Scholarships, Mentoring and Information Oracles: The Role of Alumni in Guiding Young Students

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1 Introduction

In almost all the schools, alumni plays an important role in guiding the young undergraduate students. And, this article explains the different roles of Alumni in the form of scholarship providers, mentors, information oracles among others. It is written keeping our university in mind, but this information is generally applicable to any school. Please feel free to pass this information to others, if you think this would be useful to them. We describe various proposals which would help the current students in their studies, career and life in general. The most important thing being, nurturing the talented young students to become successful engineers. To emphasize the importance on academics, strong work-ethic, integrity, technical and communication skills necessary to succeed in both personal and professional life.

The outline of this article is as follows - In section 2, we will talk about various scholarships, section 3 talks about the role of alumni as mentors and information oracles, section 4 emphasizes the importance of undergraduate dissertations and various ways to motivate students to do good work, and finally concludes with the list of faculty members and alumni board of directors who are involved in this project.

2 Scholarships

We would like to give few scholarships to meritorious students who cannot afford their education and related expenses. There are two kinds of scholarships:

- **M. N. Seetaramanath Fellowship** : This fellowship is named after our beloved faculty who taught several students like us in the past 36 years. He was a faculty at IIT Kharagpur before coming to Andhra University and mentored several students there, who went on to become faculty at various IITs - Prof. C. Sivaramamurthy (IIT Madras), Prof. Phalgungi Gupta and Prof. R. K. Ghosh (IIT Kanpur). He has extensive experience in compiler writing, algorithm design and data mining. To recognize his contribution to academia, this fellowship is named after him. This fellowship is sponsored by his student Janardhan Rao.

- **General Scholarships** : These scholarships are not named after anyone, but the only difference being - the financial resources for these scholarships come from the alumni funds.

At the beginning of every academic year, a notification would be issued and posted in the notice board about these scholarships. Students in their second year are eligible to apply for these scholarships. The faculty advisory committee would choose the best candidates from the pool of applicants based on their financial status, academic performance and a personal statement describing their professional goals. The scholarships will cover the tuition fees and expenses for textbooks, and they will be renewed after each year based on the candidates academic performance. The rationale behind this annual renewal process is to keep the student motivated to do well in academics.
We will have a bank account to manage these funds and Prof. K.V.S.V.N. Raju will be the incharge of this entire process.

3 Mentoring and Information Oracles

Most of the students who join university campus are among the top few students in our state. Talent needs to be nurtured to make them successful engineers to reach good positions in their professional life. From our experience, many of them lack awareness on important things related to their career, and mostly rely on the information coming from grapevine and other unreliable sources. Coming from a remote place, I know the value of a piece of information. One of the main things that worries me is that - with hundreds of private engineering colleges in our state, we need to produce better students from our university when compared to all those other colleges. We don’t want all our students to just aim for those software engineer jobs in TCS, WIPRO, Infosys etc. We want some of them to pursue graduate studies in reputed universities like IITs and abroad.

I believe that Alumni can fill this information gap with accurate first hand information. To this end, we will create a alumni group where students can pose their queries and we will try to answer them. To save time, we will write some articles which will guide them through some of the common questions like GATE, applying for MS abroad etc. I wrote one such article (available at http://www.cse.iitk.ac.in/users/dvjrao/gateindex.html) for GATE aspirants 5 yrs back, when I was studying at IIT Kanpur. This might be little outdated, but most of the information still applies. I will try to update this article soon and try to put together another article for MS aspirants abroad. Students can go through these articles and then, pose their specific queries to alumni group after that.

Some of the students working in Industry will visit the university from time to time and give presentations on cutting-edge technologies. This might be a good opportunity to interact with them and ask their queries. For example, Lakshmi Narayana is visiting towards the end of sept or oct.

We will also try to arrange some lecture series (or tutorials) on emerging topics, by inviting faculty and graduate students from IISc, IITs and IIITs among others. We feel that these kind of talks can motivate some bright students and in turn stimulate their thinking.

4 Undergraduate Dissertations

Dissertations are an important part of the undergraduate education. This is a good opportunity for trying out an innovative and challenging project, that would stimulate their thinking and to test the skills acquired by them over time. If they do some good work, then they would get recognized for the same. And, this may motivate some of them to pursue graduate studies and get involved in solving more challenging problems. Additional rewards like getting admissions into top schools with full scholarships, publishing a paper in a national conference and securing jobs in top companies are also possible.

We often see people trying to reproduce the results from an international conference paper or implement one of the famous algorithms. I do not see this kind of project as a good dissertation and in fact it is as good as doing nothing. Instead, they can try to use an existing algorithm for a novel application. Some of the things which they can do as part of their undergraduate dissertation are:

- **Building large-scale systems:** They can build a large-scale system which can be readily used in real-world applications afterwards. In this way, you will learn the practical importance of many software engineering principles and their trade-offs, understand the benefits of modularity and object-oriented principles like reusability.

