12th Edition
Released on 11/03/2013

# NPHASE
# 2013

*Vision Beyond Perception*

Original Posters
CAPTURE
THE reCAPTCHA

Probably You
Will Get Lucky

Facts Factory

Placements
and
Internships

# FOREWORD

Dear Readers,

We take great pleasure in presenting the 12th edition of  InPhase - 'Vision Beyond Perception'. It has been a long wait and I  must say it's worth it as the departmental magazine is all set to widen its spectrum with its new look and novel ideas. This time the main aim was to include the stuff which is not available on internet so we focussed on including articles based on original work, giving due credit to the innovation of our students. Also InPhase had started as an endeavour to connect all the students and the faculty of the department and bringing them in phase with the departmental activities and new trends in the field of electronics and communication engineering. Team InPhase takes an immense pride in carrying forward this heritage.

This Edition of InPhase features wide range of articles including technical posters which are being introduced for the first time in the history of the magazine and are based upon original work done by our students namely, 'Helping Stuck Students Talking on a Topic', 'reCAPTCHA' and 'An Enhanced MPPT Strategy'. We also introduce a special section of 'Probability' featuring important problems like 'Monty Hall' and 'Russian Roulette' along with some of the interesting facts on probability that will keep you pondering.

When it comes to placements and internships, a good advice is what you always seek for. This InPhase dedicates a complete section for the same in which students talk about their internship experiences in their sophomore and pre-final years. The article 'Placement Fundae' goes on to cover all of the most important tips which will help you crack the written tests, group discussions and finally the job interview.

Along with these articles we have tried to cover selected departmental activities and the achievements of the students, ranging from IEEE publications to entrepreneurial milestones. In this edition you will read, learn and explore some of the coolest facts under the section 'Facts Factory' which makes the magazine further interesting.

Finally I would like to thank the authors of all the articles and the entire InPhase team and would like to congratulate them for their innovative work and sincerely hope that they carry forward the legacy. Hope you will like the magazine. We are eagerly looking forward to your feedback which will help us improve further.

Krunal M Harne
Editor-In-Chief
InPhase

# Team InPhase

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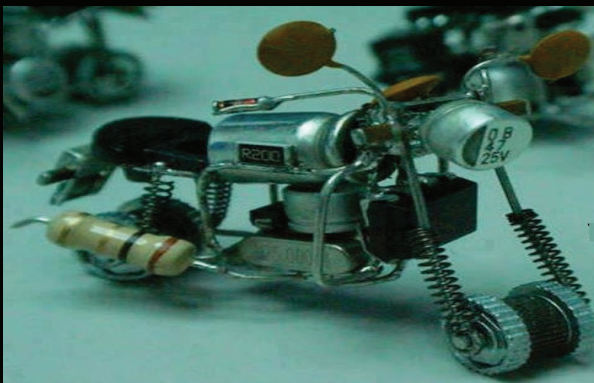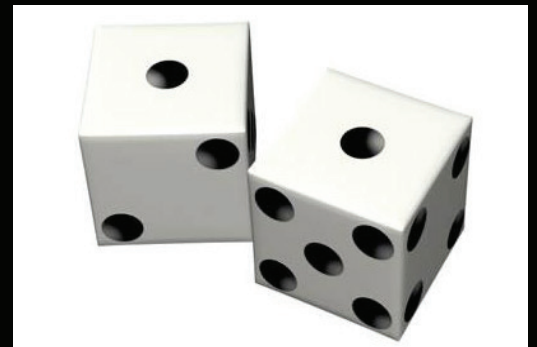
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# CONTENTS

You will find such Bubbles on each page. What do the Bubbles below mean?

●    ●    ●    ●    ●

# reCAPTCHA of Indian Vernacular Texts : Digital Text Reconstruction using Web Security Measures

Ashish Arora[1], Kailash Atal[1], Dr. Amit Sethi[1], Prof. P.K. Bora[1]

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## Introduction

CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) is a challenge response test implemented using wavy, noisy characters to determine whether a user is a human or a computer. More than 200 million people spend atleast 10 seconds to fill a CAPTCHA everyday. Unsatisfactory reconstruction of historical texts using Optical Character Recognition (OCR) due to faded ink, the need to provide strong challenge response on web that is easy for humans to solve and yet can discriminate against bots that cause spamming etc. led to emergence of constructive use of this enormous human effort called reCAPTCHA as proposed in [1] where the challenge response is a word taken from old printed text, Fig.1. reCAPTCHA in its current form exists for English literature only. The work extends the domain to vernacular Indian literature for their reconstruction and yet ensure web security.

## Proposed Work

Twenty pages were scanned from a Hindi text Central Library-IITG 22600 using HP Scanjet Enterprise 9000 (L2712A) at a resolution of 600 dpi.

Scanning of texts in general leads to the small change in angle in the text with horizontal. The scanned image is first binarized using absolute threshold and inverted followed by computation of Projection Profile (PP). Horizontal Projection Profile (HPP) of an image is the plot of average grayscale value of each horizontal segment (row) versus the row index. HPP for images rotated by 10 and 0 degrees are shown in Fig.2 and Fig.3. Variance of PP of an image (Fig. 4) is the plot of variance of HPP for the image rotated anti clockwise by angle alpha ($\alpha$) about its center versus alpha. The value of alpha for which variance is maximum gives the value of angle the image must be rotated about its center in clockwise direction to correct the orientation to horizontal alignment.

The peaks in the HPP correspond to Matra in for a horizontally aligned Hindi text while minima correspond to region between successive lines of text . The same analogy as HPP is used in the separation of words in a horizontal line with a vertical projection profile. The result obtained by combining the HPP and VPP gives a set of words in an image as shown in Fig.4.

The segmented words are grouped in the pool of CAPTCHA and reCAPTCHA set with words in former manually tagged with correct answers. The webpage displays two words: one from each set to ensure human presence and digitize text. The web implementation is shown in Fig. 5

## Results

The result of combination of HPP and VPP in the scanned plain documents is shown in Fig. 6. In a scanned document with 445 words, 200 were grouped in CAPTCHA and 245 in reCAPTCHA set. 45% of words were sent to only one user while others sent to mutiple users. Although the overall accuracy of the reCPATCHA engine was 92.55%, the set of words sent to more than 3 users have fostered reconstruction of text with accuracy as high as 98.76%.

## Discussion & Outlook

Segmentation of a set of words into a subset of single words is the first step towards reCAPTCHA. Although the method has been tested only on the plain text, the next stage of the work shall investigate robust approaches for generic old text documents with images. Handwritten texts for reCAPTCHA is another challenging prospect in this domain. The next step in this work is the integrity of semi supervised learning with strides in the direction of reCAPTCHA assisted Machine Learning based OCR in the context of Hindi texts.

