Understanding
Weaving Technologies and
Re-engineering

I am RAJESH NELLI, a Mechanical Engineering student from RGUKT – Basar. I was told by Srikanth Bashaboina(Co-intern) who conducted a program called “Techies for Karshak”, that a group of people come up with agricultural innovations. I felt happy for their work but overlooked them. They are the volunteers of Palle Srujana.

We(unguided students) started searching for the internship. We applied online for the internship at “Embedded Techpark Private Limited” located in Kanakapura. We also applied for the internship at “Moula Ali Diesel Loco Shed”. Now we started thinking about the internship at Palle Srujana.

Srikanth and I are the workmates. Srikanth said that he has a dream of working in weaving. But I mostly interested in Kanakapura internship to be in a comfort zone. Now it is the time for path selection. Healthy food always be bitter. I understood this and stated journey to Palle Srujana.

We have successfully completed the 53 days of internship from 10th May - 1st July. Below are the date wise descriptions of our work.

10th May - 12th May

We went to Palle Srujana IDC(Innovation Diffusion Center) to meet the president to talk about the internship opportunity in Palle Srujana. Upon meeting we got the particulars of the internship. President said, “You can choose the location of work, the field of work, the period of internship. But I set the standards”. We felt so interesting. We said that we are here to get the knowledge of traditional weaving technologies and requested to work from IDC for a period of 53 days. We were accommodated with free of cost. After completion of the schedule preparation, we got a chance to know about the GRIs(Grass Root Innovations) along with the IDC visitors. We searched for the award competitions for GRIs. We found three competitions each and sent the same to the president through the mail. President rejected all six competitions since those not suits with the GRIs that Palle Srujana has.

13th May

We went to Chintakindi Mallesham(GRI) sir to visit Handloom located in Aleru village. I observed each and every mechanism which helps in making an attractive saree. It took a lot of time for me to understand the mechanisms involved in handloom machine. We identified two processes which need a lot of patience and skill. The processes are Asu and joining the threads of new design with the end threads of saree under work. But these processes affect the human body. Mallesham sir solved Asu problem and now he is thinking about the other.

There is another process called marking. Sir also designed a marking machine. Asu and marking machines run based on electronics which are programmed with Assembly Language. Assembly language cannot interact with the client. This is the limitation of this language. But Mallesham sir want to embed this feature in both the machines.

What if there is no client-based interaction feature?

Without the above, a programmer can program the machine for a specific design only. So a user can work only on one design. In order to work on a new design, the user has to come to the programmer and make the machine newly programmed so that it works for a new design. So consisting client based interaction as a feature make the user work on variable designs without dependency and there is no need for the programming again and again.

So sir started learning Arduino - a programming language specially designed for electronics. Luckily, we already working with Arduino. So we take over these two projects. Sir explained every practical complexity which he faced while dealing with these projects. We understood everything and started working.

14th May

We went to Ranganathpuram to visit Powerloom. This is a community-based village works on weaving technologies. A lot of processes that are manually handled in the handloom are automated in the power loom. But the interesting thing is it also needs a human. We spent the minimum time to identify and understand every mechanism. A weaver shared his experiences with weaving life. Whenever thread completes then the machine has to stop on its own. There is a mechanism for it. Weaver surprised and felt happy after explaining the logic behind the mechanism.

15th May - 20th May

We gave a program after one day which works ideally perfect. We demonstrated the same to Mallesham sir. He felt happy about the outcome. Now he explained about how he overcome the practical problems with the conventional programming language. Before the explanation, we tried to write a program to get rid of the practical problems. But failed many times in the thought process itself. After guidance, both of us wrote two different programs in which one worked well. We again demonstrated the same after which we were provided with the electronics hardware.

Most of the time we saw the electronics digitally. We never get an opportunity to use practically. So it took a lot of time for us to understand and to use the hardware properly. We suggested new hardware for optimization. For that, we went to Koti to buy. Again worked with new hardware and succeded. We provided entire circuit design for the PCB after which we were asked to write a program for a machine which works on two motors - one for translation and another for rotation. I took care of this since Srikanth is busy in the hardware setup.

