



**Vision Image & Signal Processing Research Group  
FYP Projects 2010-11**

S. No.	Title of Project	Advisor/Co	No. of Students	Abstract
1	<b>3-D viewing system for the medical imaging data</b>	Dr. Khawar	3	This project aims to build a solution for the radiologists who want to see the complete patient data without having to scroll through each image slice one by one on a computer screen. This project will use the projector as the display, and a camera and IR sensor for the human interaction detection and the slide position and orientation.
2	<b>A Vision based remote gun control in an immersive environment. -- Silent Hunter</b>	Dr. Rehan	3	This is a very interesting project with high potential for security of sensitive locations. The task is to develop a system where a guard is able to target without endangering his life & yet being able to view and react according to the scenario. Please contact for further details.
3	<b>Affordable Multitouch TableTops</b>	Dr. Rehan	3	This project aims to develop an affordable next generation multitouch interactive table top system where multiple users are able to collaborate interactively over an LCD or projected screen similar to Microsoft Surface. A successful development shall result into an interactive display system for Museums, Geographical Military/Strategic Plannings & Board Games. The project will take input from Webcam/IR Sensors to predict the gesture and touch. In the next phase the project shall be transformed to a complete product.
4	<b>Embedded/Vision based Under Carriage Inspection using Mult View Imaging (UView)</b>	Dr. Rehan	3	Under Carriage vehicle inspection has immense potential for security/surveillance applications. These days under vehicle cameras are common at entry locations of sensitive installations. Uview system shall use the same cameras to generate a single image scan of the complete vehicle. This under-carriage image can be used for: vehicle identification by matching with number plate registration number, logging & malicious objects detection.
5	<b>Face Searching and Sorting in an Album</b>	Dr. Hammad	3	People have and take a lot of pictures these days. Sometimes they are organized in folders and at other times they are lying around in disarray. So much so it becomes difficult to look for your own pictures on your computer. Algorithms need to be developed for efficient sorting and searching of these pictures. We will use existent techniques to look for pictures that contain the face you want to look for.
6	<b>FPGA based Real time Object Tracking System</b>	Dr. Rehan	3	This project aims to achieve Real Time Object Tracking by employing Xilinx Xtreme DSP Video Starter Kit. The required hardware is available and the project shall require extensive challenge in the Digital System Design for the project.
7	<b>FPGA based real time Video Registration</b>	Dr. Rehan	3	Video Registration; stitching of multiple video frames; is one of the prime requirements of aerial video surveillance. This project aims to achieve Real Time Video Registration by employing Xilinx Xtreme DSP Video Starter Kit. The required hardware is available and the project shall require extensive challenge in the Digital System Design for the project. The demo shall be real time generation of Registered Video of a handheld video camera.
8	<b>Hyperspectral Classification</b>	Dr. Murtaza	3	Hyperspectral sensors have the capability of capturing images in a very narrow spectral range and being airborne have a decent spatial resolution. Since these sensors have a high spectral resolution these sensors are being used for effective monitoring of crops. An important aspect of this research is differentiating between different crop types and assessing their health.
9	<b>Illumination Invariant Face Recognition</b>	Dr. Murtaza	3	A major issue in face recognition is that under varying light conditions eigenface type methods fail. In order to remove this shortcoming illumination invariant face recognition methods have been proposed. The goal of this project would be to focus on the development of these methods and assess their improvement over existing illumination non-invariant face recognition methods.

10	<b>Medical Image Segmentation</b>	Dr. Hammad	3	Medical images are often unclear or boundaries of object being looked at are not very clear. Ever seen your X-ray and cannot make sense of it, you probably know what we are talking about. Algorithms exist to make those boundaries clear and make it easy for you and the doctor to diagnose ailments. We have access to various digitized medical images for analysis. A project can be carried out on them.
11	<b>Object Tracking and Tracked Path Generation using Multiple Views</b>	Dr. Rehan	3	In this project you will be developing a system that will generate the path traversed by an object being tracked in a mosaic video. A mosaic video is a video constructed by augmenting several different videos in a wide view single merged view. The tracked path will be stored as a GIF image, thus saving considerable storage space for surveillance storage. One practical deliverable shall be to judge the free parking space available for a car entering
12	<b>Pansharpening</b>	Dr. Murtaza	3	The process of obtaining a high spectral and spatial resolution image from two images having either high spectral or spatial resolution is called pansharpening. Some recent pansharpening models have tried to solve the problem of pansharpening as an optimization problem. This project would focus on the optimization of one such model. An attempt to optimize the pansharpening model using an Evolutionary algorithm was not successful. In this
13	<b>PoPuP</b>	Dr. Murtaza	3	Generally, it is not possible to form 3D images from a single 2D image. However, recently a technique has been proposed in which pop-up type 3D images can be generated from a single 2D image. The 3D image generated is like a children story book pop up and not a complete 3D model. The 3D model generated is based upon statistical measures and not on true geometric information. The goal of this project would be to develop the proposed algorithm and test it for different type of images.
14	<b>Power generating roads</b>	Dr. Khawar	3	The idea proposed in this project is to invent and design a system that can utilize the weight and the flow of traffic to generate power with the help of an array of electrical generators. These grids can be placed and tested near an intersection to store the generated power so that the LED based traffic signals can get uninterrupted power.
15	<b>Project Chauve</b>	Dr. Murtaza	3	Development of an algorithm which is efficient enough to segment human hair. In the second phase an attempt would be made to generate a bald 3D model of the head. In the third phase the goal would be to replace the segmented hair with other hair samples.
16	<b>Project Title : 3D Face Recognition</b>	Dr. Murtaza	3	The project would use three cameras to capture the front and partial side views of an individual and generate a 3D face model from the given information. The project would focus on the following goals: 1. Generating a 3D face model from the images obtained from the three cameras.
17	<b>Urdu text retrieval and recognition</b>	Dr. Khawar	3	Due to the lack of proper care of the precious Urdu literature in most of the libraries, the books are in danger of being unreadable after a few years. Digitizing such literature is therefore of high importance and will allow more people to access such rare books. The application will recognize the entire text, and will be able to know the exact word. In future, this project may be extended to convert this digital Urdu text to speech.
18	<b>Video Object Retrieval</b>	Dr. Hammad	3	Similar to face retrieval, video object retrieval can be carried out. This is a challenging task and involves searching for and identifying objects within a video sequence.
19	<b>Video-based text recognition</b>	Dr. Hammad		Text appears at various locations in a video sequence. This would also involve any text scripts of words spoken inside a video. We would like to identify what are they and apply character recognition to interpret them or search in a video sequence based upon the topics being discussed at a certain point.
20	<b>Vision-based Attendance System (Face Recognition)</b>	Dr. Hammad	3	Can we use a computer-based image processing to recognize students and mark their attendance. Projects from previous batches have shown that it is possible however, background noise and occlusion brought the resulting accuracies down. In this project, we will use existing techniques to improve our results and try to overcome the problem of occlusion and background noise.