## References

1. Luis von Ahn et al. reCAPTCHA: Human-Based Character Recognition via Web Security Measures
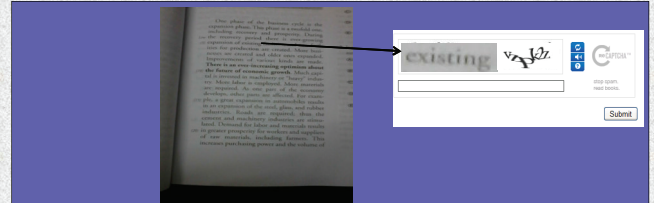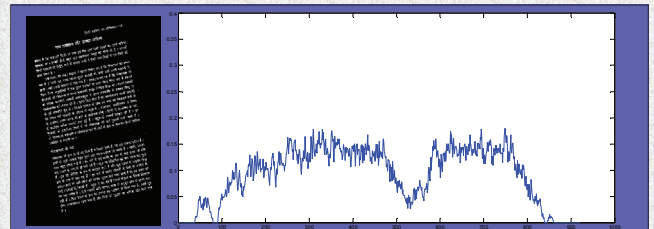
**Figure 1:** Illustration of the concept of reCAPTCHA



**Figure 2:** Horizontal projection profile of an image tilted by 10 degrees.
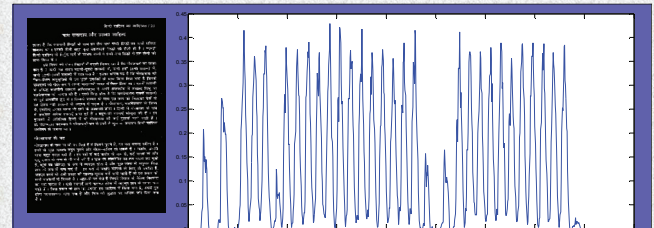


**Figure 3:** Horizontal Projection Profile of an image tilted by 0 degrees.
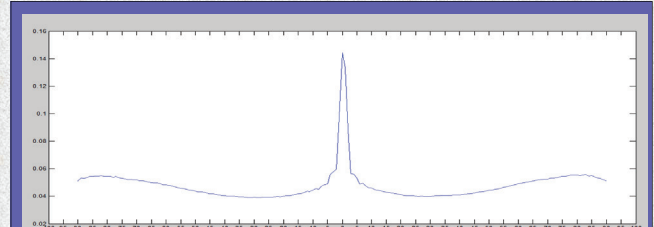


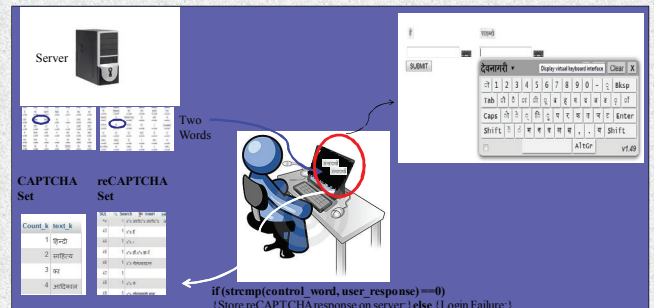**Figure 4:** Variance of horizontal projection profile as a function of tilt angle -90 to +90 degrees.



**Figure 5:** Web Implementation of reCAPTCHA.



**Figure 6:** Segmentation of document into set of lines and set of lines into set of words using HPP and VPP.

# Helping Stuck Students Talking on a Topic

## Amodh Kant Saxena[1], Priyasee Pradhan[2], Ajay Kumar[3], Dr. Carolyn P. Rose[4], David Adamson[4]

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2. Department of Computer Science and Engineering, NIT Rourkela
3. Department of Computer Science and Engineering, NIT Sikkim
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## Abstract

Even though today there are many online learning websites like Coursera, KhanAcademy etc, they don't provide a platform where learners can have real-time discussions. This poses a great challenge  for learners to continue their studies further with proper gain of knowledge. The authors provide a web interface consisting of Video lectures along with a chat room for real time discussion. Also, concerning chat system, they try to solve the problem where different learners either get stuck over a particular topic or don't agree to a common solution.

## Motivation

Have you ever watched a video lecture?
• What you do when there is a doubt?
• Have you ever encountered a situation when you seek instantaneous help but get it after a long time !!
Providing Chat System along with Video Lectures will certainly solve most of these kind of problems . In chat environment ,many times learners may get stuck or not come to a conclusion collaboratively.

## Proposed Approach

 For categorising Chat conversations :
• Chat messages can be classified with multiple class labels.
• Build appropriate model using LightSide Software.
• Real-time Class detection using the built model. For analysing & finding places where students are stuck or confused over a topic.
• Analysing previous chat conversation for domain related talks.
• Checking for overlapping of special keywords in the present and past conversation.
• And if, it turns out to be of same domain topic, suggestion of internet links should be provided

## Categorising Datasets

Defining four of classes for different types of messages :-
1. Domain-Oriented - Concerns expressions referring to the domain (like polar, dipole moment, compound etc).
2. Regulatory - Related to planning or monitoring of learning Process (like question, understand, wait, next etc) .
3. Social task - Comprises social messages like greetings, compliments, remark of private nature etc. (like hi, stupid, fun, nerd, nice, lol etc).
4. Technical - Concerns the learning environment, tools, hardware & software (like joins the room, move to whiteboard etc)

## Training & Building model

Model was trained using Machine Learning Software LightSIDE:
• 0.7244 Kappa value with around 89% of accuracy was obtained.
• A model was built using the above dataset.
• Using this model, real-time class categorization is done.

## Conclusion

The decline in both domain & social talks are considered here as an indication for learners disinterest. It is considered here as the right point for intervention to provide required relevant materials so as the learner gains his interest and continues gaining knowledge. This model can be implemented to help stuck learners talking on a topic.

