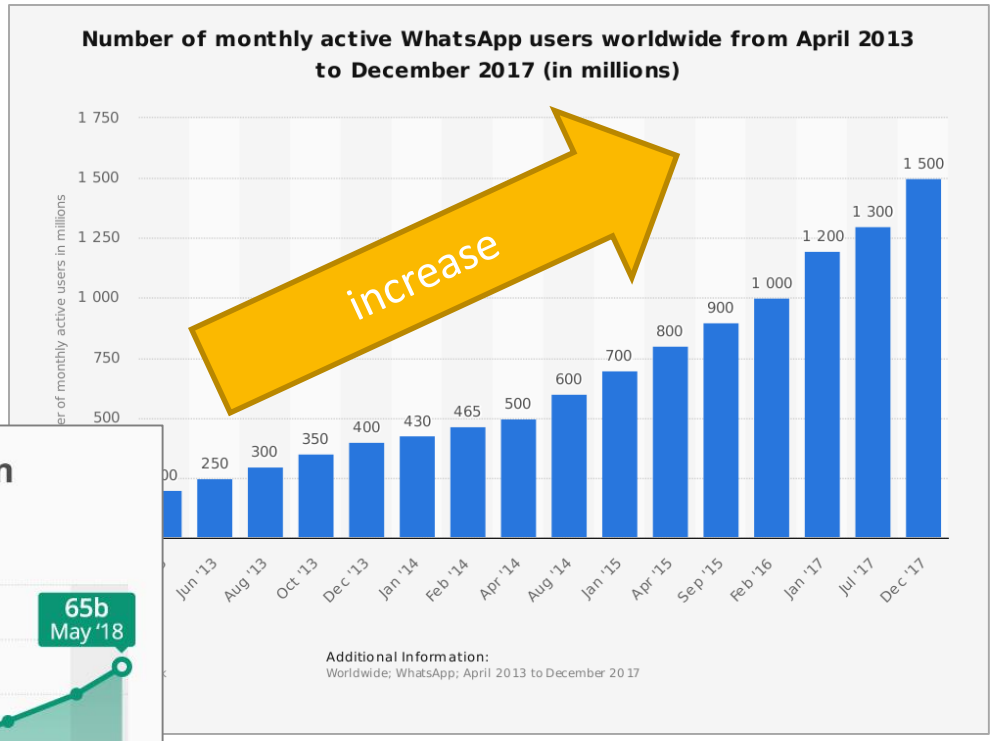
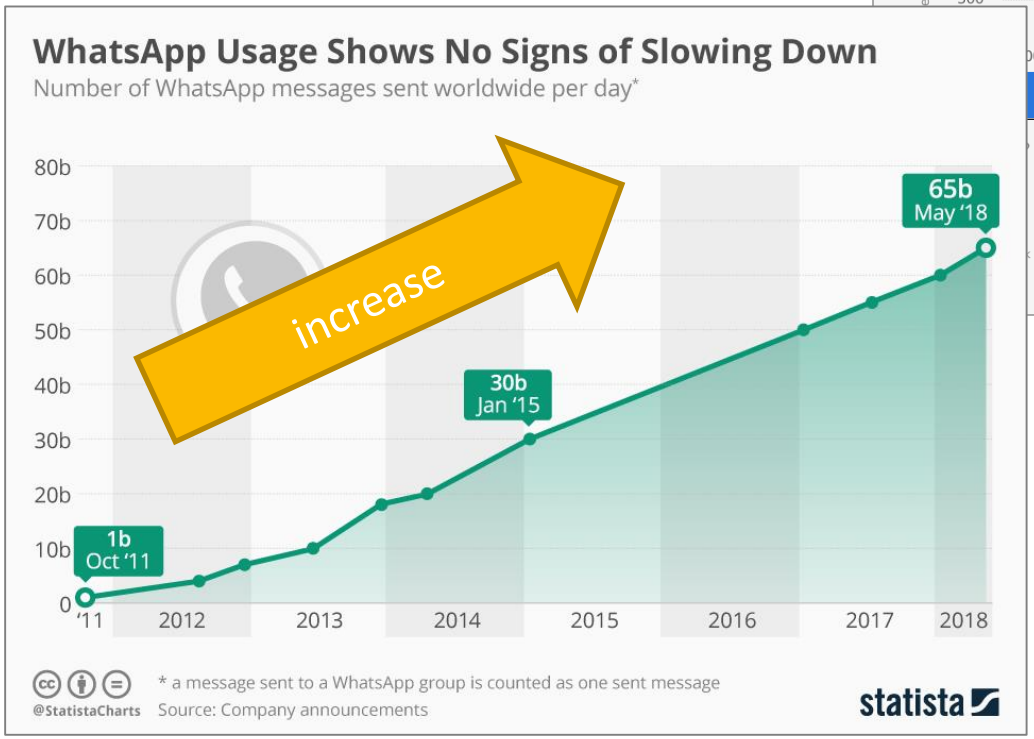