- **Open Source Application:** They could contribute to one of the open source projects among the linux community. The nice thing about this kind of project is - they would work with real code and real-time system like linux kernel and open source code. If they can do something significant here, then they will be considered as a very good systems programmer by both industry and academia.

- **Practical applications within the university:** Some of the tasks within the university can be automated using computing infrastructure. They can work on one such practical system. If
this is a big project, then several students can collaborate to develop different parts of the system. Also, several other departments like physics, chemistry, matallurgy etc. might need some computing facility that is specific to one of their problems. They can talk to those professors to know more about these kind of problems and their more general versions, to work on one of these practical applications. This kind of project would be very satisfying from their perspective, since it would help solve some real problems.

- **Exploring an active research area:** They could explore an active research area of their interest to learn more about the work that is done, identify some open problems or questions to answer and try to work on one of those. These kind of open-ended projects can be done only if they have self-motivation, helped by a good advisor who has some prior research experience. They could do something which is publishable in a national or international conference.

- **Summer Intern Program at IITs:** Some of the IITs like IIT Madras has a summer intern program, to which students who are at the end of third year can apply. You can continue working on the same project as part of your undergraduate dissertation with the guidance of your mentor from IIT and your advisor. This can be quite handy when they attend M.Tech interviews at IITs or organisations like DRDO, BARC among others.

We should have a good algorithm that would lead to some interesting dissertations at the end of the academic year. One such algorithm is below:

1. **Initialize step:** The students should have a fixed problem statement by the time they start their fourth year. They should give a formal presentation which talks about their problem, motivation, some possible approaches, tentative plan for the dissertation, along with the final product. Their colleagues and faculty can provide feedback during their presentation.

2. **Mid-review step:** We can evaluate the progress made by the students at the end of first semester in a similar way and try to give constructive feedback to the students to be able to achieve their final goal.

3. **End-review step:** We could arrange a poster session where students can show the work they have done as part of their dissertation, show live demos of their working systems. The faculty advisory committee will pick the best dissertation award from both application and research view.

4.1 **Best Dissertation Award**

In machine learning approaches, the most natural way of learning is called reinforcement learning. In reinforcement learning, the agents will get rewards or penalties based on their actions and the overall goal is to maximize their cumulative reward. In a similar way, we can introduce a Best Dissertation Award to encourage students to do good work. Faculty can nominate the dissertations under both application and research category. At the end of the nomination process, a majority vote could be taken to choose the best among them (ties can be broken by an outside faculty).

5 **Committee Members**

The Faculty Advisory Committee consists of all the senior faculty of computer science department i.e., all full professors. We leave the decision of choosing the outside faculty to the committee.

6 **Future Work**

This is a long-term project and we want to take one step at a time towards our goal. To this end, we are starting this with the above mentioned proposals which we think can maximize the influence keeping our long term interests in mind. However, we have a clear vision in our mind about the things we want to do in future. We list some of them below:

- To name a department chair after Prof. M. N. Seetaramanath to recognize his contributions to academia. Senior faculty will be honored with this chair for a period of 2 yrs.
• Try to contact as many alumni as possible and motivate them to participate actively in this project.

• Setup a mail server to allow students and alumni to have email access with our university domain name. For example, student-name@cse.auce.in

• Create a "Win-Win" model which is beneficial to both the current student and alumni in their professional life. Employees get referral bonus by referring good candidates. I know that this bonus is not a small amount, especially with startups and product development companies. "Win" for students is "best gets the best" and "win" for alumni is the "referral bonus". This is a "long-term reward" for both of them – student can go to better position if he does well (he is in a relatively good state and his overall reward depends on his future actions) and alumni’s referral bonus will increase (conditioned on the students state!), if the student performs well (increasing the confidence on the referrals by the alumni). We can make a deal with the alumni like - some share of referral bonus goes to the scholarship fund. In this way, we can keep the flow of incoming funds for scholarships.

• Develop an Alumni website and also for this project and link it to the CSE website. All the details w.r.t this project like scholarship notification, key dates, schedule of speakers and scholarship winners etc. will be mentioned on the webpage.

• Suggest changes to our academic curriculum that will help students learn better. For example, timely quizzes which would make the student study the material regularly, more emphasis on the practical applications of theory - like programming assignments to create small prototype systems (ex: Implementation of B trees or B+ trees or hashing and execute database queries on these data structures, emulating operating system components like scheduler, file manager using system call level programming etc.), new electives like - XML databases, Machine learning etc. To encourage self-study during the final year, some alumni may suggest some topics along with references and evaluate the students based on a small project or open book exam. Outstanding students will be given some prizes to motivate them to do better.

• Co-ordinate with the startup companies (like Zazu networks, Red Inc.) and real technical companies (like Symantec, Sybase etc.) to recruit our students.

• To help the students think "Big" keeping the global view in mind to compete with the best out there. To this end, we want to encourage them to pursue entrepreneurship by providing the necessary information related to it.

• Please feel free to send your suggestion and/or comments to us.

7 Contact Information

If you are interested in joining this project, then you can contact one of us below:

• Janardhan Rao Doppa (jana.iitk@gmail.com)
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