## References

1. Sten R Ludvigsen , Anders I. Mrch Computer Supported Collaborative Learning : Basic Concepts, Multiple Perspectives and Emerging Trends.
2. Amy Soller, Allan Lesgold, Frank Linton , Brad Goodman What makes peer interaction effective? Modelling effective communication in an intelligent CSCL.
3. Haicho Dong, Siu Cheung Hui, Yulan He Structural Analysis of Chat Messages for Topic detection.
4. Anjo Anjewierden, Bas Kollsoffel, Casper Hulshof Towards educational data Mining: Using Data mining methods for automated Chat analysis to understand & support inquiry learning process.
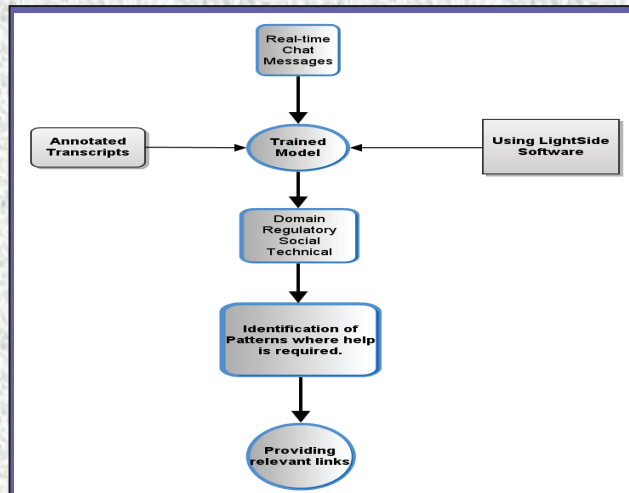
**Figure 1:** Approach in solving the problem where learners get stuck or are not getting a solution to the discussion



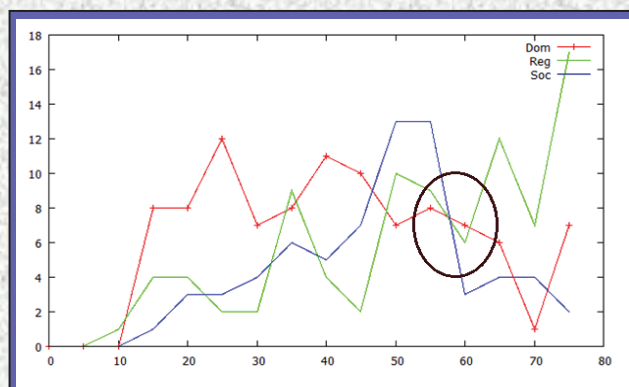**Figure 2:** In this particular graph there is a time when although social talk decreases exponentially, the domain related talks does not increase. It may mean that the student has lost interest in the conversation.
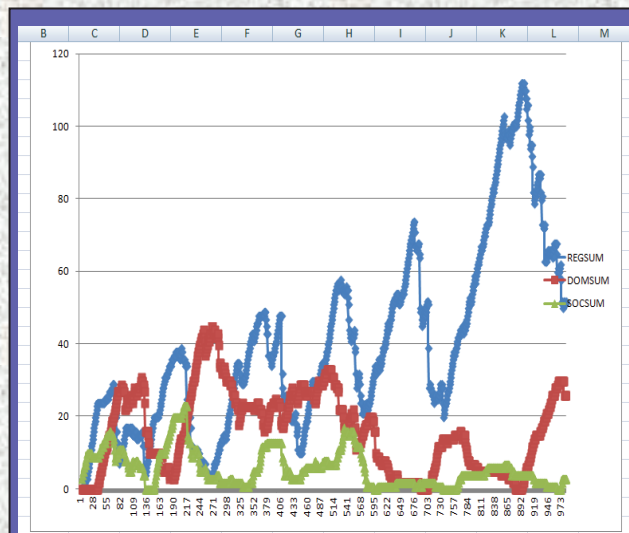


**Figure 3:** Portion of this graph, which tracks the content of the entire conversation of one and a half hour shows a portion where domain talk (red) declines rapidly thus showing disinterest in the conversation.

# An Enhanced MPPT Strategy for a Grid-Connected PV station under Rapidly Varying Environmental Conditions

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2. Department of Electrical and Computer Engineering, The Ohio State University

## Motivation

Perturb & Observe (P&O) is the most commonly used maximum power point tracking (MPPT) strategy used in commercial photovoltaic (PV) systems. It is primarily based on the principle of changing voltage in direction of increasing power. The basic P&O algorithm is illustrated in Fig.1 where, $V_k$, $I_k$ denote the voltage & current values sensed at the beginning of $k^{th}$ iteration. However, the basic P&O strategy suffers from a serious drawback for situations with rapidly varying environmental conditions [1]. A quickly increasing irradiance gives P&O algorithm the impression that power is *increasing* even as the operating point may shift *away* from the true MPP. This is because as irradiance increases, power around MPP increases roughly in proportion. Normally, a voltage shift that takes the operating point away from the MPP would incur loss of power, but under fast changing irradiance conditions, increase in power due to increased irradiance could dominate so that it may appear that power output has actually increased. The P&O algorithm would thus cause voltage to keep changing in the same direction until it has moved far enough from the true MPP that decrease in power due to distance from MPP now outweighs increasing power due to irradiance increase. A similar effect would operate for decreasing power output due to rapidly changing atmospheric condtions, except that PV voltage would now oscillate at some fixed point which can be much further off from the MPP.

P&O strategies thus need to sense & effect changes in PV voltage faster to keep up with changing power due to rapidly varying environmental conditions, and thus track MPP accurately. However, the effectiveness of such P&O methods is limited in a grid-connected PV station scenario by the switching frequency of power electronic components, like those in a series-connected inverter. This work proposes an easy-to-implement MPPT strategy that improves performance even at low operating frequencies & under fast changing environmental conditions by exercising a greater control over the transient PV voltage. The proposed MPPT strategy has also been made adaptive to reduce oscillations around the MPP. A special provision has also been made to circumvent problems encountered by traditional adaptive P&O algorithms for constantly decreasing output power due to changing atmospheric conditions.

## Proposed Strategy

The proposed enhanced MPPT strategy operates at two levels, at inner-loop for controlling PV voltage according to reference, $V_{ref}$, & at outer-loop for providing $V_{ref}$ for MPP tracking. The strategy is based on sampling the PV voltage at an intermediary point, $V_{trans,k}$, based on the assumption that inner-loop controller, shown in Fig. 2, for DC-DC converter would have affected a large enough change in PV voltage every iteration. To have greater certainty about such a transient response, a set of nonlinear equations transforming $V_{error}$ from PI controller to an appropriate change in duty cycle, $\Delta D$, have been obtained for a DC-DC boost converter, and represented as '$\Delta D$ calculation' block in Fig. 2. The transient voltage response in Fig. 3 illustrates that the equations developed ensure a sharp initial rise in PV voltage regardless of the operating point.

The overall enhanced P&O algorithm has been summarized in Fig. 4. The algorithm samples PV voltage & current at an extra point in time, right after giving a new $V_{ref}$, to calculate PV output power. The inner-loop boost converter controller action *right after* providing a new $V_{ref}$ causes the PV voltage to shoot up quickly, resulting in a small spike, followed by ripples as the PV voltage approaches the new $V_{ref}$, as shown in Fig. 3. The two voltage measurement points for $k^{th}$ iteration are denoted as $V_{k-1}$ and $V_{trans,k}$. The sampling time, $t_{trans,k}$, has been strategically chosen such that $V_{trans,k}$, lies on the initial voltage spike cause by the inner-loop boost converter action.

