

Position Paper: Measuring the Impact of Alphabet and Culture on Graphical Passwords

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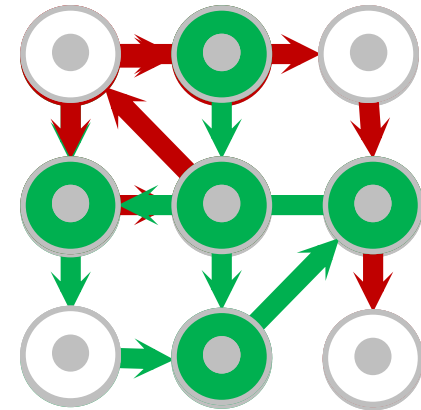
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WAY Workshop 2016

Graphical passwords

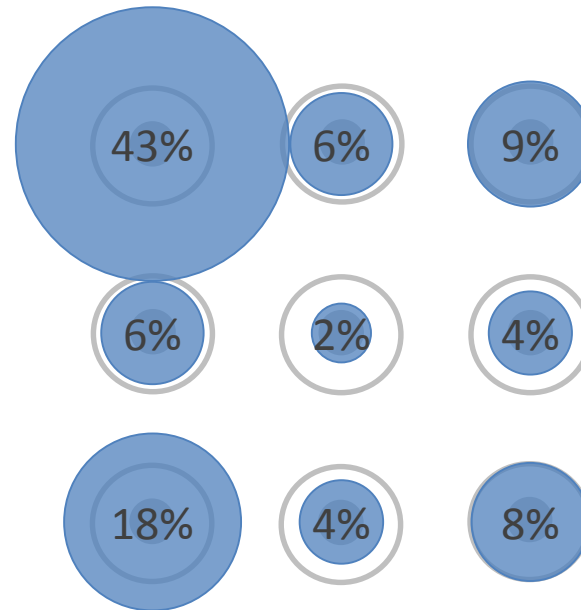
Android unlock patterns

- Graphical information is easier to remember and easier to enter on touchscreens
- Android uses a restricted Pass-Go scheme
- Probably one of the most studied graphical authentication schemes



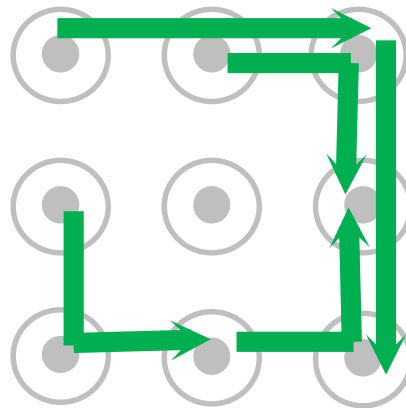
Frequent starting points

[Uellenbeck et al. CCS 2013]



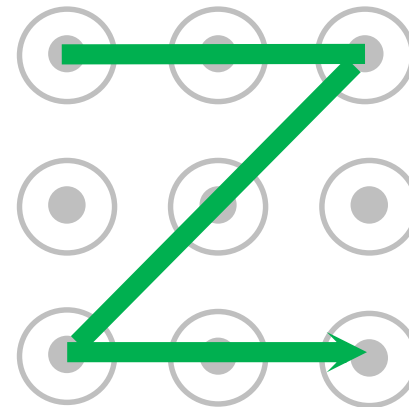
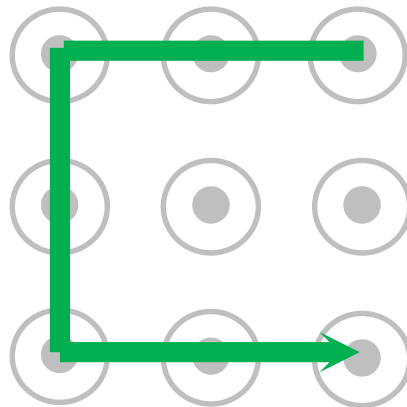
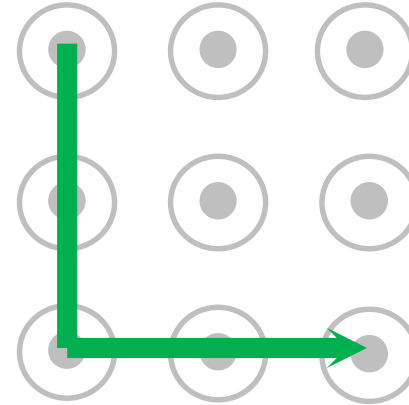
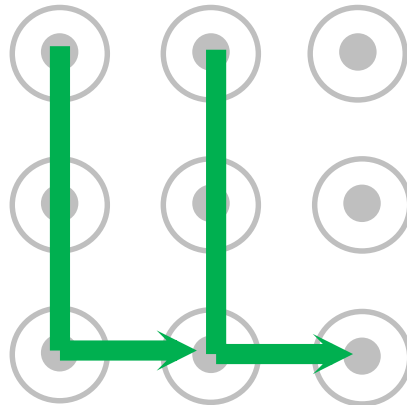
Frequent 3-grams

[Uellenbeck et al. CCS 2013]



