Digital Image Processing

Color Coded Academic ICal

Team ID : 22

Project Title : Color Coded Academic ICal

Team Members:

Appari Lalith (20161038) , Srinadhu Sai Preetham(20161043)

Github link of our project:

https://github.com/appari/dip_project

Introduction:

The project we have implemented is conversion of time table to ICal.

Previous approaches involve human expertise to manually insert reminders in the Icalendar.

Problem Statement:

Given an image of a academic calendar convert it into a form that can be modified by the users. Basically we have to convert the text in the image to

editable text. This text can then be converted into a color coded ical.

And Using that iCal we can export that data into respective applications based on user's convenience.

In this project we have implemented an ical converter for the time table given as input. The conversion is made to simplify the task of user who has to set reminders on important days in the time table. So, in this project we automated the task of user to set reminders in Icalendar which can be exported to respective applications like reminder , google calendar etc.

Motivation:

Now a days, each and every task done by a person were mostly automated.

So, In our busy daily life it is not so easy to spare much time on each task of ours and people usually get confused or forget the important tasks of theirs. Here comes the use of **reminders**.(Why wasting time to set reminders ' :(') So we automated the task of setting reminders given the time table image.

Overview:

INPUT : Time Table Image

OUTPUT : Converted ICal

METHOD :

- First recognize edges in the input time table.
- Mark endpoints of each edge detected.
- Perform a euclidean distance based elimination of duplicate points or using naive detection of duplicate points.
- Find bounding boxes formed using the points detected above.
- For each bounding box detected recognize text in the box and then separate them and store the text present in it and colour of that box.
- Construct a data structure of events and dates including months from the data stored in the above step.

  NOTE : SOME OF THE ABOVE STEPS INVOLVE

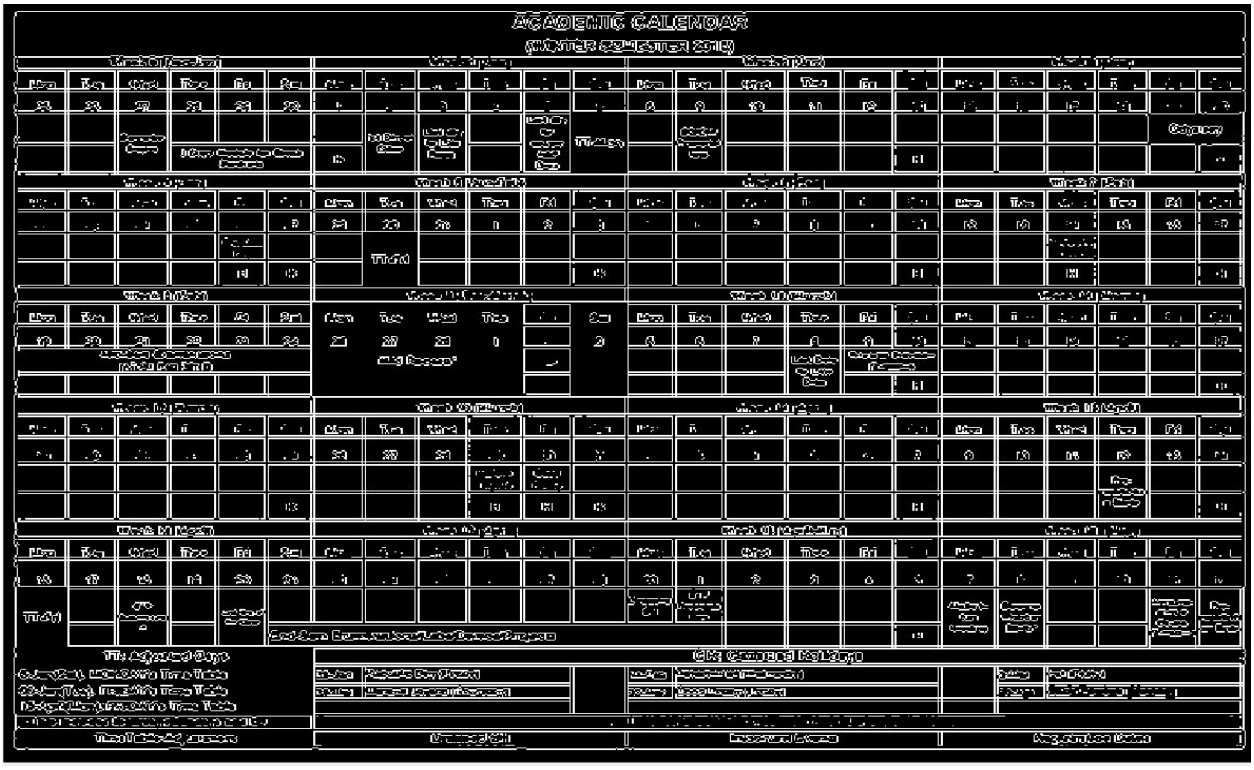
  PREPROCESSING THE DATA LIKE IN RECOGNIZE TEXT.