A transient point, $V_{trans,k}$, is take instead of $V_k$ for power measurement since $V_{k-1}$ and $V_{trans,k}$ are at very closely occurring time instants, & hence temperature & irradiance would have not changed substantially between these two points. However, simultaneously, it must be ensured that voltage change between $V_{k-1}$ and $V_{trans,k}$ is substantial as well, which is ensured by taking $V_{trans,k}$ on the spike. This is important because:
- A very small change in voltage would negate any advantages of a small change in environmental conditions.
- A very small voltage change will be more susceptible to noise.

## Simulation Studies

Fig. 5 compares the performance of the enhanced P&O strategy against the standard adaptive P&O strategy for a trapzoidal irradiance profile, ranging from 200W/m² to 300W/m².

## References

[1] T. Esram and P. Chapman, "Comparison of Photovoltaic Array Maximum Power Point Tracking Techniques," Energy Conversion, IEEE Transactions on, vol. 22, no. 2, pp. 439 –449, June 2007.
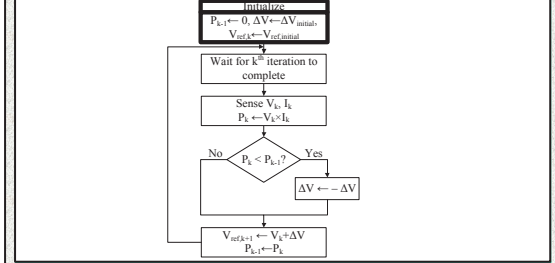
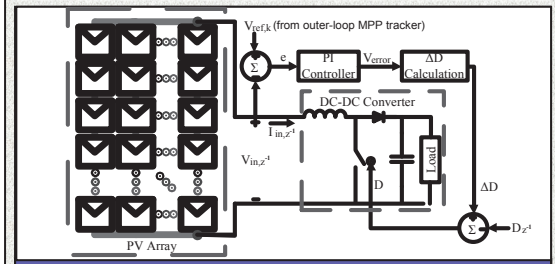Figure 1: The Basic Perturb & Observe Algorithm



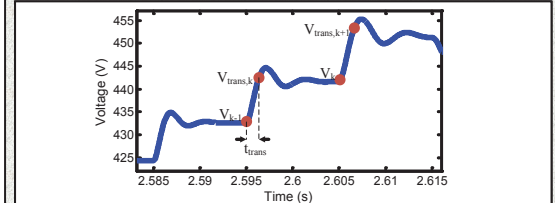Figure 2: Inner-loop Voltage Tracking Circuit



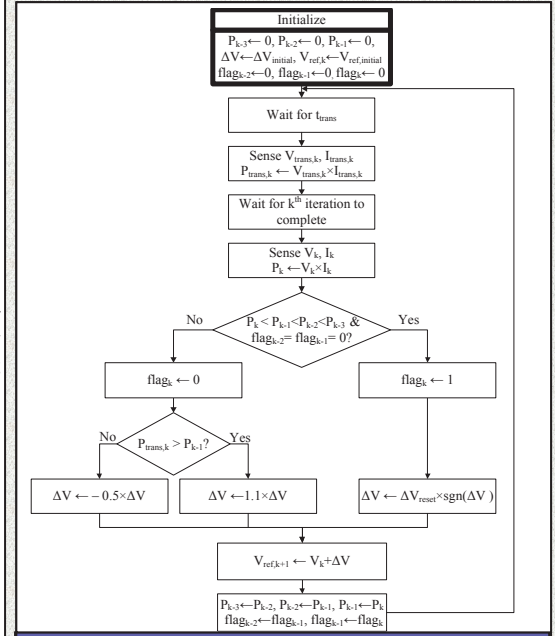Figure 3: Transient Voltage Response



Figure 4: The Enhanced Perturb and Observe Algorithm



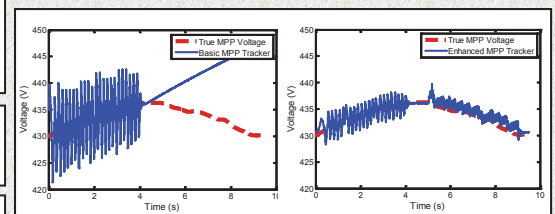Figure 5: MPPT performance with Standard Adaptive P&O Strategy (left) and Enhanced P&O Strategy (right).

# FACTS FACTORY



**Apple**
The name of the iPod was inspired by a line from 2001: A Space Odyssey: "Open the pod bay door, Hal!"

Baseline

STANLEY KUBRICK'S
**2001:**
a space odyssey



Buffering...

*An estimated 2.5 billion hours were wasted online last year as people waited for pages to download, according to a study sponsored by Nortel Networks.*



*An Electric eel can produce an electric shock of up to 650 volts at one ampere.*

*Yahoo! derived its name from the word Yahoo coined by Jonathan Swift in Gulliver's Travels. A Yahoo is a person who is repulsive in appearance and action and is barely human!*





Google India

Google Search    I'm Feeling Lucky

*The infamous "I 'm feeling lucky" is nearly never used. However, in trials it was found that removing it would somehow reduce the Google experience. Users wanted it kept. It was a comfort button. I'm Feeling Lucky Costs Google $110 Million a Year.*

# RUSSIAN ROULETTE

Probably, You Will Get Lucky...... !!!

*- Rahul Nallamothu*

"Russian Roulette" - The name doesn't sound too familiar. Think! Does the image below give you any idea?



Okay let me make this clear. It's a game played by two people. The players take turns, take up a gun and pull the trigger to themselves. Why Russian? Well, Russian here refers to the supposed country of origin.

This game is shown in a lot of movies; 'Dhoom2' and 'The Deer Hunter' among the popular ones. It is widely rumoured that William Shockley, co-inventor of the transistor and Physics Nobel Laureate, had attempted suicide by playing a solo game of Russian roulette.

Now, imagine you as one of the players. A bullet is placed in the chamber and the cylinder is revolved. If you are giving a chance to choose whether you want to go first or not, what would you do??

Let us try to analyze this mathematically and find the probability of losing the game if you decide to go first. The probability that you will lose in the 1st round is 1/6. And the probability that you lose in the 3rd round is the probability that you survive in the 1st round which is 5/6 times the probability that B survives the 2nd round which is 4/5 as there are 5 chambers and 1 bullet, times the probability that you get shot in the 3rd round which is ¼ i.e. 5/6*4/5*1/4 = 1/6. Similarly the probability you lose in the 5th round is 5/6*4/5*3/4*2/3*1/2 = 1/6. Thus the total probability of losing is 1/6+1/6+1/6=1/2. So, in this scenario it doesn't really matter when you choose to go.

