Genomics Development Library

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Background

▶ Genomics continue to provide useful personal information

- ▶ Growing number of consumers, lowering cost

- ▶ Disease risk, ancestry, drug response etc.

- ▶ Many apps are developed, for serious clinical or entertainment purposes

The APIs

- SMART Genomics API
  - Developed by Tom Chen last year at PRIMES
  - Imports data from 23andme, illumina etc.
  - Clinical standard
- 23andme API
  - API built by start-up company 23andme
  - Results and analysis of sequenced genome

Current API is Limited to Web Only

- OAUTH authentication requires many url manipulations, designed for web-based apps only
- Apps are not available to smart phones
- Library aims to make fast development available in mobile platform

Background in OAUTH API

Difficult to
achieve in
mobile

User
Authorization

Obtain
access token

Access user
data with token
attached

Implementation (SMART)

- Client end implementation of SMART
  - Authentication
  - access and parsing of user information
  - Currently includes user profile, disease risk, entire genome and specific SNP genotypes
- Suitable for clinical apps

Implementation (23andme)

▶ Basic Information

　　▶ SNP genotypes

　　▶ Whole genome sequence

▶ Genome Analysis

　　▶ Disease risks in percentage

Implementation Cont.

- ▶ Database Storage
  - ▶ Uses Android native SQL
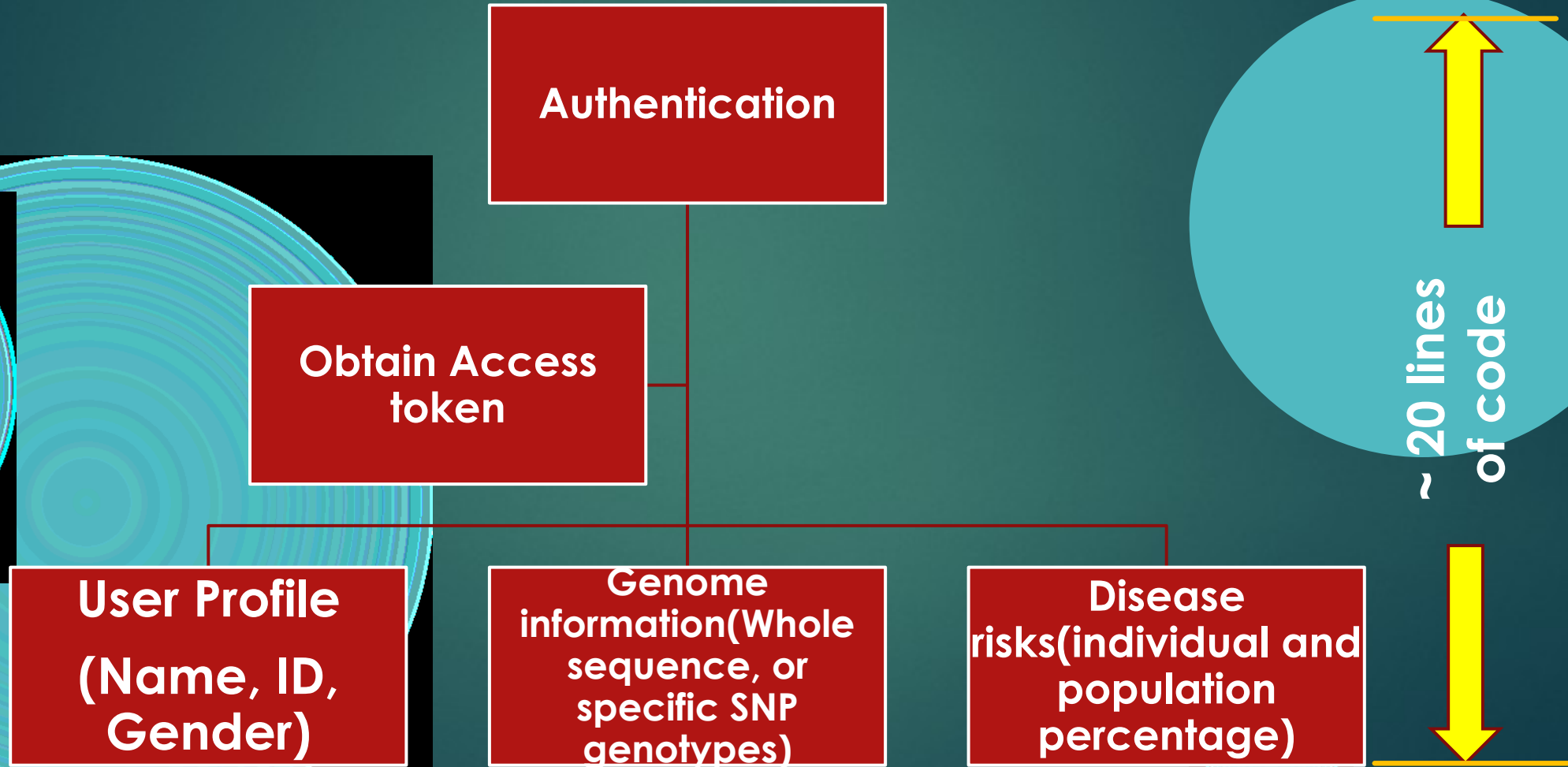 - ▶ Store and retrieve any data
- ▶ Data display methods
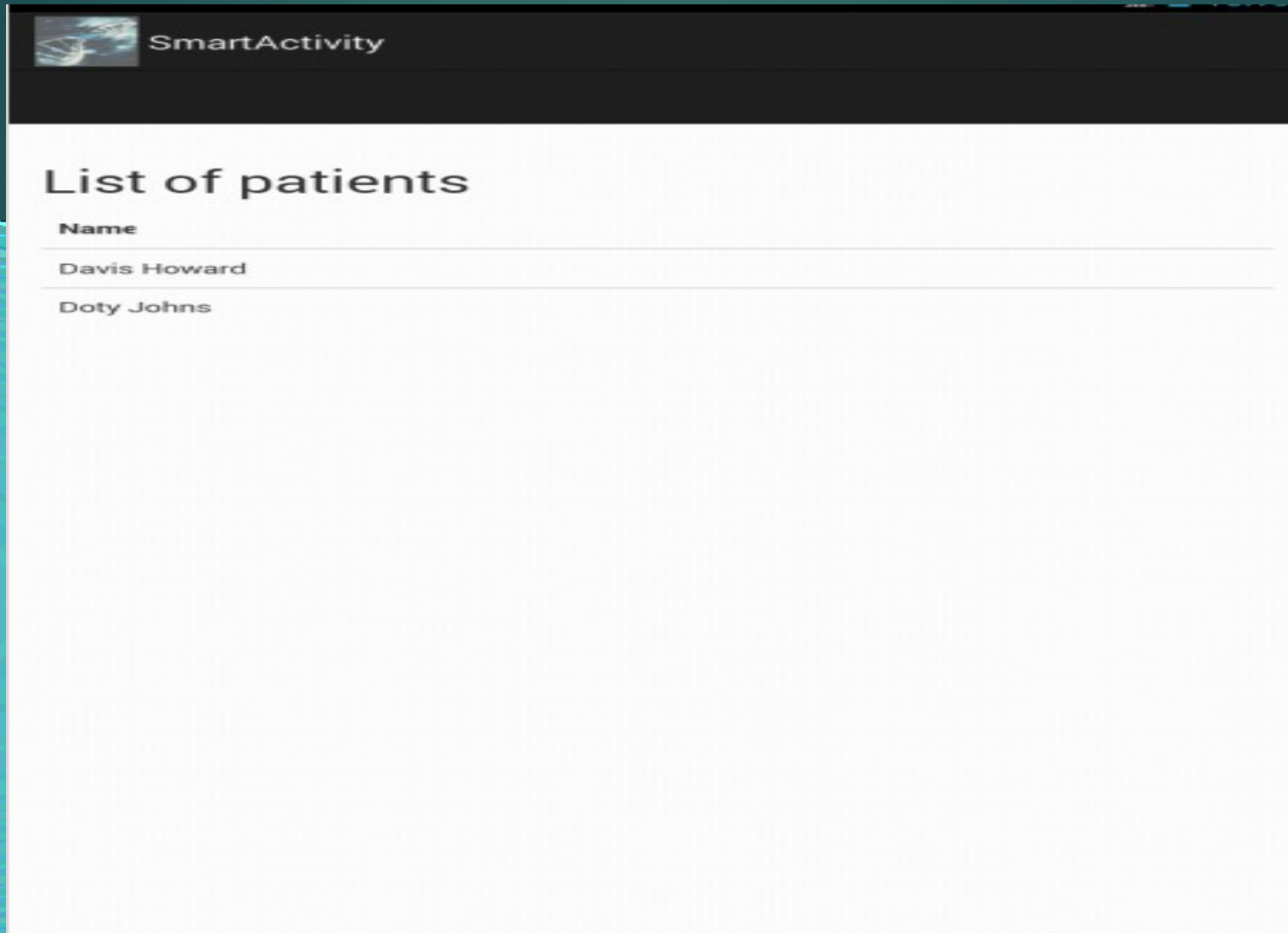 - ▶ List display with graphics