APPROACHES CONSIDERED:

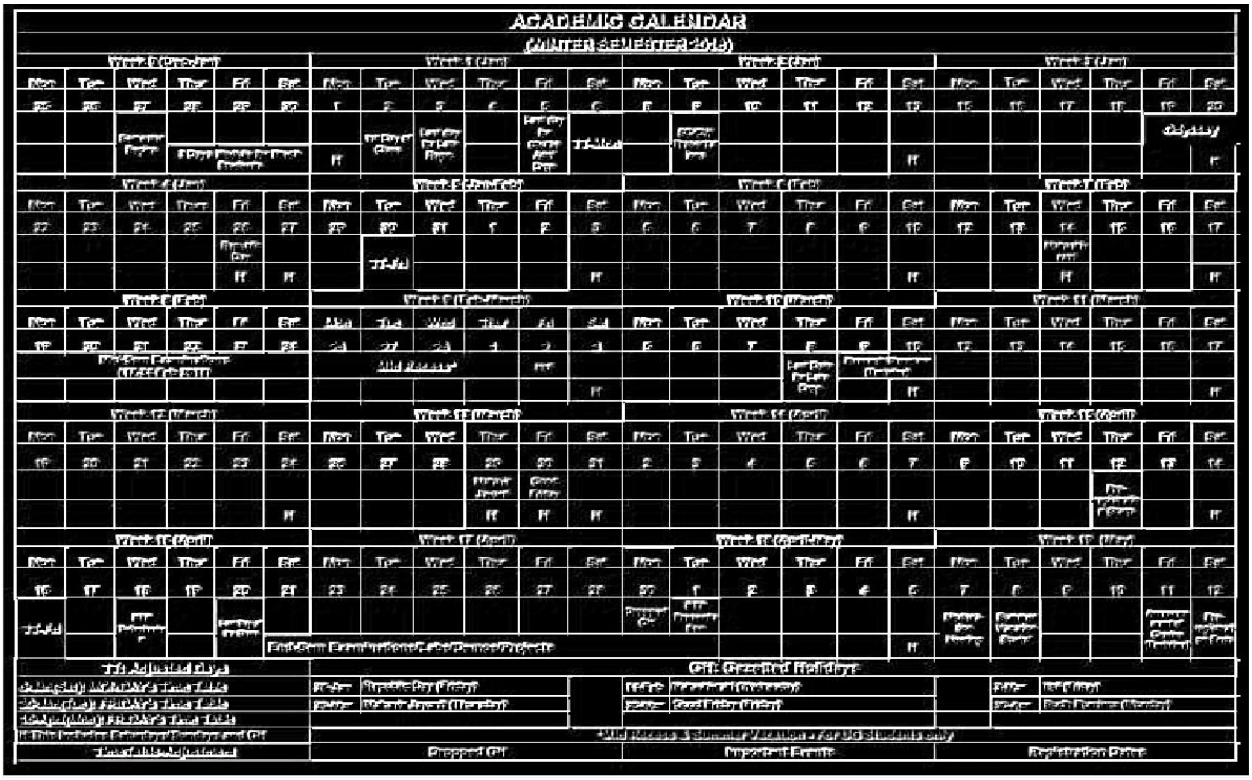
FOR EDGE DETECTION:

1. Using Laplacian Filter

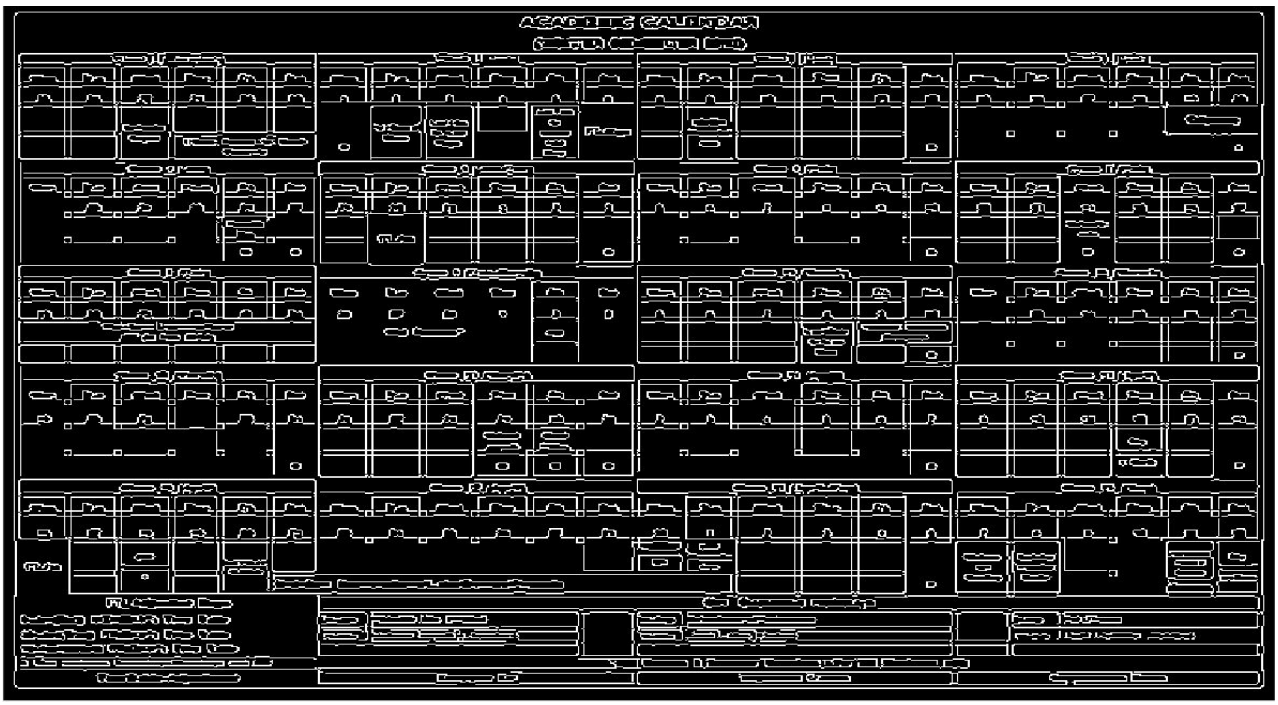
2.Using Sobel Filter



3.Using Prewitt Filter



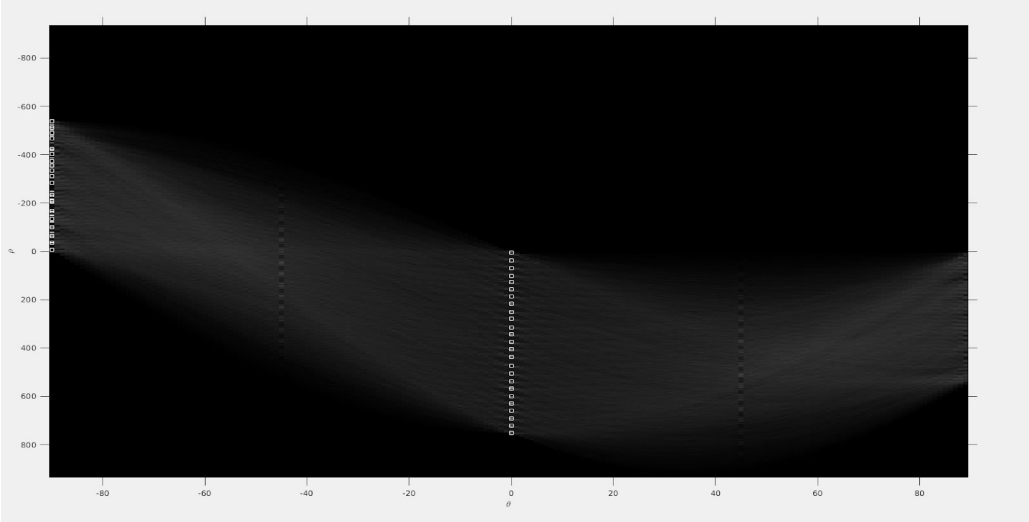
4.Using Canny Edge detection



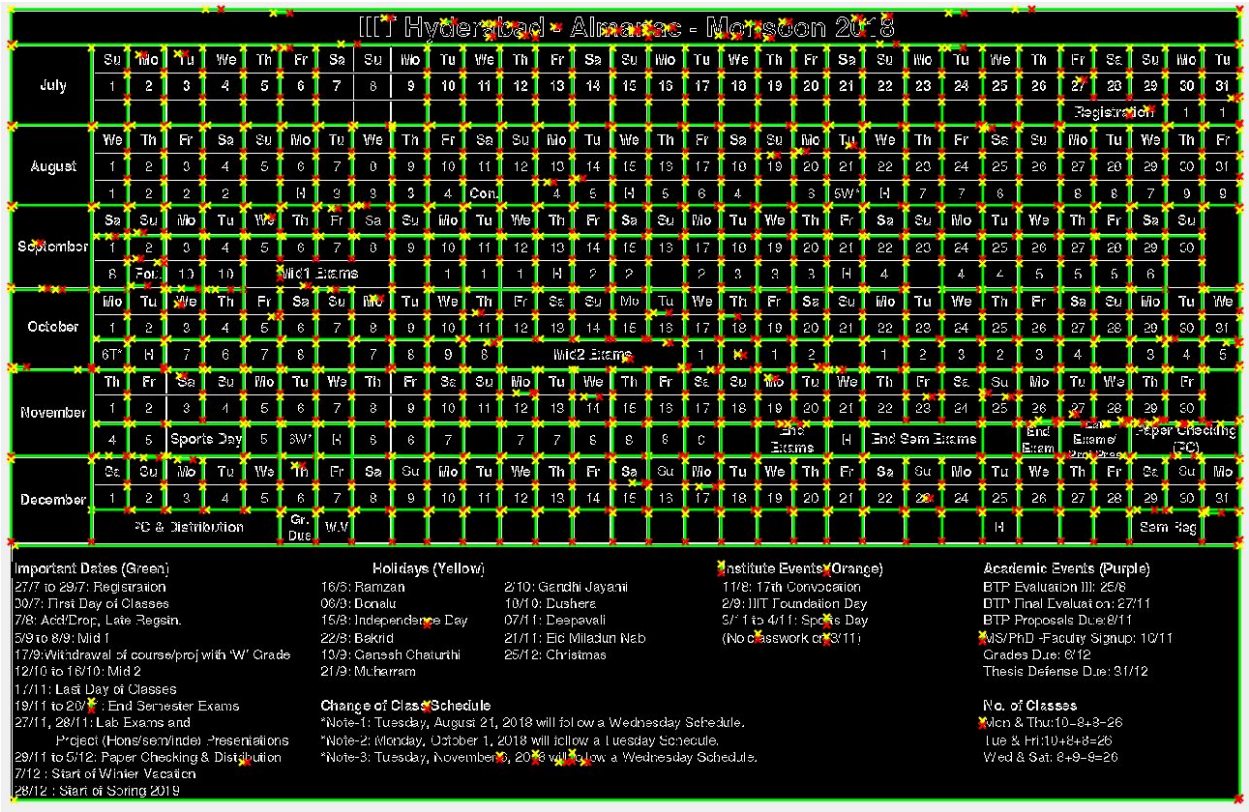
The above images are obtained by converting the image into an grayscale and then the filters are applied to them. So we can see that the images from sobel and prewitt has best preserved the edges from the given image.

For detecting the edge we perform a hough transform and then look in which filtered image max no. of edges are being highlighted.