The task is to operate the motors simultaneously. It is not possible with traditional programming methodology called series computing. I searched and found another methodology called parallel computing which needs a different set of hardware. So I decided to provide a solution with series computing itself. I wrote the program for limited sizes of the pulley. After the demonstration, Mallesham sir had not satisfied with the limited sizes. I concluded as it is not possible with series computing.

After this, we were instructed to write a program for the marking machine.

21st May - 29th May

We continued further work at Srikanth's home. Successfully completed the program for marking machine. Tried to understand parallel computing. Optimized Asu machine programming. We met Mallesham sir’s brother Narender who is dealing with marking machine. We decided to go to Narender sir’s workshop located in Ramanthapur.

30th May

We tested the Asu machine with new software and hardware. We got the expected results. So we started moving from Aleru to Ramanthapur.

31st May - 1st Jun

We tested the marking machine and got the expected output. Initially, the program needs the information about the number of pins, number of markings and distances of markings. Narender sir asked us to write a program which works the same without providing the initial information which may not be known in some cases. And also asked for a button which can stop and start the process according to our needs and for a limit switch which maintains the coordination between machine and program. I am okay with pause and limit switches. But lacking confidence in making the machine work without providing the information initially. So I started working with little confidence.

2nd Jun - 3rd Jun

Participated in T - Innovation where I saw many GRIs who works to provide solutions for real-time problems. Almost no GRI has a formal education. But they are also using engineering technologies. This is the one which surprises me a lot. They are talented and also creative. They are spending their time and money to reduce the pain of the people. The only thing that they need is encouragement.

4th Jun - 6th Jun

We went to Ramanthapur. Replaced the data entry increment/decrement switches with a potentiometer. I felt this works better and easier than the switches to program and to operate. Pause button program completed. I found a programming feature called Dynamic memory allocation which supports to run the machine without providing information initially. I started learning the concept. Narender sir said that the machine needs to be modified and I take care of that. So we were asked to complete the program before to the complete modification.

We worked on the drawing of “Prakruti Vyavasayam” which was asked by Chinni Krishna(GRI). The drawing is to provide the dimensions of the letters so that two words fit in the centre of the 130x120 feet farming land in two lines. He wants to grow different varieties of innovated and collected paddies with different colours in the text. So we have given a square style drawing. But he was not satisfied with this. He wants a curve style drawing. We directed him to do the same himself. He wants to capture the beautiful scene of growing paddies with different colours in one place with the help of a drone. This single scene provides every information about valuable part of his life. It is so inspirational.

7th Jun - 12th Jun

We went to Parkal to meet Kadivendi Mahipal Chary(GRI) who innovated a power weeder. The machine looks attractive and perfect. We were told the entire story of his life of innovation. Like every GRI, he also discouraged by society and by the family. He passed only English subject in SSC upon supplementary. He is a motorcycle mechanic. He learned welding technology. He built a strong shed on his own. He can repair the sprayers and pump sets. Fewer profits in a job moved him from the farming to the mechanic and from the mechanic to the water supplier and from here to again farming. He felt that he need a power weeder to be effortless and productive. He crossed every obstacle and completed the machine.

He went to NABARD to get the financial support where he got the contact of Palle Srujana by which he was enriched. He got National entrepreneurship award and President of India award. Now he has a national wide market. He is planning to design a new machine by replacing the iron wheels with tyres and by providing a seat. He is a fast learner and very professional. He followed his own manufacturing methods which are very effective than the traditional ones. He decided to import the engines directly from China which reduces the overall cost so the machine cost. This idea made me feel interesting and happy.

We planned to meet Pandu Ranga Rao(GRI) who innovated Air Ceal. But we missed him due to his busy and important schedule. In this time I have completed the entire program for the marking machine.

