Privacy Issues in Mobile Health Applications
Assessment of Current Android Health Apps
Introduction: About AV-TEST

- Tests of security products regarding their protection performance
  - Anti-Virus software
  - Soft-/Hardware
  - Cloud Services
- Certification and awarding of outstanding products
Ubiquitous Mobile Applications

- 1.4 billion mobile devices in 2015 (Gartner)
  - 82.8% Android
  - 13.9% iOS
- Diverse app landscape
  - Communication
  - Information and Entertainment
  - Organization and Productivity
  - …
Use device sensors and user inputs for health-related functions

- E.g. Calorie counting
  - Eating habits (ingested food, restaurant visits, food allergies)
- E.g. Fitness tracking
  - Movement patterns, fitness habits, whereabouts
- General
  - Personal information (identity, insurance …)
  - Bodily functions (heart rate, blood pressure …)
  - Emotional states (stress rate, mood …)
  - Movement (position, velocity, altitude …)
The value of user information
Legal requirements

- **Formalities**
  - Validity conditions
  - Contact information

- **Clear information about**
  - Moment of collection
  - Extent
  - Purpose
  - Storage conditions
  - Retention periods

Applicability:
- company seat or data processing entities in Germany
- Seat outside EEA, collection of data of German citizens
Sample set

- Original set [Knackmuss, 2017]
  - 60 popular mobile apps from the Google Play Store
  - 12 sub-domains
    - Support and reminders
    - Explanation and revision of diagnoses
    - Search for medical information
    - Search and comparison of medical institutions
    - Risk monitoring (allergies, diabetes etc.)
    - Fitness tracking
    - Calorie tracking
    - Recipes
    - Contraception/Fertility tracking
    - Baby diaries
    - Sleep tracking
    - Stress handling, mental health

- Adaptation
  - 2 applications became unavailable between evaluation steps
Results: Formal requirements

- **Availability of Privacy Statement**
  - 55% offer such a link (but only 38% are actually correct)
  - 72% after extended (and benevolent) search (42/58)
    - 33% refer explicitly to mobile application (19/58)

- **Accessibility**
  - 90% in German (38/42)

- **Validity**
  - 35% include validity date (15/42)

- **Contact information**
  - 28/42 email address
  - 17/42 postal address
  - 10/42 explicit contact person
  - 7/42 phone number

- **Types of Manufacturers**
  - Generic app developer (20/48)
  - Health-related company (17/48)
  - Explicit medical business (10/48)
  - University (1/48)
Results: Collected User Information

- **Personal information**
  - Name (21) and email address (22)
  - Phone number (12), fax number (3/42)
  - Home address (14)
  - Gender, age and birth date (7/42)

- **Health insurance**
  - Plus patient ID (Weiße Liste)
  - Plus symptoms (Jameda Ärztesuche)
  - Professional diploma (DocCheck)
Results: Collected Device Information

- **Device data**
  - Device ID (9/42), compared to 17/42 in permissions
  - GPS (8/42), compared to 21/42 in permissions
  - IP address (26/42)
  - MAC address, SIM number, system logs

- **User behaviour**
  - Application (8/42)
  - Newsletter/Emails (4/42)

- **Chefkoch-App**
  - Online clickstreams

- **MyDays X**
  - Installed applications, shopping behavior

- **Adidas Fitness**
  - Contact histories, product ratings, loyalty programs, in-app acquisitions
  - Linking to offline behavioral profiles
Results: Data storage, retention, processing

- Generic statement about data security (22/42)

- Storage
  - Limited information about retention (9/42)
  - Hardly any clear information about locations

- Processing/sharing
  - External storage of user data (6/42)
  - External processing (12/42)
  - Company group/partners (5/42)
  - Company transactions (6/42)

- Tracking
  - 52 different trackers named overall

- **FoodScanner/EasyRecipes**
  - Combine collected information with other sources
Conclusion

- Desirable communication
  - accessible
  - complete
  - comprehensible

- Notable examples
  - Position data
    - Health Information
    - Diary/logging apps (food, cycle, sleep, symptoms)
    - Relaxation
  - Combination of data sources
    - Adidas, FoodScanner, EasyRecipes, MyDaysX
  - Sharing with pharmaceutical/other users
    - CatchMyPain Symptom Diary
  - Vague formulations
    - “Context data” – FDDB Calorie Counter
Thank you for your attention!

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