Standalone Java Version

- ► Built for the general Java language
- ► HTTP requests + parsing JSON
- ► No database storage or anything Android platform-specific

Development Flow

Authentication

Obtain Access token

User Profile (Name, ID, Gender)

Genome information(Whole sequence, or specific SNP genotypes)

Disease risks(individual and population percentage)

~20 lines of code

App Demo(GeneMusic in App Store)

SmartActivity

List of patients

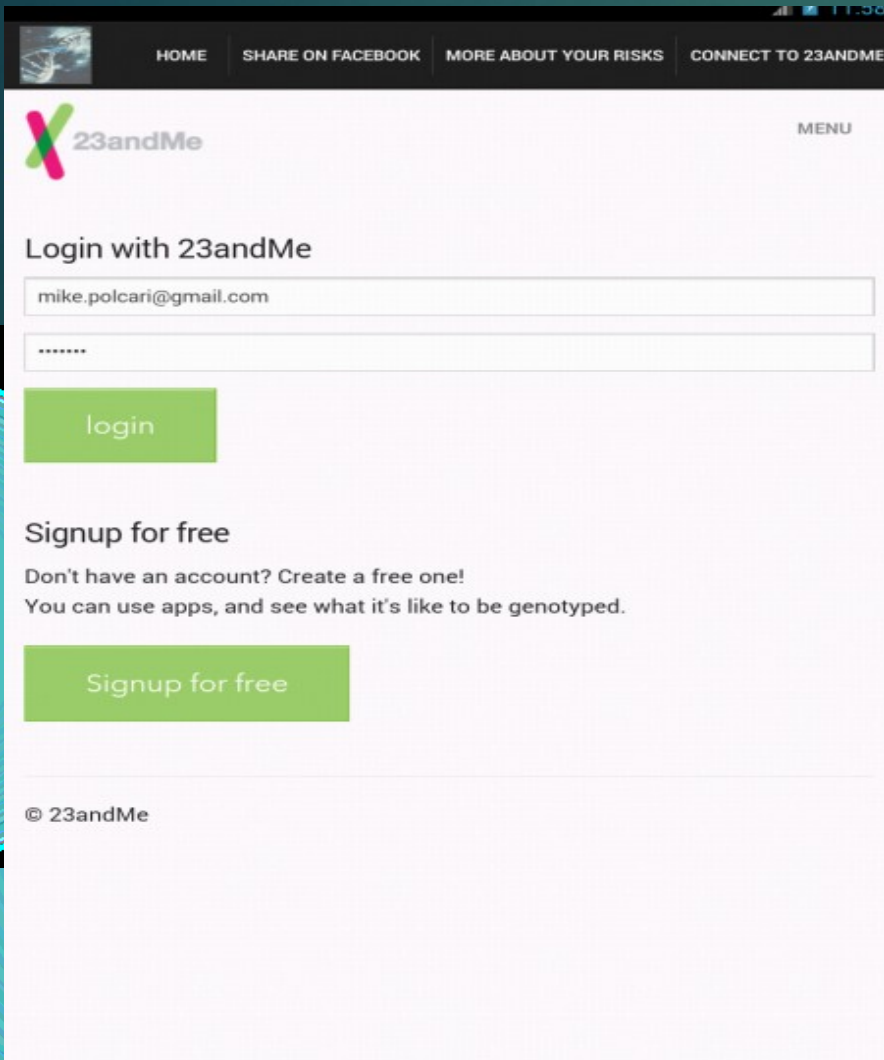| Name |
| --- |
| Davis Howard |
| Doty Johns |

100+ downloads

Music Indication of Disease Risk(Clip)

High risk=dissonant, Low risk=consonant

App Demo Cont.

Summary

- Enabled fast development for Android
- Version cut out for Java language
- Android app developed using the library, 100+ downloads

Future Plans

- Implement all features of API
- Wider release for as a SMART standard
- Methods to communicate data in interesting ways(generation of MIDI music etc.)
- Deploy HTML Documentations

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