

## Literature review.

Lameira et al. (2011) propose an application for real time object recognition without the use of a server. Even though this paper does not completely ignore the value of a server, the aim is to limit the use of the server to a maximum and to rely on the computations power of the mobile device. This decision is based on the fact that mobile device, nowadays, are improved, have increased computational power and are, thus, able to perform complex computations within a reasonable amount of time. This approach limits the use of a server to a storage facility for the data and allows for the application to perform as independent and as fast as possible<sup>1</sup>.

Amlacher et al. (2008) demonstrate in their paper “geo-indexed object recognition from experimental tracks and image captures in an urban scenario, extracting object hypotheses in the local context from both (i) mobile image based appearance and (ii) GPS based positioning”. This paper also proposes to use of geo-indexed verification to determine whether or not the assumptions, based on extracted object hypotheses conceptualized from text, made by our application are accurate. The results from the demonstration by Amlacher et al. (2008) provide us with a basis assumption to use geo-indexed data to improve the accuracy and coverage of our application. An accuracy of 92% in detecting local features in objects and in recognizing object in general is desirable. By using geo-indexed verification the application will be able to restore images, which contain parts of the Coat of Arms, from memory and combine them into a complete image of a Coat of Arms. This approach will provide the application with an extra device to achieve the highest possible accuracy for the detection and recognition of Coat of Arms.

The client-side tracker as proposed by Gammeter et al. (2010) in ‘Server-side object recognition and client-side object tracking for mobile augmented reality’ is a valuable device, which we will use to memorize the position of an object even when out of screen, using visual and sensor based cues. This client-side tracker is necessary because the user will be guided towards an object to be recognized. Gammeter et al. do not use GPS information for object recognition and tracking. This paper, on the other hand, will use GPS information for the verification of the results presented by the application and, combined with the compass on the mobile device, as a device to guide the user in to the desired direction. The use of the GPS and Compass information will provide the application with a more robust base to guide the user towards the object and to co-operate with the object recognition algorithm to achieve the highest accuracy in detecting and recognizing of a Coat of Arms.

Finally, as described in the introduction, this paper proposes the use of HOG features (Dalal et al. 2005) combined with SIFT (Lowe, 1999) to detect and recognize Coat of Arms in locale architecture. The combination of these algorithms is based on the fact that SIFT uses local contrasts to differentiate between features of selected points. This means that for our images we will achieve poor results in detection, because the images in our database do not contain sufficient local contrasts. However, with the use of HOG features it is possible to overcome this weakness and to collect a collection of unique points based on their edge orientation.

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<sup>1</sup> Independent in the sense that the application is not dependent of an internet-connection to connect with the server, once the data is stored, and as fast as possible in the sense that the computation does not depend on an external source, but is almost completely self-sufficient.