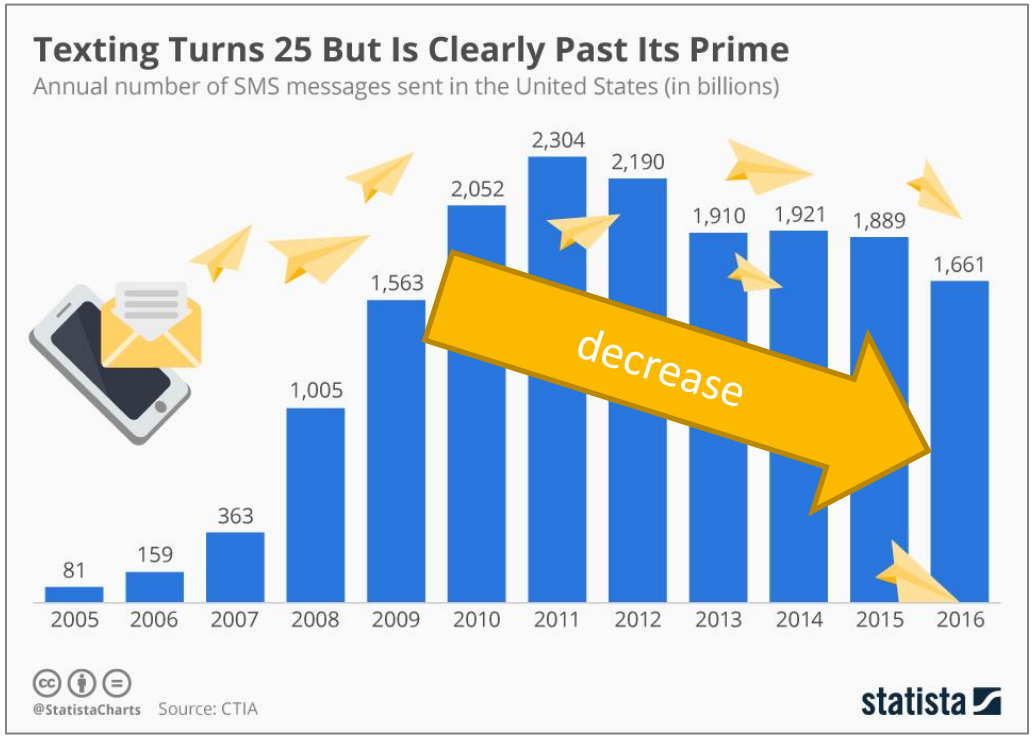
Mobile Instant Messaging (MIM) traffic