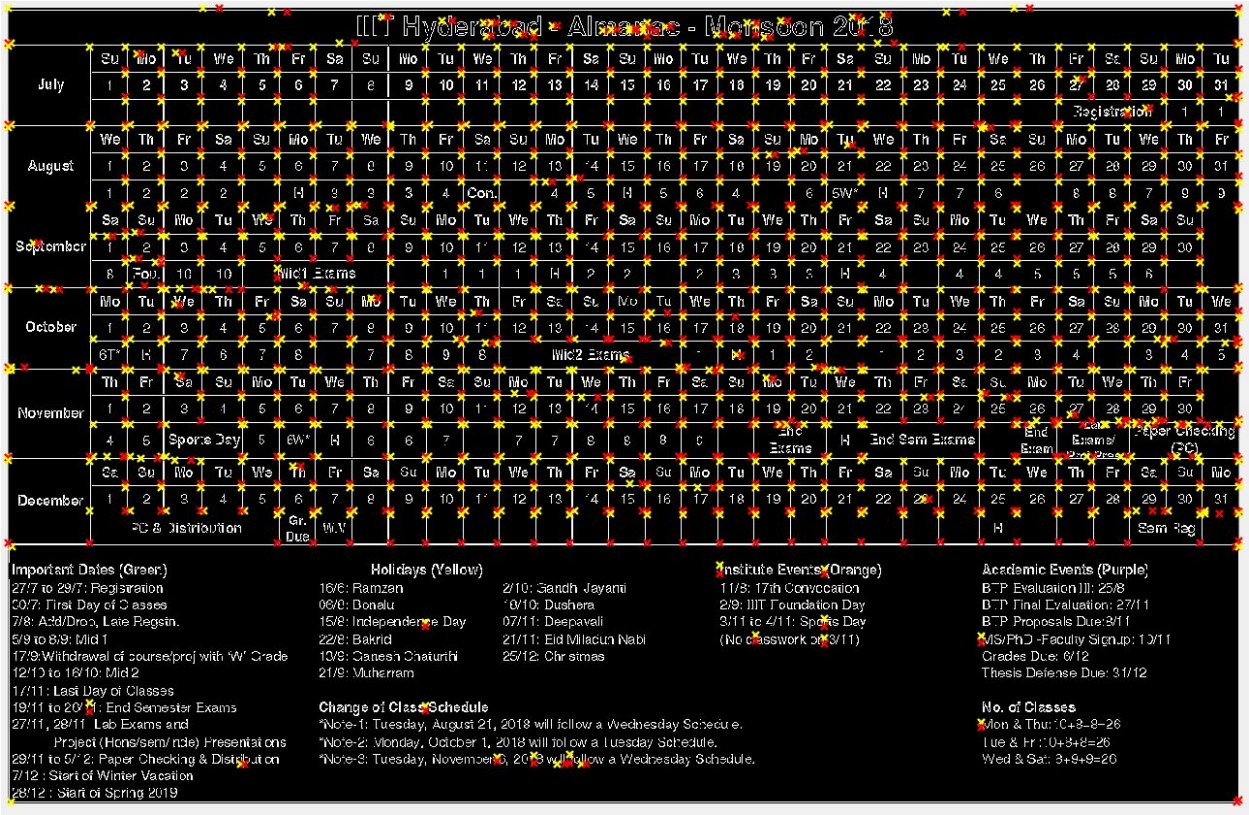
5.Using Hough Transform



We find the peaks with theta = -90 or 0 because all the edges are either horizontal or vertical.We got a total of 44 edges, 19 vertical and 25 horizontal. So after highlighting the edges we get:

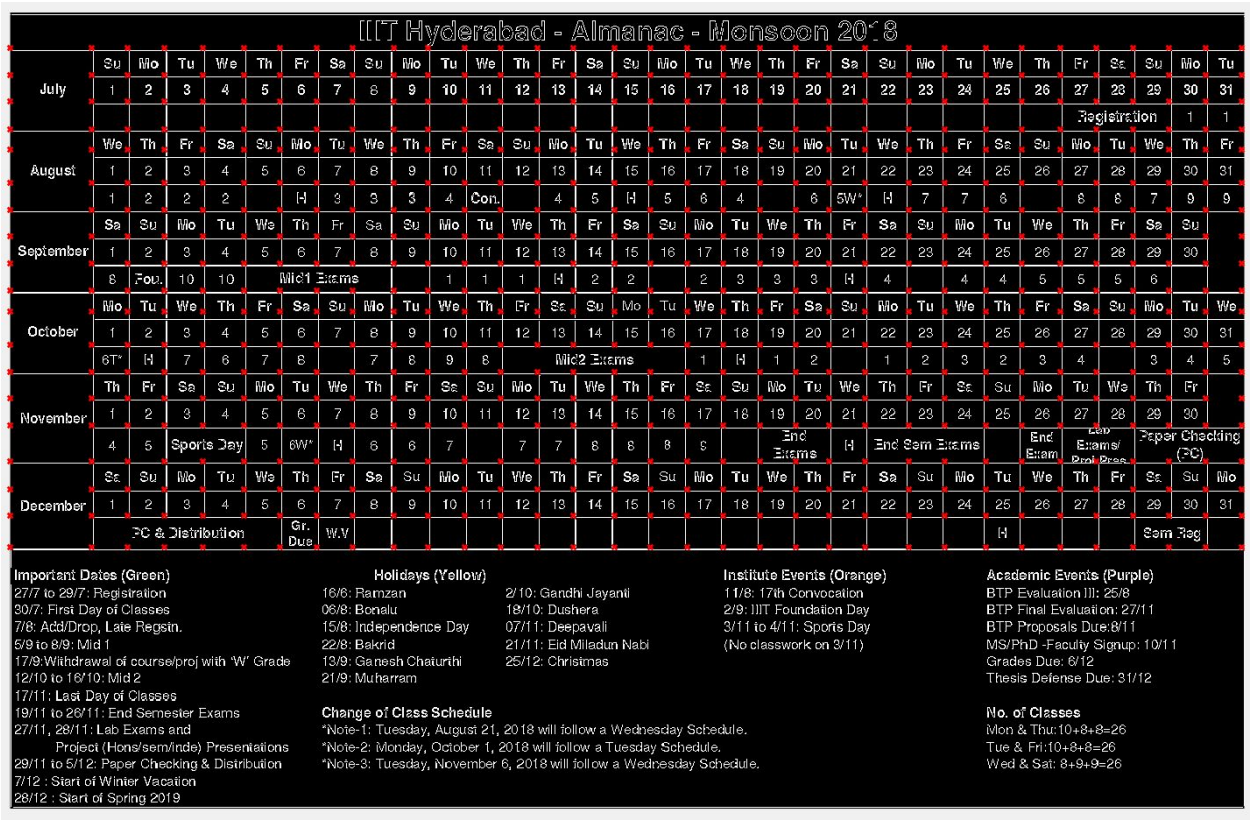


After detecting edges using Hough transform Corner points for blocks are computed by using the edges detected as in the above image.



