

Koustav Ghosal

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Interests: Tracking, Video Analysis, Action Recognition and Multimedia Retrieval and Classification

Research Project

I am pursuing MS in Computer Science from *Center for Visual Information Technology* (CVIT), IIIT Hyderabad under the guidance of *Dr. Anoop Namboodiri*. I work in sketch-based multimedia retrieval. My masters' thesis can be divided into two phases.

- (a) In the first phase, I worked with videos. After extracting robust motion trajectories, they were matched with the query sketch (of a trajectory) and the videos were retrieved using a novel multi-label boosting mechanism.
- (b) In the second phase, I tried to build a sketch-based image retrieval system. Unlike the standard approaches, instead of comparing edge-based features extracted from images with the sketches, a new solution was proposed using cluster CCA, an extended version of Canonical Correlation Analysis.

My research in the above two stages can be found in detail in the publications, mentioned in the publications section.

Current Work : Currently, I am trying to develop algorithms for retrieving objects of unknown categories, i.e those objects which the system is not trained with. We are trying to use a combination of zero shot learning and deep neural networks to address this problem.

The area of image and video analysis is quite interesting and active. Apart from retrieval and classification, it has a wide range of application areas like surveillance, traffic analysis, autonomous navigation and many more. I would like to explore some of these areas in future.

(Please visit this [link](#) for a detailed description of my current area of research.)

Other Projects

Online Handwriting Recognition

IIIT HYDERABAD

Overview

ongoing

In this project we tried to build an online handwriting recognizer for Indian languages. In India, in each script there are various handwriting styles that vary according to the region, making recognition a challenging task. However with the surge of use of handheld devices like smartphones and tablets in academia, industry and public sectors a need for a handwriting recognizer is crucial.

The objective of this project was to develop a paragraph level sentence recognizer for seven different Indian languages — Bengali, Hindi, Asameese, Punjabi, Tamil, Telugu and Malayalam. It was project funded by Department of Science and Technology, Government of India and a collaborative work of seven universities.

In IIIT Hyderabad, we worked for Malayalam language. We built a 140 class character, digits and symbol recognizer for Malayalam using ballistic features and support vector machines. The engines were developed both for windows and android. In windows, the architecture was developed in C++ in Microsoft Visual Studio Environment using open source machine learning libraries. It was later ported to Android using Android NDK.

Technologies Used

The tool is being developed using C++, Android and Python under Microsoft Visual Studio and Eclipse environment

Mentor

Dr. Anoop Namboodiri

ViShruti : A sound based navigation system for the visually challenged

IIIT HYDERABAD

Overview

Jan '13 – July '14

The project aims at building a sound based navigation system for visually challenged people. The tool will be easy to learn and portable. The work involves incorporating concepts from different areas like Auditory Perception, Art, Aesthetics and Machine Learning. It was a part of my course project for Introduction to Cognitive Science and we studied several aspects of Auditory Working Memory. We investigated the effects of using different sound parameters like pan and pitch to represent spatial dimensions for auditory scene understanding. We built a web-based application called Vishruti, which means *listening* in Sanskrit, to perform the experiments. We submitted our work in Spatial Cognition 2014 as a poster.

Technologies Used

We used Java Script and Python to develop the system.

Mentor

Dr. Priyanka Srivastava

Development of a tool for checking readability of Indian documents

IIIT KHARAGPUR

Overview

May 12 - July 12

This was a project in Natural language Processing at Communication Empowerment Laboratory, Indian Institute Of Technology, Kharagpur. The task was to build a web based application to check the readability of documents in Indian Languages based on the state of the art methods

Technologies Used

We used Python for developing the tool

Mentor

Dr. Anupam Basu

Publications

1. Koustav Ghosal, Ameya Prabhu, Riddhiman Dasgupta, Anoop M. Namboodiri, *Learning Clustered Sub-spaces for sketch-based Image Retrieval* Asian Conference on Pattern Recognition, November 2015, Kuala Lumpur, Malaysia.
2. Koustav Ghosal, Anoop M. Namboodiri, *A Sketch-Based Approach to Video Retrieval using Qualitative Features* Proceedings of the Ninth Indian Conference on Computer Vision, Graphics and Image Processing, 14-17 Dec 2014, Bangalore, India.
3. Sanchit Aggarawal, Koustav Ghosal, Pulkit Singhal, Priyanka Srivastava, *Effect of Learning on Audio Spatial Working Memory*, Spatial Cognition 2014, Bremen, Germany, 15-19 September 2014.