Mobile Instant Messaging (MIM) traffic

SMS traffic



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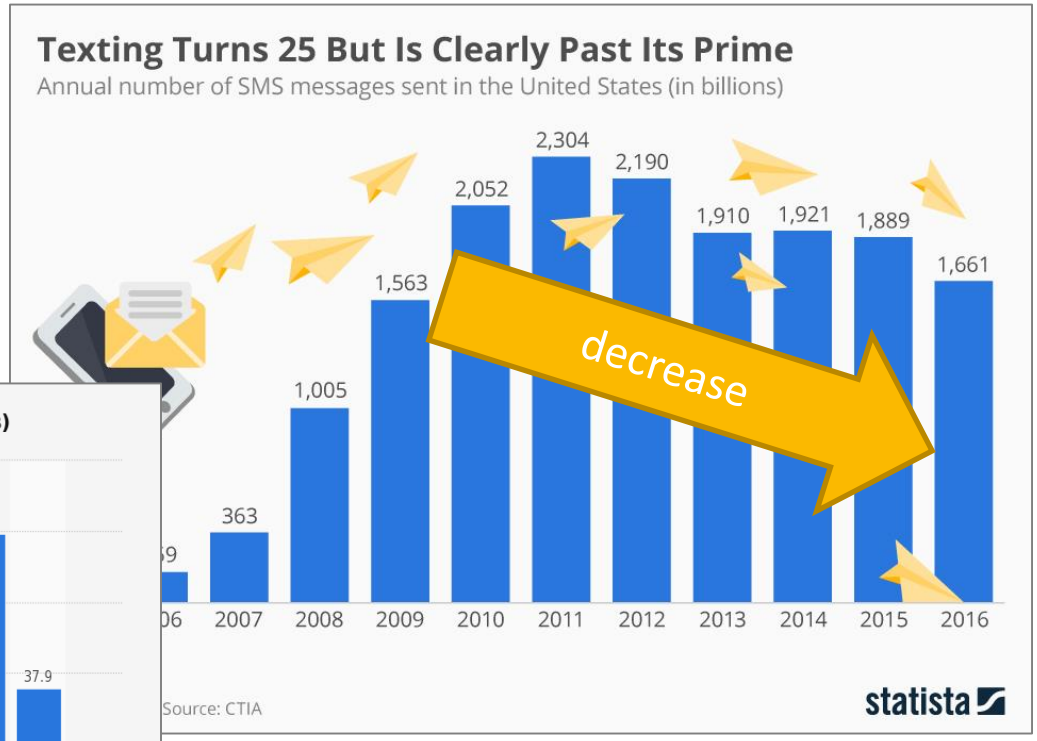

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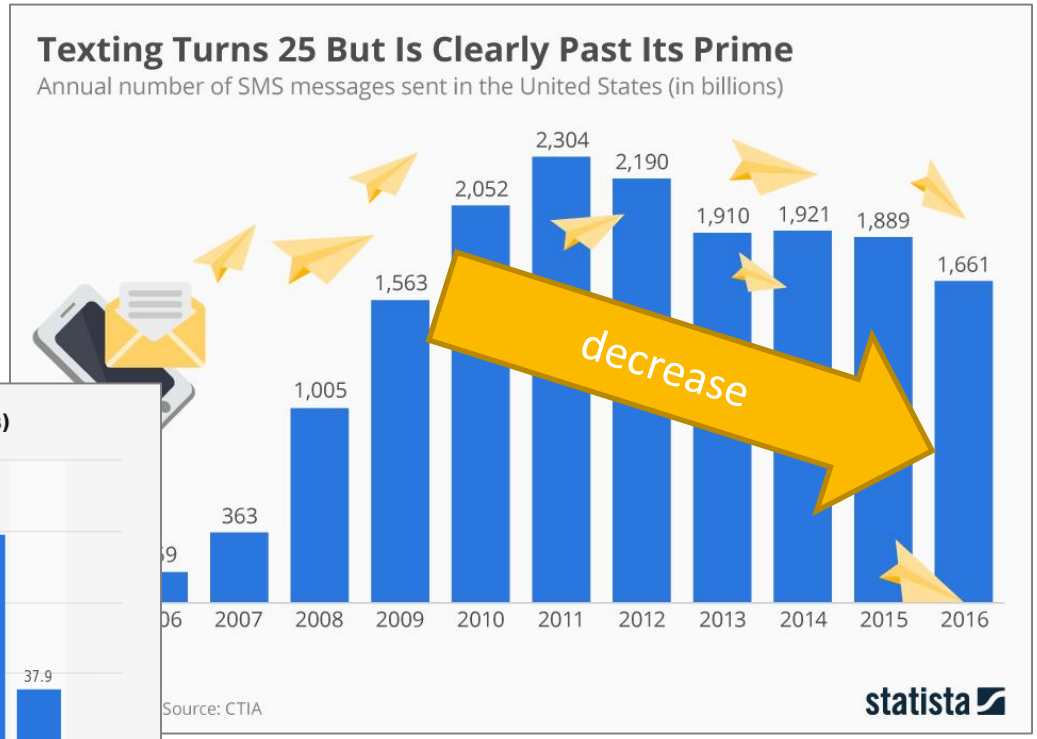

How to model MIM traffic?