Now, let us consider a slightly trickier scenario. If there are two bullets placed randomly in the chamber would the choice remain immaterial? The answer is no. You would be better off going second. The probability that you would lose going second is 2/5. How? I guess you are smart enough to find that yourselves once you have understood our calculations for the first scenario.

Suppose you are allowed to choose the relative position of the bullets, which positions would maximize your probability assuming that you go second? Will these positions really matter? They do! If you calculate the probability of survival when you are going second for all the cases, you will notice that it is 2/3 when bullets are either adjacent or diagonally opposite and 1/2 when they are alternate.

Finally, try generalizing it for 'n' cylinders and 'm' bullets and then calculate the probability that you survive given that you are going second and there is no information regarding the number of bullets. I hope that you never land in such situations and if you do, probability saves your life.

# THE CAR OR THE GOAT

Probably, You Will Get Lucky...... !!!

-Amodh Kant Saxena

Imagine you are in a game show. Three doors are shown to you by the game show host, one concealing a car and the other two doors concealing a goat each. You have no way of knowing which door conceals which item and whichever door you pick you get the prize behind it. You are then asked to choose a door. But before it is opened the game show host opens one of the other two doors. The host knows where the car is and he opens a door to reveal a goat. You are then asked, whether you would like to swap your chosen door for the remaining closed door. The question is, should you swap, should you stick with your original choice or it does not make any difference with what you do.

Which would give you the greatest chance of winning the car? Now most people would think that it makes no difference whether you swap or not. Behind one closed door is the goat and behind the other closed door is the car. The chance of winning the car is 50-50 so it makes no difference whether you swap or not. It sounds sensible. But it is incorrect.

The Monty Hall problem is a puzzle about probability. The problem is easy to understand but the answer is counter-intuitive. What should you do? The answer is: you should always swap, as this gives twice the chance of winning the car. It can be explained in different ways. But the easiest one is examining the chances of winning the car in both the two strategies: Swapping or Not Swapping. Let us look at what happens if we don't swap.

In the start of the game you are asked to pick a door. Since there are two doors and only one car, the probability of you picking the car is 1/3, about 33% and since there are two goats, the probability of you picking a goat is 2/3 or about 66%. Now if you don't swap the door, it makes no difference as you have already fixed your choice and the probability of your picking the car is 33% and your picking the goat is 66%. So by not swapping, you have a 33% chance of winning the car and a 66% chance of winning a goat. Now let us see the consequences of swapping. Let's consider if by luck you pick the car first time with 33% chance. It is obvious that if you pick the car on your first go and then you swap you are going to end up with a goat. So if you swap you are going to end up with a goat at least 33% of the time. But what if you pick a goat in the first time? Here lies the main crux of the problem. The host would open the only other door which has a goat.
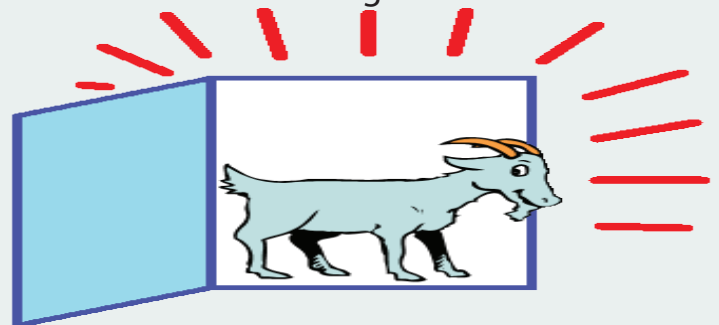


This time you swap to the other door to win the car. In fact whenever you pick the goat-door the first time, you are going to win a car, and the chance of picking a goat the first time is 66%. Hence by swapping you have a 33% chance of winning the goat, by picking a car first time and 66% chance of winning the car, by picking the goat first time. The only question which now remains is that do you actually want to win a car or do you want to win a goat?

# FACTS FACTORY



We are nothing if not unimaginative with our e-mail passwords. It seems "123456" is the all-time most popular choice for protecting our precious online correspondence. This sequence came out on top in 2009 when 10,000 Hotmail passwords were exposed online. ("123456" also topped the list of passwords in the recent Gawker hack)



Did you know that Domain registration was free until an announcement by the National Science Foundation on 14th September, 1995, changed it?

The first e-mail from space was sent in 1991. The crew of STS-43 Atlantis used Apple's early AppleLink software on a Macintosh Portable to transmit the following:
"Hello Earth! Greetings from the STS-43 Crew. This is the first AppleLink from space. Having a GREAT time, wish you were here... send cryo and RCS! Hasta la vista, baby... we'll be back!"
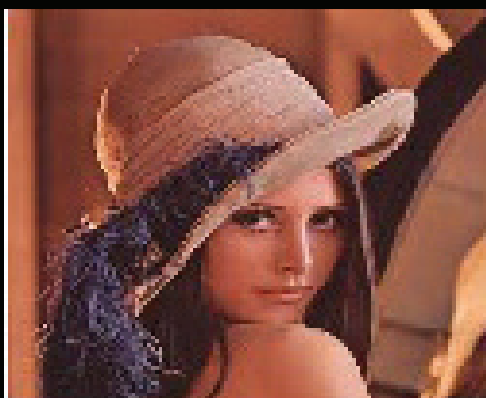




If you don't find an image of Lena in an image processing book, check again! You might be referring to a wrong one.

# PLACEMENT++

- Krunal M Harne

Placement season is the most important and a testing phase in IIT life. I appeared for just three interviews but it was a great learning experience. Here are some tips I would like to share with you which might be helpful.

Honestly speaking your placement generally boils down to at least one of the three factors- CPI, Coding skills, Analytical skills/aptitude. CPI represents your knowledge and consistency which is generally required by core companies. Remember, once you clear the CPI cut off, everything depends upon your Interview.  IT and management/finance companies mostly look for your knowledge in coding or your analytical skills (puzzles and aptitude). If you are targeting core companies in ECE/EEE, begin revising important departmental courses at least 2-3 months before the placement season kicks off in December. Here is a short list of few must do courses – Principles of Communication, Digital Communication, DSP, Signals and Systems, Embedded Systems, Digital Circuits and Microprocessors and Analog Circuit Design. Organize a series of placement lectures, given by your batch mates, on these topics in your 7th semester. It really helps you discuss key interview questions and revise your courses effectively.

