Teaching computers to understand images by
detecting visual concepts

Title of the dissertation
From pixels to semantics: visual concept detection and its applications
Från pixlar till semantik: detektion av visuella koncept samt tillämpningar

Contents of the dissertation
The amount of digital visual information available today is enormous and the rate of
growth is staggering: YouTube receives 100 hours of new video every minute and
more than 350 million photos are posted to Facebook every day! This is valuable
data as it represents the creativity and knowledge of billions of people, but how do
we find the "needle" relevant to us in this enormous "haystack" of information?
Search engines such as Google and Bing are good at finding textual content, but
finding relevant visual content is still an unsolved problem.

This thesis studies one approach to this problem, called visual concept detection, in
which complex computer models are trained to detect concrete objects, locations or
events based on the raw pixel data. Such detectors are used as stepping stones
across the semantic gap between human and machine intelligence. The thesis also
contains several real-world applications, such as finding images using social
network tags and visualisation of huge video databases.

Field of the dissertation
Computer and Information Science

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notice board in Konemiehentie 2 and at Otakaari 1, Espoo at the latest 10 days prior to public defence.