Goal

- Present an attack that recognizes what's the user's input on an Android smartphone’s touch screen by only using the sensors data, which can be collected easily without any permissions.
- Show that sensor data should be considered as a kind of user privacy as well. Hope this attack can arouse vendors’ attention to importance of data privacy.

Motivations and Objectives

- **Motivations**
  - Many APPs have access to sensor data nowadays.
  - High risk of data privacy leakage

- **Objectives**
  - Implement an APP disguised as a health&fitness APP to collect sensor data at the background
  - Train and use the CNN model to analyze the sensor data to infer the user’s input
  - Arouse the public’s attention to the serious of data privacy

Research Challenges

- The movements between two touches are small and quick.
- The sampling rate might be limited because background APP has lower priority.
- Too much useless sensor data, hard to find out whether it is a touch on the screen or not.
- How to choose the features to train the CNN model

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Methodology

- Write an APP to collect the training data
- Machine learning based on TensorFlow
- CNN architecture: Input->Conv->Conv->Pool->Conv->Conv->Pool->Fully Connected->Fully Connected->Output->Argmax or Softmax
- Final model deployed on APP and AWS server

Results

The second figure indicates that we can infer user's input from the sensor data. Although the accuracy is only 60%, the result shows a considerable correlation to the real input. We successfully prove that the sensor data should be considered as a kind of user privacy, which is a more important thing.

References