



# A Robust Visual Object Tracking Approach On a Mobile Phone

[Link to publication record in Manchester Research Explorer](#)

## Citation for published version (APA):

Mohammed, A., Morris, D., Goos, G. (Ed.), Hartmanis, J. (Ed.), & van Leeuwen, J. (Ed.) (2014). A Robust Visual Object Tracking Approach On a Mobile Phone. In *host publication* Springer Nature.

## Published in:

host publication

## Citing this paper

Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

## General rights

Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

## Takedown policy

If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [<http://man.ac.uk/04Y6Bo>] or contact [uml.scholarlycommunications@manchester.ac.uk](mailto:uml.scholarlycommunications@manchester.ac.uk) providing relevant details, so we can investigate your claim.



# A Robust Visual Object Tracking Approach on a Mobile Device

Abdulmalik Danlami Mohammed<sup>1</sup>, Tim Morris<sup>2</sup>

<sup>1-2</sup> School of Computer Science, University of Manchester, Manchester, UK

<sup>1</sup>[Abdulmalik.mohammed@postgrad.man.ac.uk](mailto:Abdulmalik.mohammed@postgrad.man.ac.uk)

<sup>2</sup>[tim.morris@manchester.ac.uk](mailto:tim.morris@manchester.ac.uk)

## Abstract:

In this paper, we present an approach for tracking an object in video captured on a mobile device. We use a colour-based approach. The performance of many of these approaches degrades due to lighting changes and occlusion. To address the issue of lightning changes, our approach makes use of colour histogram that is generated by accumulating histograms derived from target objects imaged under different conditions. A CAMShift tracking algorithm is applied to the back-projected image to track the target object.

We have tested our approach by tracking an Emergency Exit sign and the results obtained show that the tracking is robust against lightning changes.

Keywords: CAMShift Algorithm, Histogram Backprojection, Colour Space

## 1 Introduction

Object tracking is an important task that is required in many high-level computer vision applications. It is concerned with estimating the trajectory of an object in a given scene [1]. Recent advances in mobile phones technology, in particular, the low-cost, high-resolution camera, has opened a new research direction in object tracking technique.

Object Tracking algorithm have been use in applications such as face and head tracking, video surveillance system, human-computer-interaction, traffic monitoring system, document retrieval system[1].

Many tracking approaches utilise features such as colours, edges and textures to model the object to track. The choice of feature to use for tracking depends largely on how robust it is against challenges such as lighting changes, blurring due to camera motion and occlusion; they are robust to different challenges. Many implementations will therefore use a combination of features that collectively address most, or all of these issues. However, this will involve additional computation to the tracking system which may prevent real-time tracking from being achieved in devices with low processing power.

Most Visual objects contain colour combinations that make them distinct from the surrounding environment. For example, a standard exit sign in the UK is a green rectangular object with some or all of a schematic running man, an open door, an arrow and possibly the word "EXIT". The arrow and running man give an indication of the direction to be taken in the event of emergency. Hence, colour information should be helpful to detect and track sign.