Education

IIIT Hyderabad

HYDERABAD, INDIA

MS by Research

2012 – Present

Currently, I am doing my masters in Computer Science from Center for Visual Information Technology, IIIT Hyderabad under the guidance of Dr. Anoop Namboodiri.

GPA : 7.2 / 10

Netaji Subhash Engineering College

WEST BENGAL, INDIA

BTech, Computer Science & Engineering

2007 – 2011

I did my Bachelors from Netaji Subhash Engineering college under West Bengal University of Technology in Computer Science & Engineering.

GPA : 7.9 / 10

Sri Aurovindo Vidyamandir

WEST BENGAL, INDIA

10, 10+2

2005, 2007

I did my schooling from Sri Aurovindo Vidyamandir, Chandannagar under West Bengal Board of Education. I passed 10 and 10+2 in 2005 and 2007 respectively.

Percentage : 89% (10th) & 84% (12th)

Job Experience

OMitra : A Social Android App for Train Journeys

HYDERABAD

Overview

2014

OMitra is an utility app for train journeys in Indian Railways. It can be used to get automatic location updates and journey information. It can also be used to chat with co-passengers during a journey. I have worked for this company for a period of six months as a developer and consultant. The app is available for download at Google Play Store at this [link](#)

Technologies Used

The application was developed in Android environment. We used Eclipse platform for development. The server side scripting was done using PHP.

Deep Learn Labs

HYDERABAD

Overview

2014

I am working here with a team of developers in Traffic Video Analysis. This company works in Machine Learning and Computer Vision using Artificial Neural Networks. I work with the team to understand, improve and implement the existing algorithms in Deep Neural Networks. It has a small team doing quality work. Since it is a small team, every member stays associated with everything from project planning, developing the product to marketing and fund raising. It has been a great learning experience from the beginning.

Technologies Used

C++, OpenCV, Caffe

Teaching Assistantships

Statistical Methods in AI

IIIT HYDERABAD, INDIA

Instructor : Dr. Anoop Namboodiri

Monsoon 2014

Responsibilities

This course covers the fundamentals of Pattern Recognition and Machine Learning. The responsibilities were conducting tutorials, evaluating answer sheets, mentoring projects and preparing question papers.

Cognitive Neuroscience

IIIT HYDERABAD, INDIA

Instructors : Dr. Priyanka Srivastava, Dr. Kavita Vemuri, Dr. Bapi Raju

Spring 2014

Responsibilities

This course is a fundamental course and bridges areas of Perception and Neuroscience. Visual and Auditory Perception, Motion Perception were covered. Apart from that fundamental concepts about structural and functional aspects of the brain was also covered. The responsibilities included conducting tutorials, viva, evaluating answer sheets, conducting lab experiments.

Skills

Coding: I am comfortable with C, C++, Java, Android, Python. I have used and familiar with the open source libraries like OpenCv, LibSVM, SciKit Learn, Numpy, Caffe etc.

Environments: Microsoft Visual Studio, Eclipse, Matlab

Natural languages: Bengali (*mother tongue*), English (*full professional proficiency*), Hindi (*full professional proficiency*).

Other Interests

I enjoy travelling to new places. India, with it's diversity is a great place to travel. I live in the southern part of India which is extremely rich in natural resources. I enjoy reading travel blogs, magazines and trekking. A new city in every three years - is the philosophy I want to live by. I have lived in two in last seven years. At least fifteen more to go !

I try to pen down my experiences in a new city as a blog, which I hardly ever finish and publish. I am a great fan of street photography. I like to stroll around the streets with my camera and listen to the dialect, taste the food and feel the pulse. I would definitely like to spend more time with cameras once I can afford many of them.

Last updated on : January 7th, 2016.