Detecting and removing duplicate points from the edge points detected would result in the following image(can be done with multiple nearest points elimination)i.e; by removing points which are near to each other and keeping only one point instead of the whole.

The corners detected binary image will look like the below one:



IIIT Hyderabad - Almanac - Monsoon 2018

July	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
																											Registration		1	1
August	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	1	2	2	2		H	3	3	3	4	Con.		4	5	H	5	6	4		6	5W*	H	7	7	6		8	8	7	9	9
September	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	8	Fou.	10	10	Mid1 Exams					1	1	1	H	2	2		2	3	3	3	H	4		4	4	5	5	5	6		
October	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	6T*	H	7	6	7	8		7	8	9	8	Mid2 Exams				1	H	1	2		1	2	3	2	3	4		3	4	5
November	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	4	5	Sports Day		5	6W*	H	6	6	7		7	7	8	8	8	8		End Exams		H	End Sem Exams				End Exam	Lab Exams/ Prof. Pres.		Paper Checking (PC)		
December	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	PC & Distribution					Gr. Due	W.V																		H				Sem Reg		

Important Dates (Green)
27/7 to 29/7: Registration
30/7: First Day of Classes
7/8: Add/Drop, Late Regstn.
5/9 to 8/9: Mid 1
17/9:Withdrawal of course/proj with 'W' Grade
12/10 to 16/10: Mid 2
17/11: Last Day of Classes
19/11 to 26/11: End Semester Exams
27/11, 28/11: Lab Exams and Project (Hons/sem/inde) Presentations
29/11 to 5/12: Paper Checking & Distribution
7/12 : Start of Winter Vacation
28/12 : Start of Spring 2019

Holidays (Yellow)
16/6: Ramzan
06/8: Bonalu
15/8: Independence Day
22/8: Bakrid
13/9: Ganesh Chaturthi
21/9: Muharram
2/10: Gandhi Jayanti
18/10: Dushera
07/11: Deepavali
21/11: Eid Miladun Nabi
25/12: Christmas

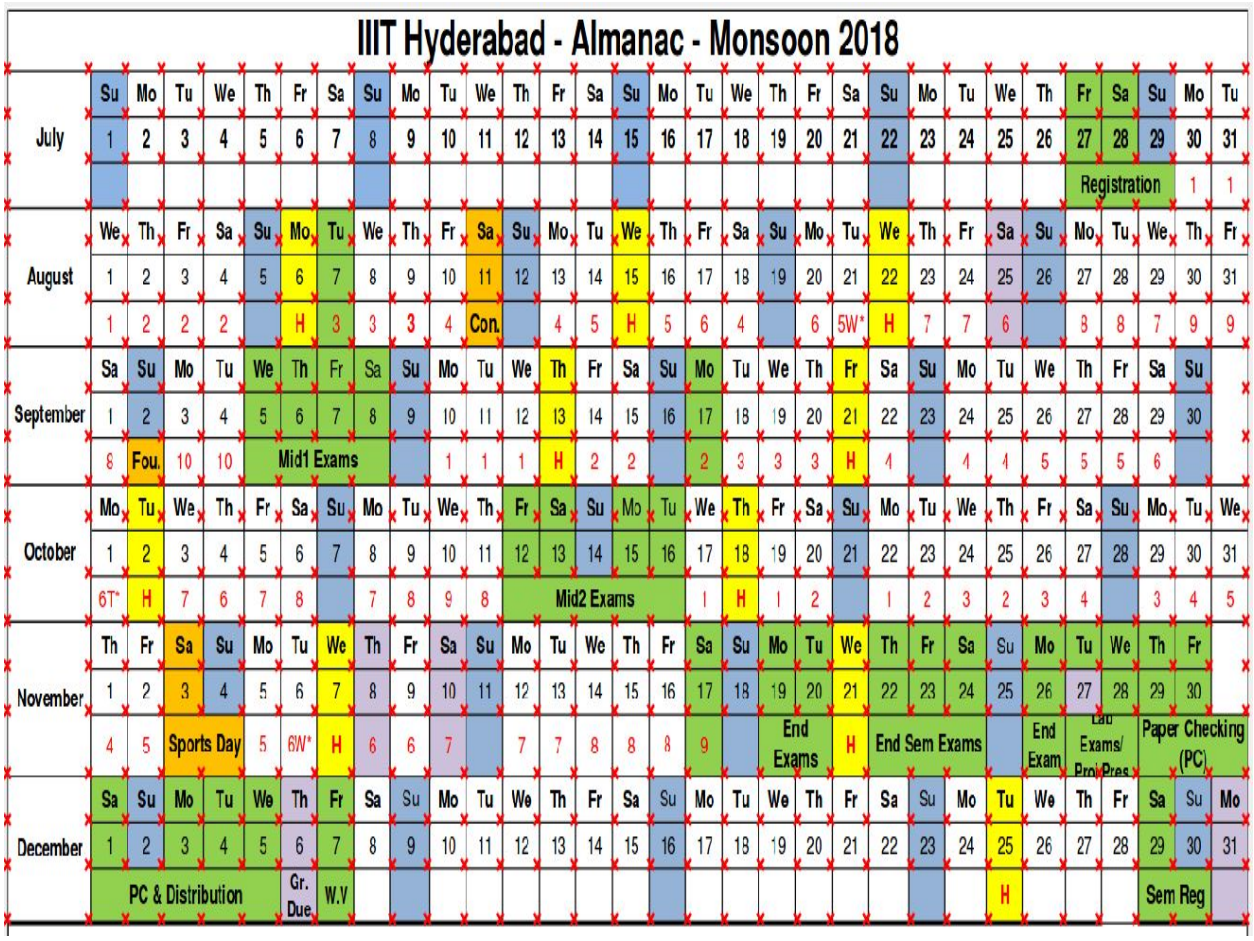
Change of Class Schedule
*Note-1: Tuesday, August 21, 2018 will follow a Wednesday Schedule.
*Note-2: Monday, October 1, 2018 will follow a Tuesday Schedule.
*Note-3: Tuesday, November 6, 2018 will follow a Wednesday Schedule.