Before appearing for a written/online test of a company, practice some questions that appeared in their previous tests. You can practice some standard aptitude questions. Google will help you here. Traverse the question paper before you start solving since many simple questions are deliberately placed in the end.No matter how your communication skills may be, mock GDs are necessary! Sit with a pen, paper and carefully listen and note down in short what others say and add your points to the discussion referring to previous points (you may start like "as my friend has mentioned..."). Be polite. Do not shout or add irrelevant points. If others are shouting, raise your hand and wait for your chance to come. Before you go for the interview, check the website of the company to get a fair idea about the job profile. Contact your seniors in different companies to know how they prepared and what kind of questions were asked in the interviews. You can make two CVs - one for core companies - explaining your projects, another for non-core companies -highlighting your extracurricular activities.

**Interview tips**
Churn your CV! You should know each and every point you've mentioned in the CV. (For example, I had added Ubuntu and Fedora in the 'operating systems'; they asked me when and how I worked on them and what's the difference between the two) Prepare an explanation for everything. Remember the entire interview can drift in the direction you take it.
Practice solving puzzles as you may sometimes encounter standard puzzles directly in an interview. Search on Google - 'Coin puzzles', 'Prisoner puzzles', 'Hat puzzles' and solve all the puzzles belonging to each category. This will cover most of the standard puzzles those help you shape your logical thinking which help in order to crack the puzzles directly in an interview. Remember, DO NOT directly tell the final answer if you are not sure. Your approach matters more than the answer. Explain the approach first.

Most people don't use pen and paper while explaining their projects to the interviewer. How can you expect the interviewer to understand the work which took you an entire semester?

Everything depends upon how you explain. Focus more upon what you've learnt and their applications in real life in an interesting way. Be alert. The interviewer may fire a random or an unexpected question at you. For example, in Oracle interview, just after I answered two back to back puzzles, the interviewer suddenly asked me 'How will you convince your grandmother to use internet?' I had no clue whatsoever!

## How to prepare for HR Interview?

### Tell me about yourself ?
They judge you with every question they fire at you. Keep the answer short and sweet (not more than 2 minutes). You would definitely not like to give a boring start at the first question. Include major achievements or turning points of your life. If you are holding any post, tell them what you've learnt from your work and how it has helped shaping your personality.

### Why should we hire you?
Be honest. Interviewers are smart, they'll immediately catch if you're lying or have mugged up the answer. Mention your strong points and convince them how those qualities make you suitable for the job. Always keep a rough explanation ready in your mind to convincingly answer the possible counter questions.

### What are your strong points and weaknesses?
Again, be honest. For example, do not stammer while saying 'I have good communication skills'. Know yourself! Keep real life examples ready to support your answers. This will again depend upon person to person but if you are mentioning a weakness of yours, support it with an explanation of how you did or will manage to get rid of it.

### Why did you choose this company?
Knowing the job profile thoroughly is very important. Give a proper explanation highlighting your strengths and how those qualities are going to help you gain an exposure in a particular learning environment. If you are going for a finance company, they know the fact that being an engineering student you only have a technical background and no exposure to finance. It's going to be a completely new learning experience for you.

### Why is your CPI low?
(Most common question asked if you've cleared their cut-off by a small margin)
The point is you may not be a jack of all trades. Tell them how you've pursued other interests. You may add how you managed to lift your CPI in a particular semester (if that's the case). If you have done significantly well in your projects, you can always add that as a comeback point to convince the interviewer that you do have the potential.

### Do you have any questions for us?
Yes. Ask questions. Not too many though. Show them that you're really interested in their company and willing to learn new things. You can ask about the work culture and learning opportunities. Finally I would like to say, do not panic. Don't hesitate to ask your seniors for the advice. Be confident! After all you are an IITian. Rejections will occur but don't lose hope. Always remember it's not about how many times you get knocked down; it's about how many times you get back up. All the best!

# *INTERVIEWS*

### Devendra Singh Sachan
*Cisco interview:*

I was trying to show off my knowledge by giving very detailed mathematical explanations.

Interviewer : (After listening to everything) Dude, I did my engineering 15 years back. I really can't under
stand anything. (Rejected)

*Virtusa HR Interview :*

Interviewer : Why do you want to join Software Industry?

Me : I like Programming... blah... blah... blah...

Interviewer : That was not convincing. Please tell me more.

Me : (I couldn't bluff anymore. It was 2 am) I saw an inspirational video in which the idea was that the impact of large scale data analysis could be similar to the impact of microprocessors today. Your Tech guy told me that in Virtusa you also have a big data lab. So I want to join Virtusa. (Rejected)

### Hemant Agarwal
*Global Analytics:*

Interviewer : On a concluding note, do you have any questions for us to answer?

Me : Ma'am, actually I am quite interested to know the contribution of iRUNWAY in the domain of patents and intellectual property rights?

Interviewer : iRUNWAY?

Me : Sorry, I mean I am quite interested to know the aspect of analytics and strategies that Global Analytics work on?

### Mandar Kulkarni
*Samsung :*

Interviewer : (Pulling my leg) I think I remember your face during my PPT. Were you the one who asked me the doubt regarding the current Samsung projects in R&D ?

Me :  Oh yes, I think you remember my face as I was sitting two seats away from the person who asked you that question.

Interviewer : (I believe his expressions said that more than his speech) *Kaha se aa gaya bhai tu?*

### Krunal M Harne
*Global Analytics:*

*This was a walking interview on 2nd floor*

Interviewer : (Pointing at the people on ground floor) What if you're standing in that crowd and I'm standing here and everyone is trying to create an impression on me say, shouting at the top of their voice, how will I recognize you?

Me : (Instantly) Ma'am, you would easily recognize me  because I would be the only one standing quiet.

Interviewer : Then what if you are dancing in a DJ night shouting with everyone, how will I recognize you?

Me : Again, you would easily recognize me because you can easily spot a person who is the worst dancer in the crowd.

Interviewer : Tell me one good quality that your best friend has but you don't!

Me : (Confused with no clue whatsoever) Ma'am, he's a very dominant person and I'm not!

Interviewer : Being dominant is not a good quality.

Me : (Instantly) That's great then! I've never tried being that.

# INTERNSHIP EXPERIENCE

### Aditi Olemann
### B.Tech Final Year, ECE
### Schlumberger

For the ones looking for an internship packed with adventure, Schlumberger is the right place to be. From the moment you join the gang of fellow field interns for your summer sojourn, it is a roller coaster ride that shall take you through posh four star comfort during the initiation to the grill and adventure of spending nights at an oil-field, probably putting up in a high end Schlumberger Truck with computers and fancy gadgetry that shall make you feel like part of a sci-fi movie. When they come to recruit you, all that Schlumberger looks for in a student is the enthusiasm to learn and the adventurous streak. You get to learn about the oilfield industry in the most innovative ways possible. If you cherish meeting new people, then I can assure you that you shall meet some of the coolest engineers you can ever think of. But at the end of the day, when you see a brightly light oil rig standing majestically in the darkness of the night, it makes you take pride in engineering.