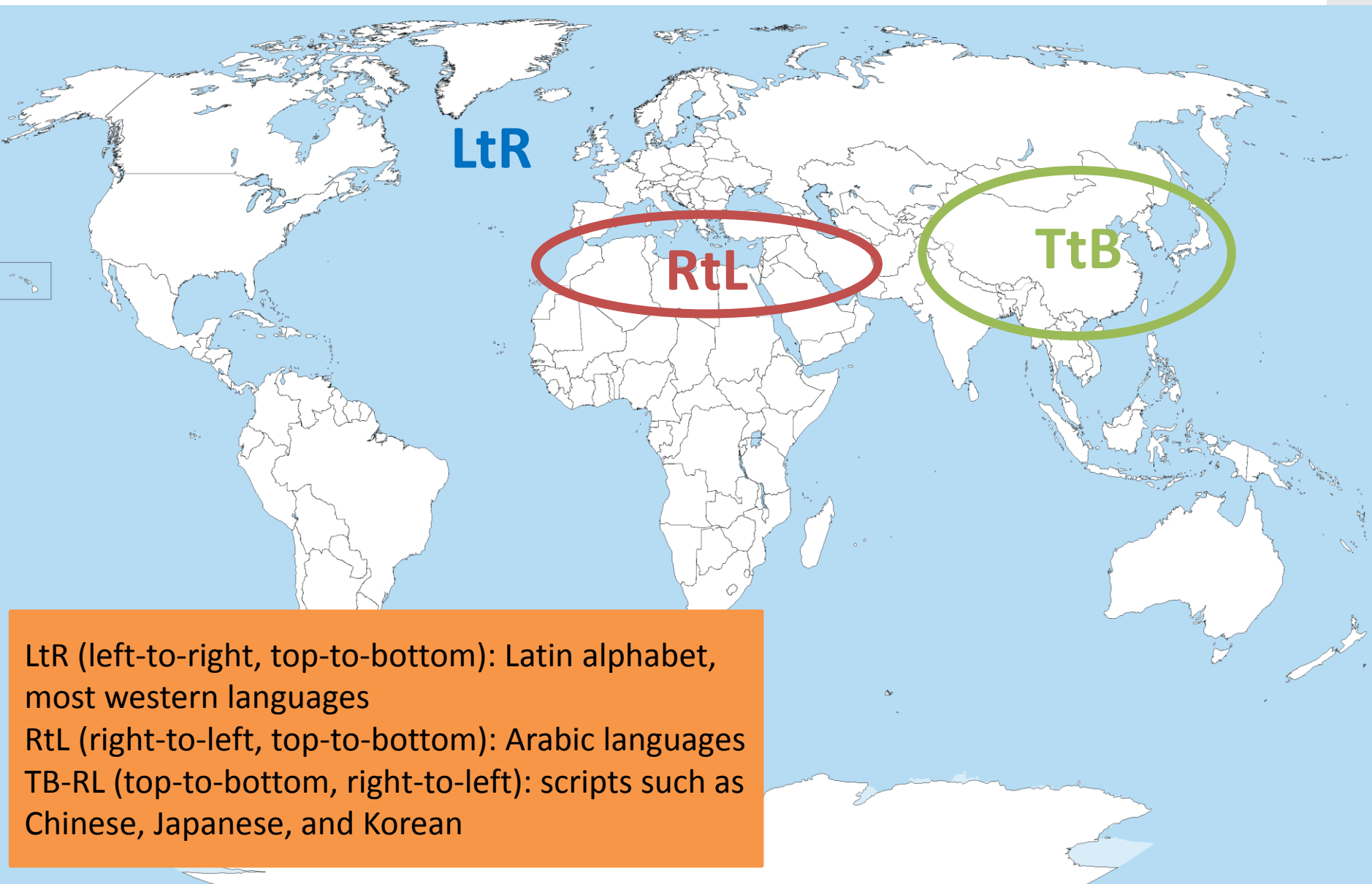
Frequent “letters”

[Uellenbeck et al. CCS 2013]



- Android Patterns
 - Influenced by
 - gender, handedness, locale [Aviv et al.]
 - experience in IT security, gender, age [Loge et al.]
- PassFaces
 - Influenced by gender and race
- Text passwords
 - Influenced by language, ...

Influencing factors: Directionality of writing systems



LtR (left-to-right, top-to-bottom): Latin alphabet, most western languages

RtL (right-to-left, top-to-bottom): Arabic languages

TtB (top-to-bottom, right-to-left): scripts such as Chinese, Japanese, and Korean

Influencing factors: Language

	English	French	German	Turkish	Polish	Icelandic
c	2.78%	3.26%	2.73%	1.46%	3.90%	0
h	6.09%	0.74%	4.58%	1.21%	1.02%	1.87%
k	0.77%	0.05%	1.42%	5.68%	2.75%	3.31%
q	0.10%	1.36%	0.02%	0	0	0
w	2.36%	0.07%	1.92%	0	5.81%	0
y	1.97%	0.13%	0.04%	3.34%	3.21%	0.90%
z	0.07%	0.33%	1.13%	1.50%	4.85%	0

Influencing factor: Culture



- Language spoken
- Bilinguality
- Alphabet
- Writing direction
- “Culture”

effect on

- password features
- pattern strength within group
- pattern strength globally
- possibilities to improve password choice

- Vast space of questions
 - Some are (relatively) obviously
 - Some are (almost certainly) very hard
- E.g.:
 - Starting point based on writing direction
 - “Letters used” based on alphabet
 - What is the influence on other graphical password schemes? (Emojis?)
 - What other aspects of “cultural background” may influence user choice?
 - How does cultural background influence affect password meters?
 - ...how we can help a user with other security-related tasks?

- Recruitment
 - how to sample a comparable and representable set of participants from different cultural backgrounds?
 - we need comparable samples from a diverse cultural backgrounds
 - preferably also samples that are representative for the entire population (using mobile devices)
 - Mechanical Turk unsuited (?)
 - students

- Translation
 - rather technical language

Brief Announcement...



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passwords2016.rub.de**

THANK YOU