Institute Events (Orange)
11/8: 17th Convocation
2/9: IIIT Foundation Day
3/11 to 4/11: Sports Day
(No classwork on 3/11)

Academic Events (Purple)
BTP Evaluation III: 25/8
BTP Final Evaluation: 27/11
BTP Proposals Due:8/11
MS/PhD -Faculty Signup: 10/11
Grades Due: 6/12
Thesis Defense Due: 31/12

No. of Classes
Mon & Thu:10+8+8=26
Tue & Fri:10+8+8=26
Wed & Sat: 8+9+9=26

Final Output for the colour image is as below:



In the above image the red points are corners detected corresponding to each box.

Success and Failure Cases:

Edges and corners are detected well for clear table images(like our almanac).

But the results are not good for calendars which are blurry

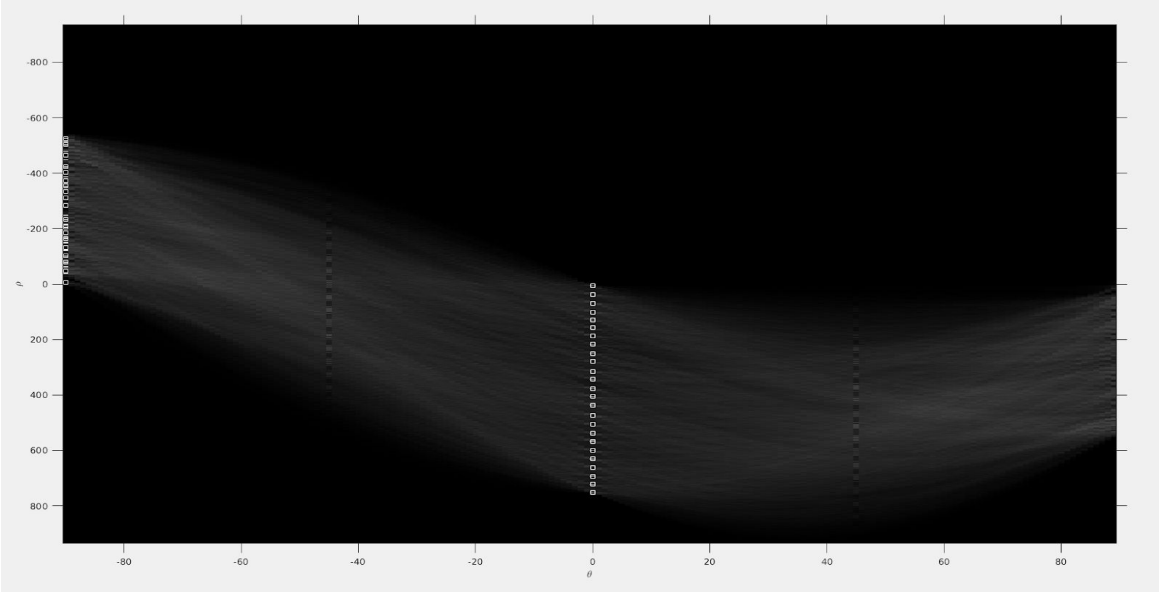
1.Successful case would be image as above.