### Sarthak Gupta
### B.Tech Final Year, EEE
### ITC KITES

Having done an academic intern in my 2nd year, I decided to opt for an industrial one in the third year. I was fortunate enough to be selected for ITC's KITES (Knowledge, Initiative & Talent Excellence Series) program. My project was on "Optimization of Power Usage". I had to propose methods to reduce the overall power consumption of the plant. The plant in Pune, where I was posted, produced Bingo Mad Angles, Potato Chips, Tangles, and Sunfeast Yipee noodles. It was an amazing experience in itself to study the production lines which churned out several tons of finished goods every day. Working on the project was a test of all my knowledge in electrical machines, control systems and instrumentation and even used some concepts of mechanical engineering. In the end I came up with proposals that would help reduce the consumption by 15 lakhs KWh/annum. Overall it was a full on learning experience. This internship gave me an opportunity to put to use all that I had learnt so far. After all, isn't that what we have always been aiming for?

### B.L.S Mounica
### B.Tech Pre Final Year, ECE
### ISI Kolkata

I opted for image processing and pattern recognition since a lot of reasearch is going on in this area. Since some of my seniors had already worked under Professor Bhabatosh Chanda of ISI Kolkata, a pioneer in the field of image processing, I decided to apply for my intern in his group. Starting with an exhausting first week with a lot of reading work on a completely new topic : "Restoration of Old Murals using IP", my internship was indeed a great learning experience. I, along with Dhruv Ratra with our professor's guidance came up with a novel painting recovery technique based on patch matting. Our work got published in IEEE Transactions on Image Processing. The summer of 2012 added an entire new chapter in my life. I realised that doing research and finding something new is really not very tough if one works with interest and commitment and my very first experience of working in a research lab with distinguished people was just incomparable.

### Anurag Kapale
### B.Tech Final Year, ECE
### Hanyang University

Mid March 2012, occured a late realization that I should have prepared coding for industrial interns. After a week's despair, I started out with a try for the only last hope, a foreign research intern! Number of futile attempts and then I got a first positive reply from Hanyang University, Korea. Determined not to lose this chance, I showed a strong inclination towards working and it was my pre-intern work on the basis of which my professor agreed to provide funding if I complete my task sucessfully. With the wonderful hospitality and awesome outing experience, I also experienced intense research work with my professor. Cherishing the every Korean experience I tried all sorts of weird foods ranging from octopus to silkworms and learned the Korean script with its culture. Finally, my efforts starting from before the intern to the one whole sem after it, paid off well with an IEEE journal paper submission and a job at Qualcomm.

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# ACHIEVEMENTS

## Conference Papers

1. Rakesh S, Kailash Atal, Ashish Arora, Pulak Purkait, Bhabatosh Chanda, "Face Image Retrieval Based on Probe Sketch Using SIFT Feature Descriptors", 1st Indo-Japan Conference on Perception and Machine Intelligence
2. Best paper award in signal processing stream in the 17th National Conference on Communications 2011 held at IISc Bangalore - Haris B.C
3. K. Thirugnanam, H. Saini, P. Kumar, "Mathematical modelling of Li-ion battery for charge/discharge rate and capacity fading characteristics using genetic algorithm approach", Transportation Electrification Conference and Expo (ITEC), 2012 IEEE , vol., no., pp.1-6, 18-20 June 2012
4. Best Student Paper Award in IEEE MV Chauhan All India Student Paper Contest, presented at IEEE INDICON, Dec '12 – Abhinav Agarwal and Abhijeet Singh
5. Dharmendra Kumar Prajapati, Vivek Gunawat and Mahesh Kumar, "Analysis of Implementing an electric city bus and its coordination with the grid", IEEE Conference INDICON 2012, Kochi
6. IEEE Ganesh N. Ramaswami memorial student grant sponsored by IBM, for the best paper in speaker/language recognition area in IEEE ICASSP 2012 held at Kyoto, Japan – Haris B.C.
7. Kartik Dwivedi, Dr. Saibal Kumar Pal, "A new chaotic Permutation and Substitution Based Digital Image Encryption tech nique", International Conference on Mathematical Science and Applications, New Delhi, India, 2012

## Journal Papers

1. Bhabatosh Chanda, Dhruv Ratra, B.L.S. Mounica , "Virtual restoration of old mural paintings using patch matching tech nique," Emerging Applications of Information Technology (EAIT), 2012 Third International Conference on , vol., no., pp.299-302, Nov. 30 2012-Dec. 1 2012

## Posters

1. K. Atal, T. H. Steiner, M. A. Zulliger, D. Nesic, R. Müller and K. S. Stok, "A quantitative analysis of the effect of altered femoral bone structure with the onset of osteoarthritis in a preclinical rat model"- Swiss Society for Biomedical Engineering, Laus anne, Switzerland
2. K. Atal, T. H. Steiner, M. A. Zulliger, D. Nesic, R. Müller and K. S. Stok, "Quantitative joint alignment measurements for preclini cal models of osteoarthritis" - Swiss Society for Biomedical Engineering, Lausanne, Switzerland
3. Amodh Kant Saxena, Priyasee Pradhan, Ajay Kumar, David Adamson, Dr. Carolyn P. Rose, "Helping Stuck Students Talking on a Topic" - IPTSE Winter School 2012 at MS Ramaiah Institute of Technology, Bangalore in collaboration with Carnegie Mellon University, US

## Scholarships and Awards

1. Best Project Award in GE Edison Challenge, Dec 2012. General Electric (GE) Research Award of $ 20,000 – Jayesh Bhaskar Yerrapragada, Abhinav Agarwal, Abhijeet Singh and Aditi Olemann
2. Recipient of prestigious DAAD WISE (Working Internships in Science and Engineering) Scholarship 2012 – Mandar Kulkarni
3. Recipient of prestigious MITACS Globalink Scholarship 2012 – Abhinav Agarwal
4. Selected at International Association for the Exchange of Students for Technical Experience for funded summer internship at ETH Zürich, Switzerland 2012 – Kailash Atal
5. Awarded OPJEMS '12 - Ujwal Kalra
6. Gayadhar Pradhan , Haris B. C., Rohan Kumar Das and Prof. S. R. M. Prasanna stood 3rd in NIST Human Assisted Speaker Recognition (HASR) task worldwide
7. Winner of MISB National Business Quiz - 2012 and won a Trip to Italy - Vivek Gunawat
8. Participated in Drishti, Technology Vision 2035 and went up to the final round where only twenty teams had been selected from all over the country for entry "Flexible Solar Cells" - Amodh Kant Saxena

