**MAKERERE UNIVERSITY**

COLLEGE OF COMPUTING AND INFORMATION SCIENCES

DEPARTMENT OF NETWORKS

BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING (YEAR 2)

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CONCEPT PAPER FOR:

**MULTI SALIENT OBJECT ANALYSIS PROJECT**

**SUPERVISOR: NOAH KANGE**

**GROUP 13**

**PROJECT MEMBERS**

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| --- | --- | --- |
| **NAME** | **REG No.** | **STD No.** |
| MARGARET NASSIWA NJOGEDDE | 16/U/10024/PS | 216002556 |
| TIMOTHY MASIKO | 16/U/6880/PS | 216004877 |
| JASON KIGOZI | 16/U/5972/EVE | 216013047 |
| ANTHONY ISINGOMA MBAHE | 16/U/7002/PS | 216013407 |

**Introduction**

Humans are able to detect visually distinctive (so called salient) scene regions effortlessly and rapidly (pre-attentive stage). These filtered regions are then perceived and processed in finer details for extraction of richer high-level information (attentive stage). This capability has long been studied by cognitive scientists and has recently attracted a lot of interest in the computer vision community mainly because it helps find the objects or regions that efficiently represent a scene and thus harness complex vision problems such as scene understanding.

Salient object detection has been attracting a lot of interest, and recently various heuristic computational models have been designed. We propose a multi salient object subitization model for classifying and categorizing images based on the number of salient objects they contain

**Background to the problem**

Images on multimedia and computer screens enrich our daily life. However, processing such large amount of visual information in images in a short time is a difficult task. Information in images differs in importance. An automatic and selective mechanism that answers which information is necessary to pick up from an image for further analysis can be useful and need for design. A feasible way is by the selective mechanism of human visual attention and salient detection technique with certain algorithms. Modeling human visual attention on images is referred to as saliency detection; which aims at detecting salient image parts that can easily attract human attention. which aims to highlight the most important object regions or distinctive parts in an image, has been a fundamental problem. As a key pre-processing, saliency detection has been applied to benefit various computer vision applications; including image segmentation, object detection, image retrieval, image classification, etc. Many computational models have been proposed to capture different saliency cues.

In the last decade, saliency detection has become a research field in computer vision attracting much attention. It is originally a task of predicting the eye-fixations on images, and recently has been extended to identifying a region containing the salient object.

**The problem this project will address:**

One of the fundamental challenge in salient object detection is to uniformly emphasize desired objects and ignore irrelevant background.

This project focuses on salient region/object subitization in natural images. The aim is to generate high quality saliency model that predicts the existence and number of salient objects in a scene using holistic cues.

**The main goal of this project is:**

The goal of this project is to develop a model that enhances salient object detection to maximum effectiveness

**The specific objectives this project will achieve to accomplish that goal are:**

The objectives are to train the model to:

Recognize image inputs

Differentiate between salient parts and irrelevant background parts of the image

**The anticipated outcomes resulting from this research/project are:**

The anticipated outcome of this project is a salient object subitization model that predicts the existence and number of salient objects on a scene using holistic cues.

The model will be able to categorize the images according to the number of salient objects they contain

**The methodology to be used to accomplish the above objectives are:**

**The first step** is ***feature extraction***, in which multiple low-level visual features, such as intensity, colour, orientation, texture and motion are extracted from the image at multiple scales.

**The second step** is ***saliency computation***. The saliency is computed by a centre-surroundoperation, self-information, or graph-based randomwalk using multiple features. After normalization andlinear/non-linear combination, a master map or a salientmap is computed to represent the saliency of each imagepixel. Last, a few key locations on the saliency map areidentified by winner-take-all, or inhibition-of-return, or othernon-linear operations. While these approaches have workedwell in finding a few fixation locations in both synthetic andnatural images, they have not been able to accurately detectwhere visual attention should be.

**References:**

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[2] J Hunaizu, Y. Zejian and S Li, Salient Object Detection: A Discriminative Regional

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