13th Jun - 16th Jun

I involved in the preparation of Chinna Shodha Yatra(CSY). The journey is to get the village knowledge in the village by the villagers. The complete journey is all along with nature. I enjoyed it very much.

I spent three days in CSY. I completely expressed myself to others. I felt very tired of walking on the first day. I thought that I definitely get leg pains. But luckily I didn't get the pains. I was provided food after so many kilometres of walking. That is why I enjoyed the food.

I talked with strangers. I spend some time with organizers to understand the pain and responsibility. I got a good teacher. I spent my time with the persons who are so special.

I attended to IGNITE program. So I understood the moto behind this program since children are really creative and active.

I identified that everyone trying to adapt everything which gives enjoyment. I tried to be alone to feel the reality over layers of fake and temporariness.

Many times I listened to the word "perspective". So I started exploring the idea of perspective. I learned how to start a discussion.

I was thinking about modifications in the CSY. I talked with the cab driver and understood his views of life and on CSY. I haven't participated in the silent walk but we the driver and I felt the silent walk from the cab itself.

I felt very happy when I feed a dog. Because I don't know whether it likes it or not. Without knowing this I need to through the food on to the floor. The food is excess for me, so I don't want to waste it. But if it doesn't eat then it is going to be wasted.

I shared my knowledge of automation with a Yatri. I learned to operate the mains of a pump motor. I found a useful mechanism in a tractor.

Most inspirational thing is the concept behind the Telugu Ganga project.

Ultimately, I got a completely new experience, so the knowledge.

17th Jun - 22nd Jun

I have translated two stories from Palle Srujana bi-monthly magazine. The stories are “Low-cost ear machine” and “Mastless windmill”. I have given more priority to the problems which can be solved by these innovations among other problems which were solved by other innovations. Though I felt it was so hard, it is productive. I learned new words of English and of Telugu. The writing style of these stories is different from each other in the level of difficulty. That is why I worked out very easily with the mastless windmill than the low-cost ear machine though it has less content.

Drafted the story of Kadivendi Mahipal chary and made a complete report and presentation.

23rd Jun

We went to Mukthapur to visit Godasu Narasimha(GRI) and to file technical documentation on Ashok's(Son of Narasimha) Innovation. He provided a website link to get every detail about him. We read some of it for some time. He is from a fishing community which face the problem of Hyacinth cover. The community needs to spend three months every year to remove the hyacinth from the fish pond to collect the fishes without earning any money. They work in different fields for the remaining nine months to secure the money for the three months. They also thought to remove the hyacinth with the help of labour. But the sum of wages of labour is higher than the profits that they get out of the fish sale.

The quality if hyacinth is to become two times in its size in 15 days. So Narasimha planned to make a machine which cuts the hyacinth at the outlet of the pond. He took money from the community and made a motor-powered machine with attached blades. The machine worked well in the air but failed in the water due to insufficient torque. So he was discouraged by the community.

He decided to make a conveyor which carries the hyacinth from the pond to the cutting machine. He borrowed some money to make this machine. He learned gear ratios from a tractor driver, the relation between speed and torque from a mechanic and usage of belt and chain with his own experience. These are the requirements to make the machine work as expected. The community said that they pay the debt after successful completion of the machine. But now they don't want to.

He earned some money by removing the hyacinth from the ponds of surrounding villages. He was greatly supported by Palle Srujana which made his debts clear, worked on recognition, patent and etc. His machine played a vital role in cleaning the ponds of Hyderabad. The Indian government wants to give this machine to Kenya as a gift. As per the government policy, the bills will be paid after completion of the machine. Again Palle Srujana supported him in making this happen. Government appreciated him with a national innovation award.