Are the old models (SMS & IM) still applicable?

simulative network performance evaluation

- controllable
- repeatable
- scalable
- low-cost

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quality depends on the used models

- as simple as possible, as complex as needed
- load, mobility, etc.
- derive models from real measurements
- used for synthetic generation of load, mobility, etc.

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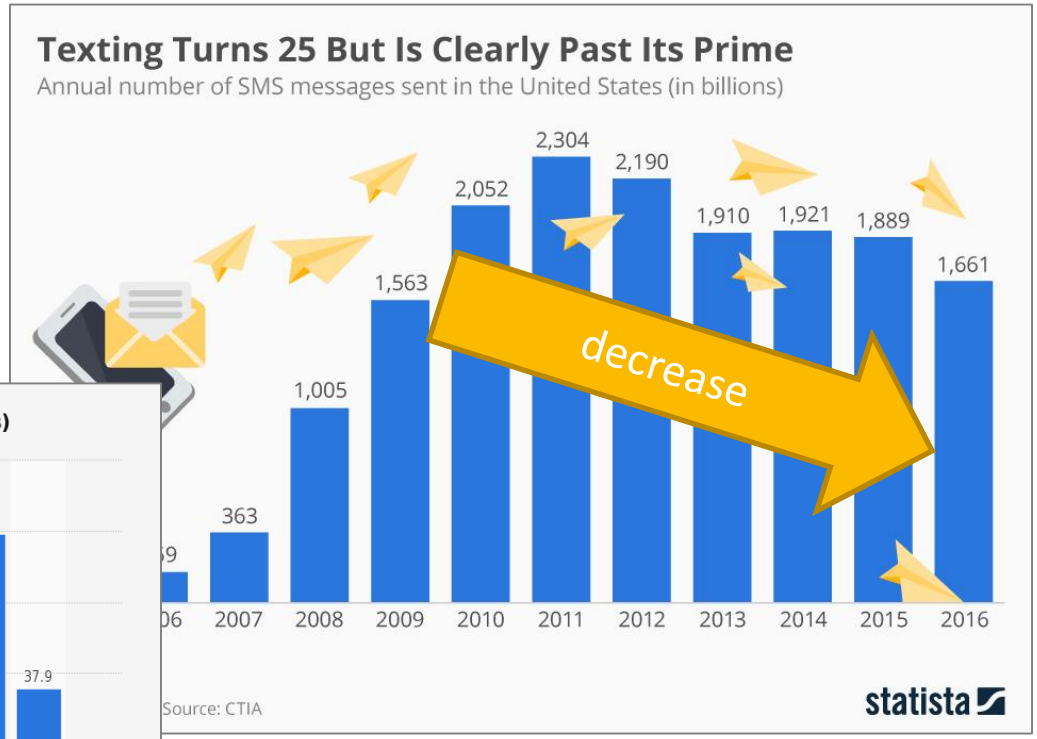
SMS traffic



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Device Analyzer (DA)[4]

- 1103 users from all over the world
- used app 01/2012 – 01/2014
- 1.7 million SMS

Mobile Data Challenge (MDC) [5, 6]

- 185 users from Lausanne Data Collection campaign
- 10/2009 – 03/2011
- >160,000 SMS

[4] D. Wagner, A. Rice and A. Beresford, "Device Analyzer: Understanding smartphone usage," in *Proc. 10th Int. Conf. Mobile and Ubiquitous Systems: Computing, Networking and Services (MobiQuitous 2013)*, 2013, pp. 1-12.
[5] N. Kiukkonen, J. Blom et. al., "Towards rich mobile phone datasets: Lausanne data collection campaign," in *Proc. ACM 7th Int. Conf. Pervasive Services (ICPS)*, 2010, pp.1-7.
[6] J. K. Laurila, D. Gatica-Perez et al., "The Mobile Data Challenge: Big Data for Mobile Computing Research," in *Proc. Workshop Nokia Mobile Data Challenge (MDC), in Conjunction with the 10th Int. Conf. Pervasive Computing*, 2012, pp. 1-8.

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other data (GPS, Bluetooth, calls, …) available, too!