## Budding Entrepreneurs

1. Start-up known as "BOOKNEST" – Vishal Gawade, Amrit K. Lenka, Shruthi Chivukula
2. Co-founder of Intellinfo – Ujwal Kalra
3. President, Kairos India-East Global Fellow, Kairos Society – Ujwal Kalra
4. Kairos Global Fellow – Srijan Maulick

## Inter IIT Sports Meet

1. Lovish Choudhary : Won gold medal, Cricket, Inter IIT Sports Meet 2010
2. P. Alekhya Muthyam : Won gold medal, Table Tennis, Inter IIT Sports Meet 2012
3. Surabhi Bhargava : Won four silver medals, Swimming category, Inter IIT Sports Meet 2012

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# DEPARTMENTAL ACTIVITIES

| Date | Name of the Event | Speaker |
|------|-------------------|---------|
| 09/08/2012 | Introductory talk | Kailash Atal and Tousif K.Nizami |
| 17/08/2012 | Internship talk for III year | Various |
| 18/08/2012 | Technical talk on internship experience at TU Berlin on Body Area Networks | Mandar Kulkarni |
| 24/08/2012 | Invited talk on Bangla OCR | Prof. B. B. Chaudhari, ISI Kolkata |
| 25/08/2012 | Technical talk on internship experience on Magnetic Resonance Imaging | Mridul Krishnan |
| 26/09/2012 | Talk show on how to make Android applications | Ajaykumar Kannan |
| 28/09/2012 | Talk show on Multipath Transport Layer Protocol | Samar Shailendra , PhD |
| 29/09/2012 | Talk show on Deep Learning | Neeraj Kumar, PhD |
| 10/10/2012 | Freshers' party | Various |
| 9/1/2013 | Talk show on reCAPTCHA of Hindi text | Kailash Atal |
| 15/1/2013 | Video lecture on Netra and Bokode | Moderated by Kailash Atal |
| 16/1/2013 | Basics of MATLAB | Rahul Nallamothu and Vineeth Thomas |
| 18/1/2013 | Advanced lecture on MATLAB | Rahul Nallamothu and Vineeth Thomas |
| 19/1/2013 | Workshop on Basic Electronics | Ashish Amber, Akshay Gulati and Abhinav Agarwal |
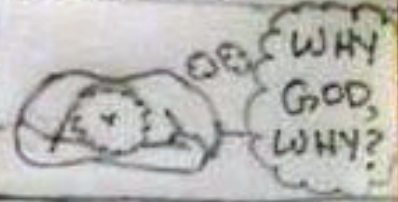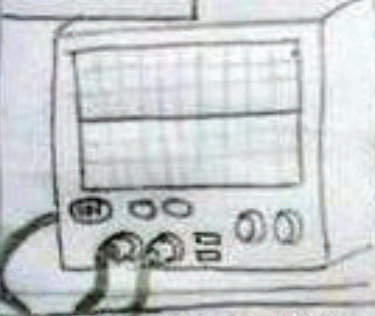
# WHEN CHIPS GET ROMANTIC

- Akshay Gulati

## Love-Letter from a Microprocessor to a Code



Miss Codeshwari.txt
Offset no. 2H, Index no.32H
Tag 25083H, RAM-II
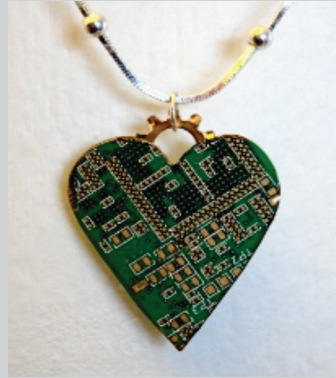
Dearest Codeshwari,

     Last week I saw you travelling in the nearby data bus. You were in a simple and traditional binary dress(I loved it). Your first look was like a TRAP interrupt to me. Since then I have not been able to execute anything properly. I have even witnessed a dip in my CPI (cycles per instruction). It seems that I have fallen in love with you.

     Codeshwari, although I belong to the poor Intel-x86 family, yet I have many things to offer. Unlike the newer generation, I don't have parallel processing so I will execute you and only you till you halt. I have a sufficient Cache to give shelter to your variables. I also possess a large data bus to cater to your demands from the memory market. I promise to disable all my interrupts so that nobody could interrupt your execution. I will always allow you to POP my stack whenever I will PUSH your data. All in all, I promise to be compatible partner.

     I tried convincing your father to get a permission to execute you but he seems a very emotionless person. (I could very well understand this since HE IS A PROGRAMMER AND HAS NO LIFE).

     Codeshwari,let me run on you. I promise to deliver healthy and effecient KIDS.EXE files.

Thanking you in anticipation.
Yours lovingly,
Mr. Chippo
CPU
     (Please deliver to the neighbouring address if valid bit is null) ;)

# WORDS OF WISDOM(?)

We asked our final year students *'What is it that you think you should have done in your first three years which you regret the most in your fourth year?'* Here's what they have to say...

## Devendra Singh Sachan

I should have focused and stressed more on the placements preparation (i.e. practicing a lot of objective coding and aptitude problems).

## Anonymous

I should have tried at least once to impress a beautiful girl!

## Siddharth Kabra

I should have learnt at least one programming language completely and kept it brushed up. I think it is important to concentrate particularly on those subjects that your profile develops towards because even if you are not aiming for something , your profile may have unknowingly been developing in a single field. You will most likely have found it by the end of your 5th semester.

## Mandar Kulkarni

One thing I learnt in my four years is that, there are really so many doors open to give you opportunity at a place like IIT that it depends on what you choose to knock. I chose to knock an academic door but I really feel I should have tried knocking atleast one more door (say Cadence or Xpressions) that would have kept my school day hobbies alive still today.

## Deepchand Prajapati

I should have developed communication skills. It would have really helped me in my placements.

## Rahul Mittal

Attending classes regularly and giving due importance to academics is very important. Everything else is indeed secondary. I hope juniors understand the severity of this thing early in the undergraduate years.

### About The Logo:
The logo represents the journey of InPhase. Having completed 11 years of its commitment to the EEE society of IITG, InPhase has grown from a tiny step towards connecting the students and faculty and keeping them in phase with departmental activities and upcoming technolgies to a medium inspiring students to innovate and excel.

InPhase Magazine
By Cepstrum Student Society
Dept. of Electronics & Communication Engg.
Indian Institute of Technology Guwahati

# AWAITING YOUR FEEDBACK
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