2.Failure cases Image is as follows

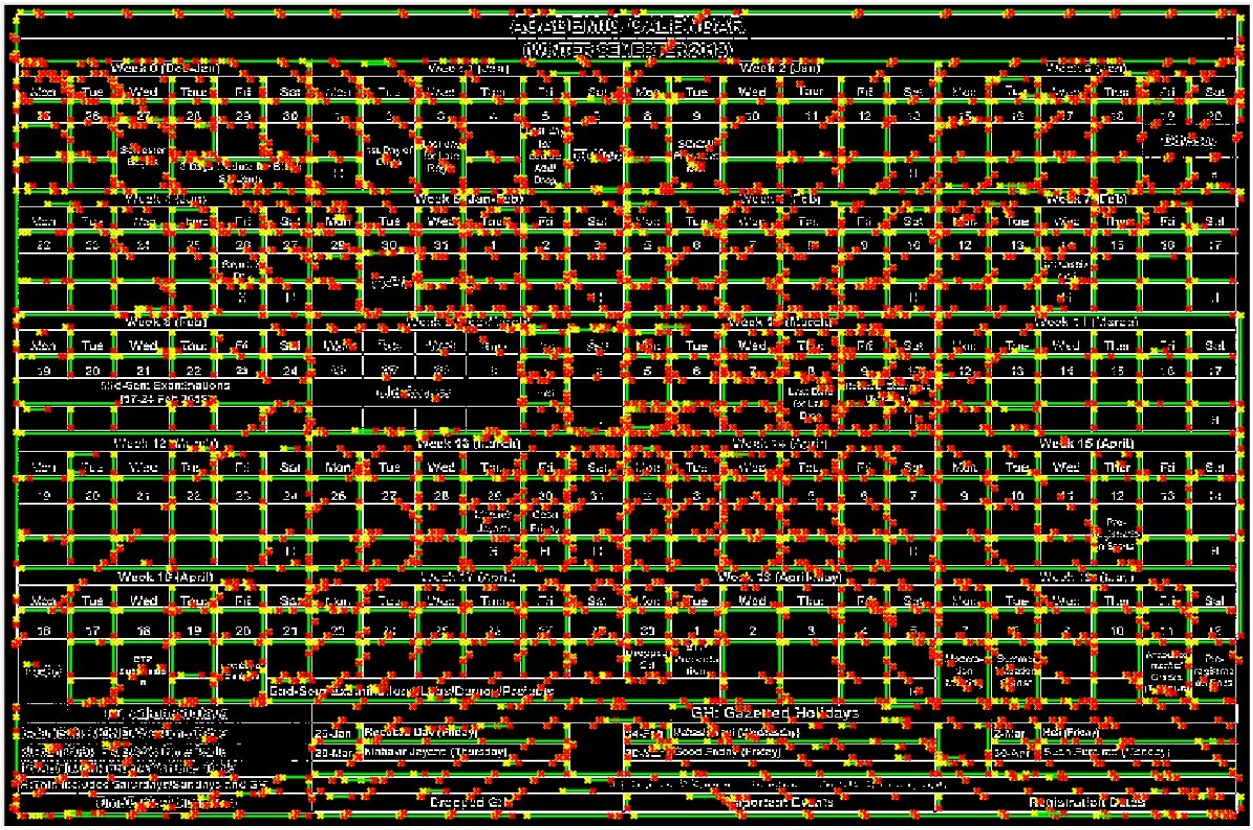
As we can see from the above image that the edge corner points were not detected well so our corner detection will not work for images like this.

Hough transform output for sobel filtered output of failure image:

2



We get 20 vertical 25 horizontal edges. So highlighting the edges we get:



FOR DETECTION OF TEXT INSIDE BOX:

Now our new objective will be to detect text inside a box

We performed preprocessing of the box using binary image conversion and

Detected text inside the box using **OCR.**

Milestones

Milestone	***Date***	***Task allocation***
Gather the background information for the project	October 4	(Both)
Recognize text in the image(Code)	October 8	Appari Lalith
Detect the recognized text(Theory)	October 22(Tentative)	(Both)
Convert the text in the image to	October 26	Appari Lalith

text(Code)		
Detect Colors from the image	October 31	Sai Preetham
Gather various types of information from the Image and convert them into an object	November 9	(Both)
Construct an ical	November 15	(Both)