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effects mediated by…

– technology used

https://commons.wikipedia.org/wiki/File:Nexus_One.png

https://commons.wikipedia.org/wiki/File:N95_Front-slide-open.jpg

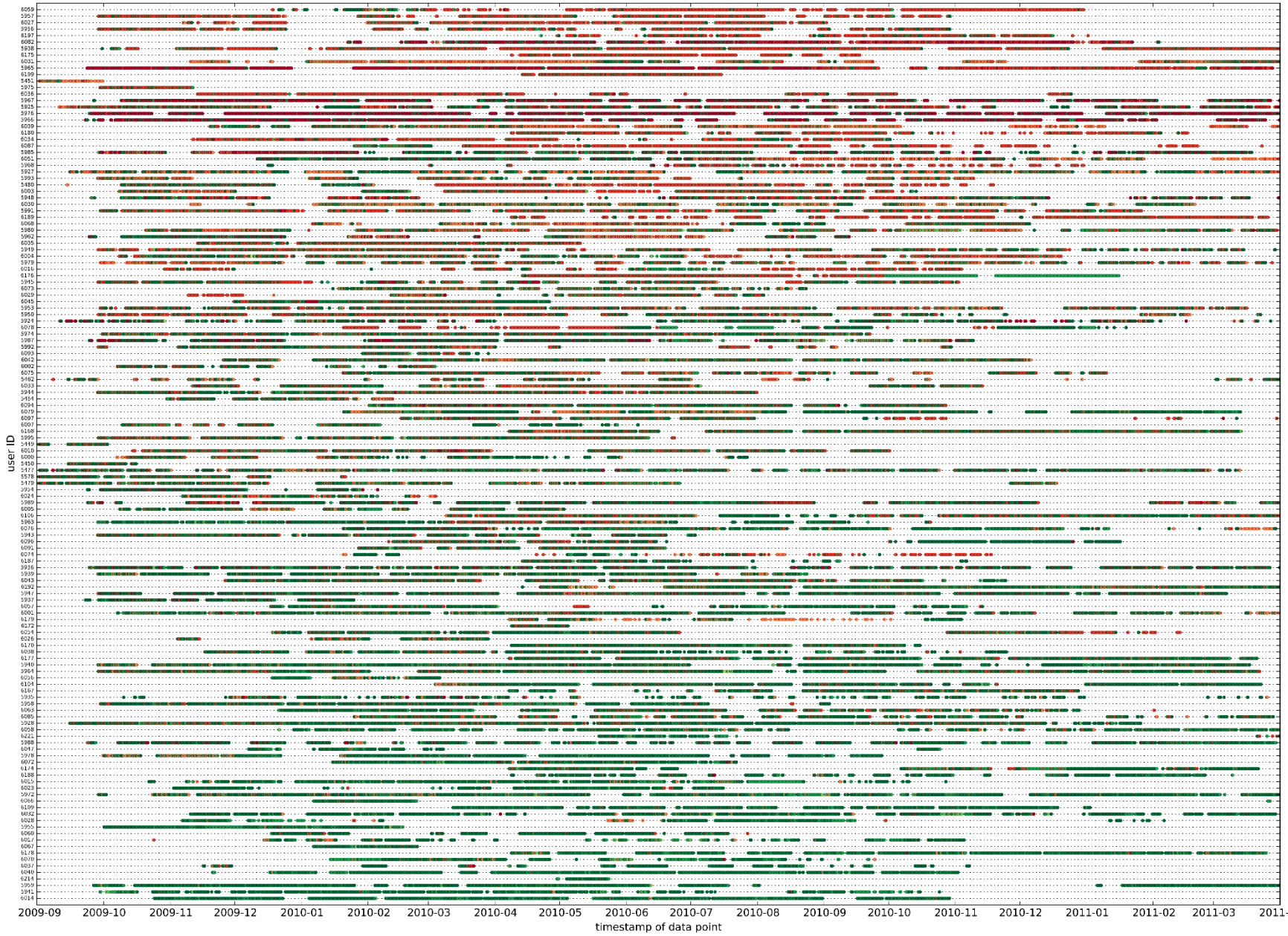
DA on Android 2.1 or higher
e.g. Nexus One