Now it is about Ashok's innovation. Using auto or trolley for shifting loads is costly especially in the villages. So he made a vehicle powered by Chetak engine and a four-wheeler gearbox. This vehicle consists of everything that a conventional four-wheeler has. He powered only one rear wheel. So the powered wheel losing its contact with the road on the uneven surfaces. He solved this by dividing the chassis into the front and rear parts and making a hinge connection between these two parts. Rear wheels are attached to the rear part of the chassis and front wheels are attached to the

front part of the chassis. Hinge made the front part to rotate about the axis along the road without transferring the effect of uneven surfaces to the rear part. This vehicle can be used for farming. I was surprised and greatly motivated by his innovation. We documented his innovation.

24th Jun

I started to a private school by the auto along with Akhila(Volunteer in PS) in the afternoon. IGNITE presentation editing was not completed since I was told on the same day morning about the afternoon session. I have completed the editing in the auto itself. I met Abhishay(Employee in Inqui-Lab foundation) at the school and we were told that the projector is not working. We adapted to the situation. I presented the IGNITE innovations to the students with the help of Akhila. Students were very active and they were asking for the working principles of the innovations. We have given answers to every question. Making them understand without a projector is the only difficult task that I have faced. It is a valuable opportunity for me to interact with the children for the betterment of India.

25th Jun - 26th Jun

I started making a video sequel of innovations. I collected videos from Mr Subhash(A senior volunteer in PS and MD of Creative Minds). I collected innovation information from the NIF website. I was planned to make the videos short but informative which reduces the size. I categorized the innovations into Agriculture and Non-Agriculture. The video consists of innovation, the title of innovation, name of innovator and photo of the innovator.

27th Jun

We went to Narender sir to make a few modifications. Changed the code for variable markings. Pause button worked. Dynamic memory allocation program tested. We found the program need debugging. Replaced a stepper motor with DC motor, so the code. Attached limit switches for the two motors. I added the code for these switches. I recorded the machine working with a video recorder. We taught Narender sir how to handle the hardware and software. We told Narender sir that we will come to you after completion of the internship for further development of the machine.

28th Jun - 30th Jun

Edited the project videos for the presentation. Started making a report on Narasimha's story. Successfully completed the video sequel.

1st July

We prepared ourselves for the presentation and presented our complete internship to the Brigadier Ganesham sir and to a guest. We received the feedback.

Impressions and Takeaways

- Communities are the different groups of people who work for human sustainability. Solving their problems solves everything.
- I heard many times the word "Determination". But in this internship, I was exposed to it.
- The receiver is the key aspect of communication.
- Loneliness gives time to introspect ourselves.
- One should not be different to be equal.
- There should not be any assumptions in a reference.
- Patience and determination are the key points to avoid failure.
- Best way to helping others is to uplift their's state of mind.
- Giving the best solution to a problem is eliminating the cause.
- Thinking from the other's perspective is the only complex thing which decides the future.
- One should at least taste the unknown without fear.
- I learned the concept of systemization.
- I understood why scientists want to store the intelligence of Einstein(An old).
- People are not friends to a particular caste. They just don't want to face the difference.

- The collaboration between old and new makes everything possible.
- Engineering is for the people and technology should not be a constraint.
- End-user satisfaction is a necessary consideration to provide the best solution.
- I learned to translate and learned some video editing techniques.
- Adopted the idea of working rather talking.
- I got a lot of inspiration throughout the internship.
- I was exposed to NIF, Honey Bee Network and of course Palle Srujana.
- I framed this - “Know – Realize – Follow”.
- Though we have differences we managed and learned to work as a team . My teammate appreciated my work.
- I learned to adjust to different types of environment.
- There are a lot of journeys in this internship. Though I don’t like it, I managed.
- I have seen a community-based village. It gave a new experience.
- I was exposed to life in the metro city. I observed metro railways working, traffic jams, bus transportation and etc.. Understanding metro railways are easier than the buses in the metro city.
- Today’s successful businesses of the world are the innovations in the past.

Above points are not enough to express the importance of this internship. In the entire internship, most respected and inspirational personalities are Mr Subhash and Mr Shiva. It is so difficult to understand and adopt the qualities of the president.

Thanks to Brigadier Ganesham sir for giving us this opportunity.

- RAJESH NELLI