

PicFeel: merging geolocation pictures and emotions

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Abstract

Sentiment analysis enables us to identify and extract subjective information of certain resources. With this aim, it is often used language processing techniques, textual analysis or computational linguistics. However, this process is quite expensive in terms of computational cost and the results obtained so far are relatively difficult to obtain or understand or even impossible to detect such as irony in textual analysis.

In this work, we aimed at obtaining this information directly from the users. Specifically, we created a mobile app that allows us to take a picture and select the emotion it causes to the user, and then we automatically located it, allowing us to create a worldmap of emotions.

Keywords: sentiment analysis, emotions, geolocation, geocoding services, mobile apps

1 Introduction

Smart cities make use of information technologies to improve performance and quality of urban services, to decrease costs and to optimize resources, besides to involve citizens actively [1]. Among the different areas developed in such a context, we focus on sentiment analysis.

Sentiment analysis is the field where sentiments, evaluations, opinions and emotions from written language are analysed. It is a very active research area in natural language processing and is also widely used in data mining. The importance of sentiment analysis grows in parallel to the social media. Nowadays, it is possible to analyse a huge volume of opinionated digital data recorded in a digital support.

Sentiment analysis processes are being applied in many businesses because opinions are key to almost all human activities and are influencers of our behaviours. Our beliefs and perceptions of reality, and the choices we make, are largely conditioned on how others see and evaluate the world. For this reason, when we need to make a decision we often seek out the opinions of others. This is true not only for individuals but also for organizations [2].

In this work, we propose a different focus on sentiment analysis. Instead of analyse social streams and such a volume of information, we created an application [3] where users are able to inform about their emotions by using pictures and geolocation. In this manner, we can create a worldmap of emotions.

Nowadays, access to data sensors is progressively being adapted to different standards with a clear objective: to bring them interoperability and visibility. In this context, the growth of volunteered geographic information (VGI) as sensor data providers is an assertive method of collecting geospatial information, and it seems difficult to force the use of strict standards in this kind of data workflow. This free source of data through the efforts of volunteers is growing and

becoming a very important base to build applications that exploit such data. Our work takes advantage of this new manner of collecting and distributing information by using a particular VGI environment.

Therefore, we combined three key aspects: sensors, mobile platforms and spatial proximity operations. We published and made use of a web 2.0 network of emotions data, where content is user-generated and user-collected and exposed as available information for the virtual community. Management of this type of information from a mobile application could result in an important decision tool as it enables us to provide user with emotions-related data according to his context and geographical location. Therefore, we implemented a native mobile application which allows us to perform geospatial queries based on user location offering, at the same time, access to all data provided by the emotions data sensor network created within a VGI context.

In our work, we propose an alternative for such a type of sentiment data processing; we take advantage of the information provided by users, including emotions and location.

Moreover, the fact of creating actionable information and usable applications from data sensors, in our case VGI, offers valuable insights by exposing and exploiting the geographic dimension of that data using maps as a visualization tool to non-gis users. This application [3] is open and visible to all of those users through a platform of distribution for mobile platforms.

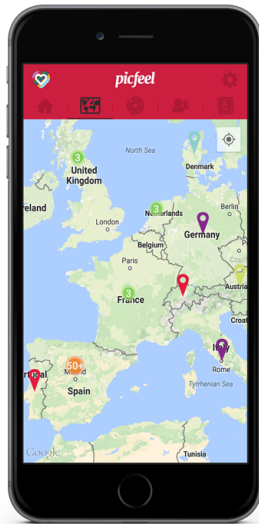
2 Results

From an implementation point of view, we took advantage of different technologies and libraries. In the client side (the mobile app), we developed an app for iOS (iPhone and iPad) and for Android. To support clustering, we created a new clustering method for the map visualization. We also took advantage of ArcGIS online by using webmaps and

implemented our RESTful web services for a better interoperability. Moreover, pictures and emotions have been located exactly by using the GPS sensor, or approximately by IP, which required a series of services to locate the devices.

In Figure 1, we can observe the clustering system implemented, where we defined a well-known distance criterion to group emotions.

Figure 1: World map of emotions focused on a particular extent.



In Figure 2, sentiment data provided from users are shown in an animated stream. It shows the emotion, the picture and the country where it was felt.

Finally, Figure 3 represents a heatmap where we can see the places in the world where more people share their emotions.

Figure 2: Sentiment stream from the app.

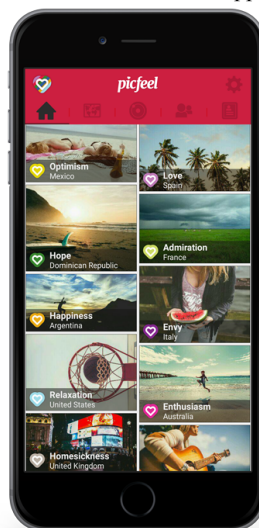
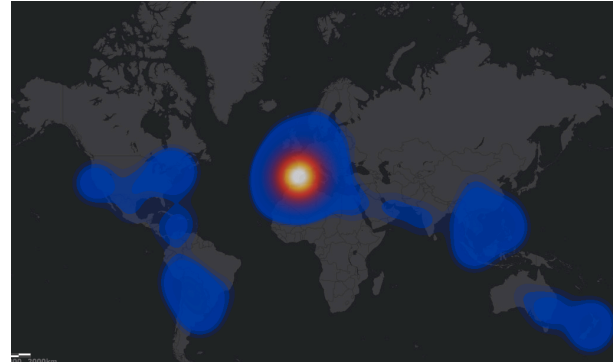


Figure 3: World map of emotions represented as a realtime heatmap.



3 Conclusions and Future Work

In this work, we successfully combined different components: users as data sensors (VGI), mobile platforms and spatial proximity operations. As a result, we obtained a mobile application [3], which allows us to operate in a reliable manner with data from a sentiment data sensor network, taking advantage of the geospatial information as well.

This application is on its first stage, and next steps include the creation of an API to involve more users and explore others uses as well as analyze how the geolocated emotions are bound to the weather, a sport event and so forth.

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