MDC used Nokia N95

effects mediated by…

- technology used
- data deletion / anonymization / …

Lessons Learned: Traces



M. Schwamborn, N. Aschenbruck, "Towards an Extensive Map-oriented Trace Basis for Human Mobility Modeling," Proc. 35th IEEE Int. Performance Computing and Communications Conf. (IPCCC '16), 2016, pp. 1-10.

effects mediated by…

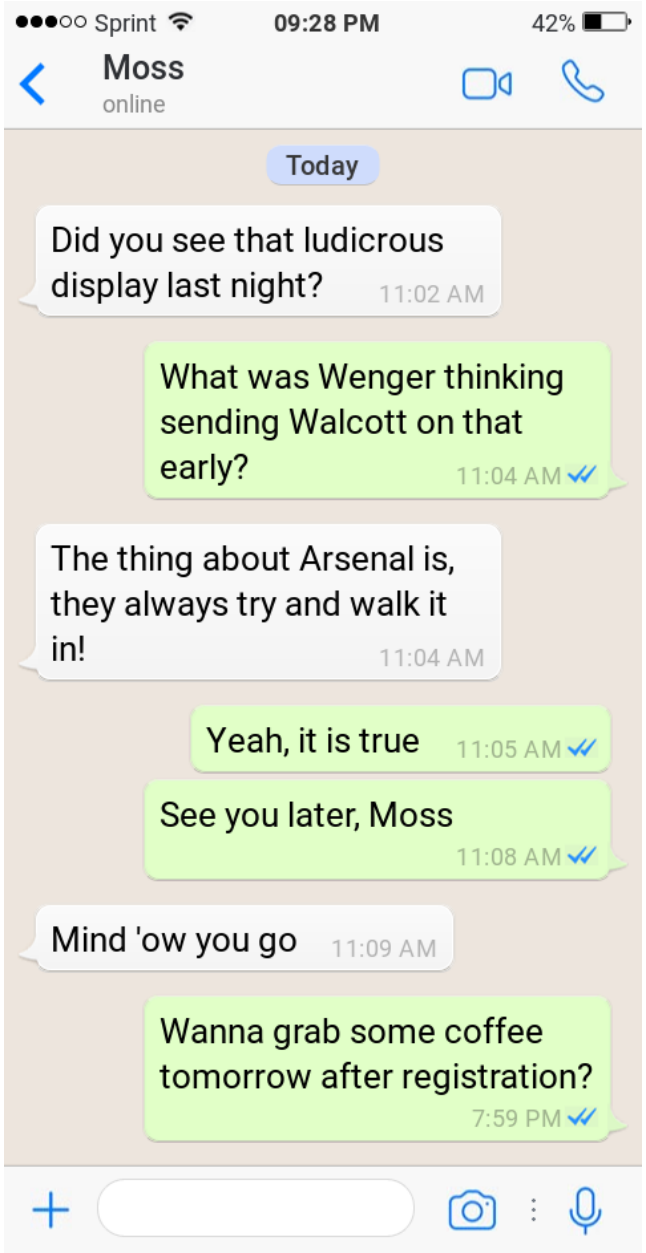
- technology used
- data deletion / anonymization / low battery / …
- incentives to use messaging / SMS (flatrates)
- …

	SMS	MIM	
authors	Zerfos et al.[1]	Li et al.[2]	Vergara et al. [3]
data collection	9 days in 04/2005	1 month, 2014	01/2011-01/2014
#participants	approx. 11 million	7 million	51
population	Indian cellular network	China Mobile subscribers	Europeans
application		WeChat / Weixin	WhatsApp

[1] P. Zerfos, X. Meng et al., "A Study of the Short Message Service of a Nationwide Cellular Network," in Proc. 6th ACM SIGCOMM Conf. Internet Measurement (IMC '06), 2006, pp. 263-268.
[2] R. Li, Z. Zhao et al., "Understanding the traffic nature of mobile instantaneous messaging in cellular networks: A revisiting to α-stable models," Access, IEEE, vol.3, pp.1416-1422, 2015.
[3] E. J. Vergara, S. Anderson and S. Nadjim-Tehrani, „When Mice Consume Like Elephants: Instant Messaging Applications," in Proc. 5th Int. Conf. Future Energy Systems (e-Energy ,14), 2014, pp. 97-107.

