Smartphone App Concept for Medical Applications.

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Abstract

The market for smartphone based medical applications is a relatively new and growing quickly. The majority of medical apps are relatively simple health management and tracking applications that might remind a user to take his or her medicine or monitor blood pressure and heart rate data provided by accompanying devices. However, more sophisticated apps can directly provide diagnostic information by capturing and analysing data directly. Several apps exist that can asses the risk of skin cancer by tracking changes in the growth of skin lesions over time.

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3.1 Data Gathering

3.1.1 Gathering Data from the Apple iTunes Store

Searching the Apple iTunes store is typically done manually via the iTunes Application from which text and data cannot be automatically extracted. Therefore, searching for and gathering data about IOS Applications is not easy. However, Apple does provide an rss feed that can be used to list Apps in specific categories and ordered according to how new, or how popular they are and if they are free or not. The rss feed is limited to 100 items per category. The data provided by the rss feed is minimal, not much more than title and a text description of the app. There are no sub-genres or tags than can be used to further differentiate the apps.

Using a python script data was gathered from the following rss feeds:

Top 100 Free Medical Apps Top 100 Grossing Medical Apps Top 100 Paid Medical Apps This combined results included data about 255 IOS apps. The title and description fields were imported into a database. Other information from the data such as price, right, or image link were ignored.

3.1.2 Gathering App Data from the Google Play Store

In order to gather data from the Goole app store a script was programmed that could extract lists of apps from a specific url. The following urls were scanned:

- Top Paid Medical Apps : https://play.google.com/store/apps/category/MEDICAL/collection/topselling_paid

- Top Free Medical Apps : https://play.google.com/store/apps/category/MEDICAL/collection/topselling_free

For each app listed the script would extract the url of the app's detail page. From the detail page more imformation would be gathered and stored in a database. The data set is similar to that of the itunes rss feed. The title and description text were imported, other fields such as pricing and copyright were ignored.

Data on 480 Medical Apps for Android was imported. However a significant percentage of the apps could not be classified because the description text was in a language other than English, German, or French.

3.2   Categorization

The term "Medical App" is broad and neither the iTunes nor Google app stores offer any kind of sub categorization. In order to get a better overview of what sort of Medical Apps are available it was necessary to manually browse the gathered data and assign categories to the apps.

A database management tool was created using the python based Django Web Framework. Django provides many tools that makes constructing and interacting with databases very easy. The built-in backend administration tool can be configured to browse, edit, and filter data.

In order to quickly browse through and categorize over 700 apps. The Django backend admin was configured so apps could be categorized one after the other with a minimum of clicks or scrolling. The user was presented a list of uncategorized apps. The first one is clicked. The user is then presented with a page displaying the title and summary text of the app and a field from which a category can be selected. Once saved, the app is no longer presented on the list, the user can select the next app at the top of the list.

3.2.1   Description of Categories

- **Community** - provides some soft of social networking service through which the user can share data with her family or with a network of people suffering from similar disorders.

- **Fun / Entertainment** - These apps have to real medical purpose. They are for enjoyment only.

- **Alert / First Response** - Apps that assist first responders or that help users alert first responders that help is needed.

- **Health / Lifestyle** - Relaxation and meditation apps, or ovulation and fertility reminders

- **Resource Finder** - Apps that locate resources in the vicinitly, nearby pharmacies or care providers.

- **Reminder** - Apps with timer or calendar functionality that might remind a user of an appointment or manage medince consumption.

- **Algorithmic / Diagnostic** - These are apps that provide some sort of diagnositc information based on data that as been gathered by sensors or entered by the user. Examples are seizure detection apps, or stroke severity evalutaion apps.

- **Learning / Educational / Reference** - By far the largest category, this includes apps that provide reference information about diseases or education material like anatomy apps for example.

- **Organisational** - Apps in this category might help a user or practitioner organise, share or track data and documents. Examples are apps that help users track the status of their blood pressure or blood sugar levels, create health diaries, or manage clinical data and images.
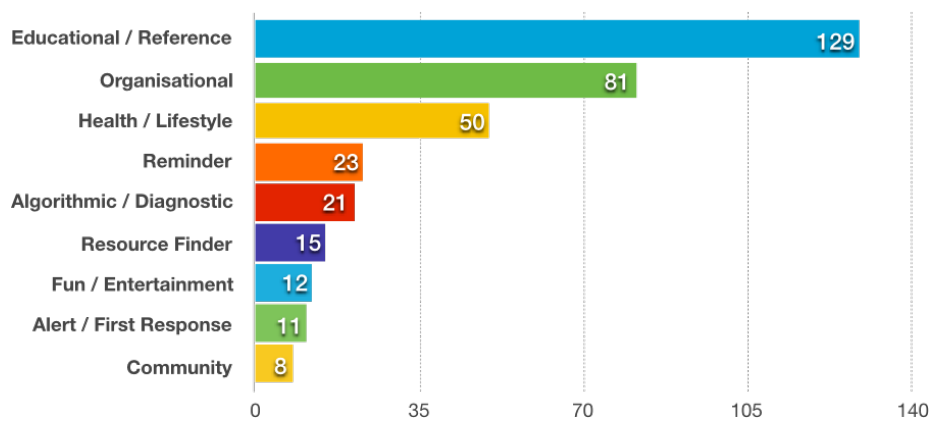
3.3 Results

3.3.1 IOS Medical Apps

Figure 3.1: Medical Apps on the iTunes Apple Store, Search conducted on 17.05.2016

Chapter 4

Image Data Sources

4.1 Section Title

Chapter 5

Image Feature Extraction

5.1   Section Title

Bibliography

Chapter 6

Appendix

Chapter 7

Notes

7.1 Notes

Research the medical app market:
itunes store search api:

- official api :
  https://affiliate.itunes.apple.com/resources/documentation/itunes-store-web-service-search-api/
  limited to 200 results, no posibility to get next 200.

- python wrapper
  https://github.com/ocelma/python-itunes
  too limited, better to use the python "requests" library
  still depends on official api so same limitations

- rss feed with additional filters : https://rss.itunes.apple.com/us/?urlDesc=%2Fgenerator
  can filter free or paid applications, can rank by user feedback and gross

android seach api:

- no official api

- unofficial : https://github.com/egirault/googleplay-api
  hackey, pretends to be an android device

FDA (U.S. Food and Drug Administration) Mobile Medical App Submissions

- API : https://open.fda.gov/device/510k/ example : https://api.fda.gov/device/510k.json?limit=20&search=tumor%2

- reference : https://open.fda.gov/device/510k/reference/
  API is useable but might have too much information (not just for mobile apps).
  I need to reasearch if there are adequate filtering possibilities to narrow down
  results