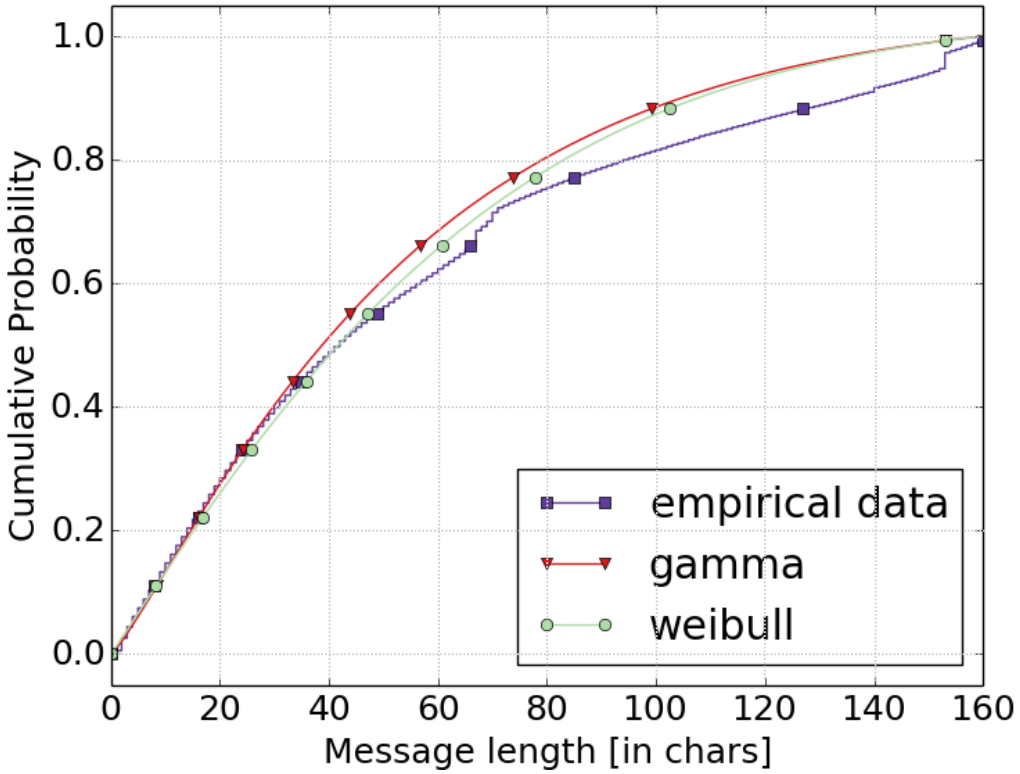
- message length
- message IAT
- thread IAT
- #messages per thread

thread = messages between 2 users that are not more than 10 minutes apart



our findings:

- avg. length: 55 chars
- 75% ≤ 79 chars
- only half of the available message size utilized



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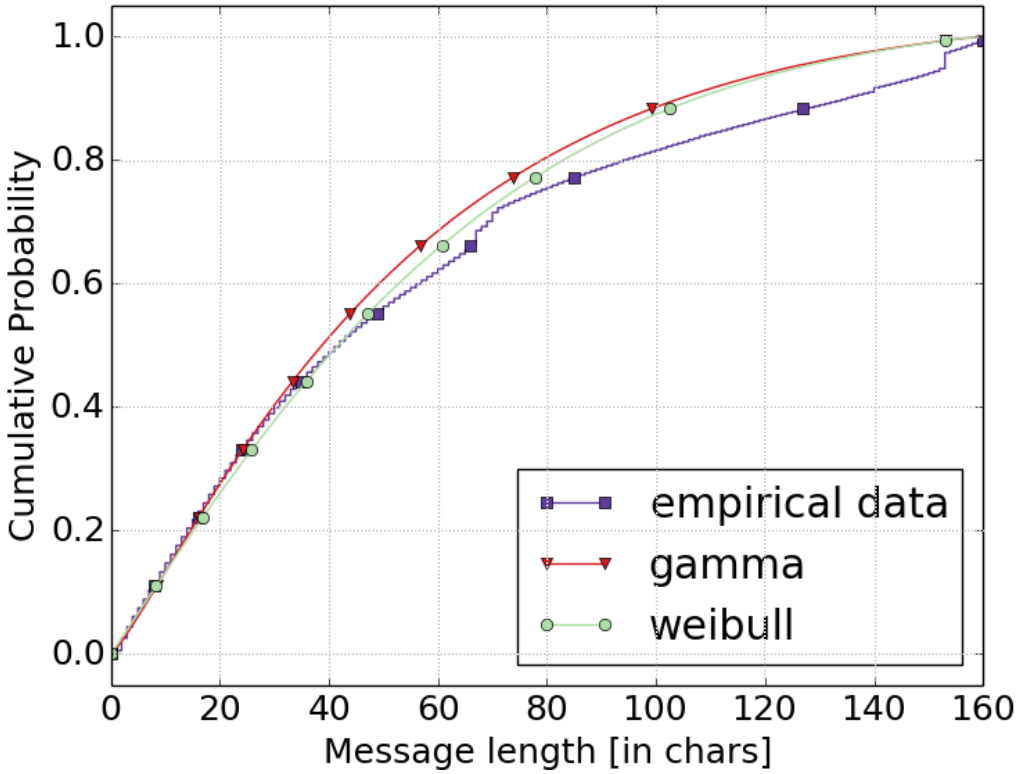
related work:

- *Zerfos et al.:*
  SMS evenly distributed
- *Li et al.:*
  MIM heavy-tailed
- *Vergara et al.:*
  avg. MIM length: 26 chars,
  83% < 40 chars



SMS & MIM closely related nowadays

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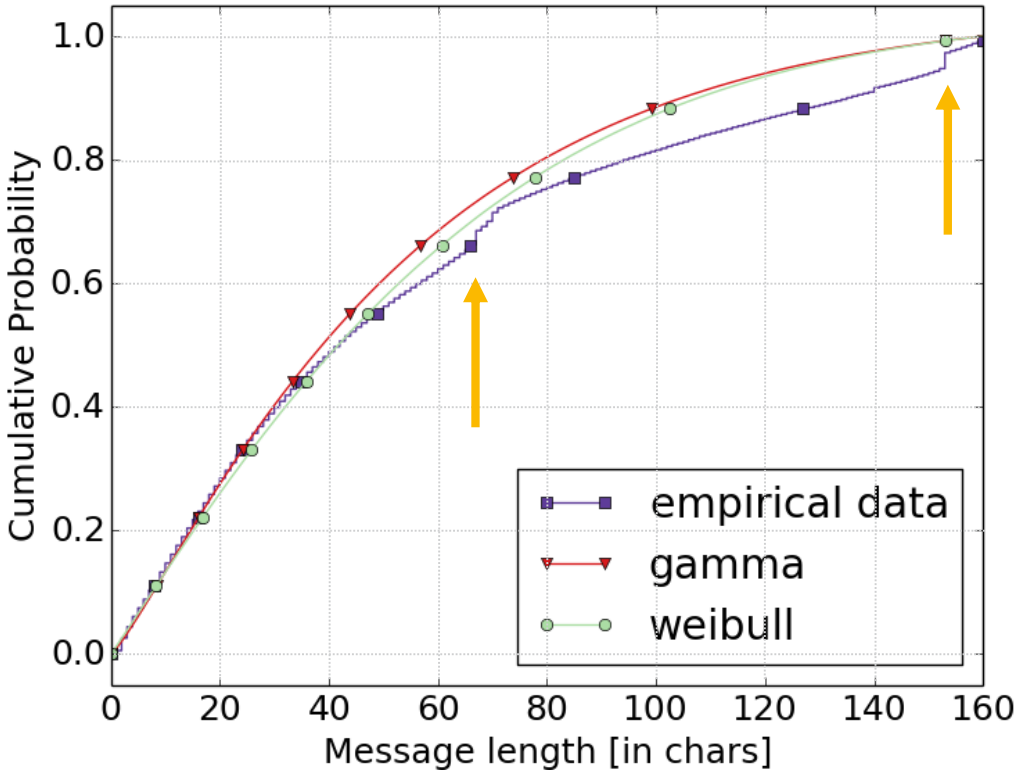

SMS & MIM closely related nowadays

comparing data sets is not straight forward!

- mind the context of each study

SMS usage has slightly shifted

- steady thread & message IAT
- decreased number of messages per thread
- message length shortened

future:

- acquire large-scale SMS & MIM trace for direct comparison

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