# SPACE Annual Report 2016-2017

Introduction

SPACE entered its 13th year with great expectations and drew satisfaction from fulfilling them by the year end. Support from external stakeholders helped us move ahead with our initiatives, be it the Insight project for children with special needs, faculty development programmes, women hackathons or research and development activities. It was a essentially a busy year for SPACE, where we registered significant progress in all fields of involvement. The year also saw us extend our reach and raise our visibility. An overview of the activities we were involved in 2016-2017 is presented below.

Insight Project

Insight, our ICT Center for Cognitively Challenged, run with support from the Social Welfare Department, Government of Kerala since 2014 completed another successful year. The initiative, which leverages Information and Communication Technology (ICT) for the benefit of cognitively challenged children, offered services to nearly 60 children directly besides supporting similar initiatives in Kerala. The training methodology that we have developed and practise are found extremely useful for children and it won appreciation from other institutions and organisations working in this area.

In 2016-17 academic year, so far, 70 students have attended training at the INSIGHT Thiruvananthapuram centre. Among the students, 51 are boys and 19 are girls. It is worth mentioning that 29 are new entrants. Number of students attending classes every month are approaching 50 from nearly 30 in the previous years. Each student is assessed on their cognitive ability and individualized plans are prepared on the basis of their specific needs. The students are allotted a maximum of two sessions every week depending on their convenience. The individualized plan for the students are prepared by a team included by psychologist, special educators and technologist in consultation with parent.
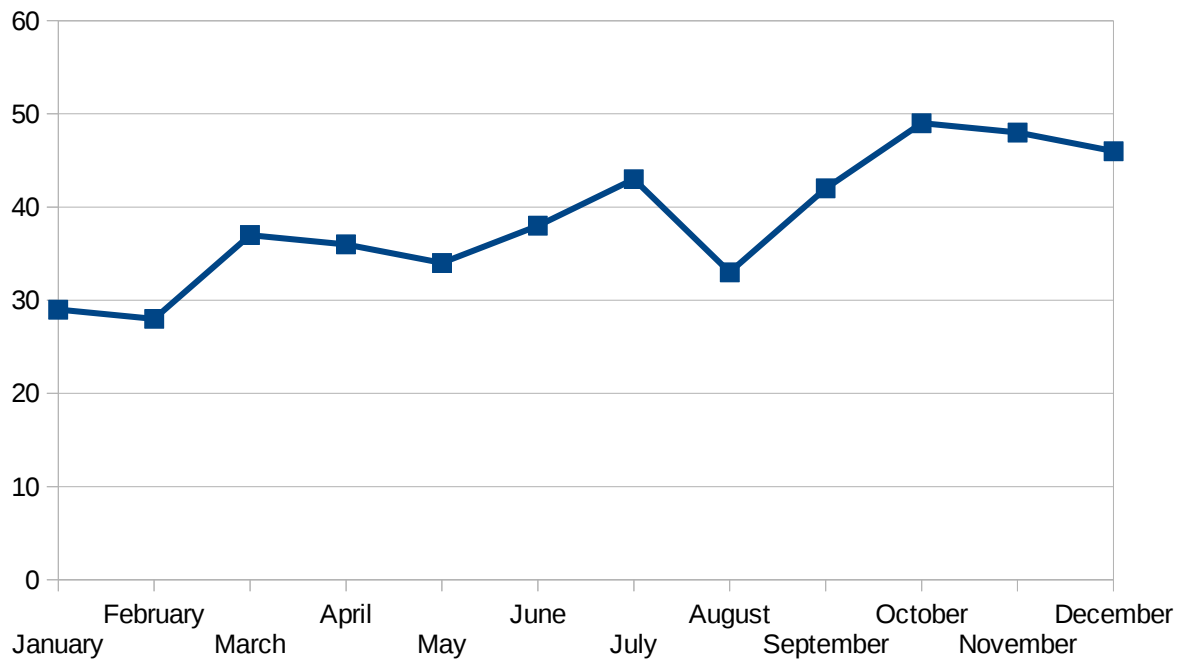
Illustration 1: Students attending the training each month

We got generous support from SBI Life to set up a Sensory Stimulation Room for Sensory Integration Therapies this year. Sensory Integration Therapies are essential for children with autism and attention deficit hyperactivity disorder. The sensory room contains electronic and non-electronic devices and toys that can provide visual, auditory, tactile, motion and olfactory sensations to children.

The facility was officially inaugurated by Shri. K. Muralidharan MLA in a function where nearly 100 people, including parents, friends and well-wishers, participated. Each child is now provided with 20 to 30-minute session of sensory training at this facility.

Apart from ICT training, we conducted a set of training programmes to special educators and parents during the same period and the feedback received was positive. Also, we made significant technical progress this year by developing more interactive games, developing a custom IEP software and enhancing the AAC-SPEECH-Android project.

SPIN-IEP

This year we made some technical contributions in the special education sector. One is the development of custom IEP platform which is named as 'SPIN-IEP' for Special Education. As per federal law, an Individualized Education Plan or IEP needs to be prepared for every public school student who is eligible for special education. An IEP is an important legal document as well. This provides a detailed description of each child's unique learning issues, intended educational goals, the services that the institution would provide, the progress of the child and how it will be measured. Hence IEP would be different for different students. It is also very important to update IEP regularly.

Creating an effective IEP often requires time, effort and patience. Several people including parents and teachers are involved in this process. Considering its complexity and relevance, the possibilities for software support in this domain are huge, but they still remain almost unexplored.

Very few open source tools like IEP-IPP, GrowIEP are available for IEP, of which IEP-IPP has been in a dead state since 2013. Hence reviving this project is of high importance. But while realising its inability to enhance well, it was decided that a new application may be developed from scratch. Laravel framework was chosen for development. The application is designed such that it can be implemented within an office. However, it can be deployed over the Internet, and with relatively minor configuration, it can be offered as Software as a Service (SaaS). It is now being piloted at Insight project. After an initial pilot period of 3-6 months, we shall be able to offer the service to other institutions.

The software is available for free download at:
https://github.com/jithin-space/spin

AAC-SPEECH-ANDROID

AAC-SPEECH-ANDROID is an android application aimed at helping people with speech disabilities by offering them an alternative way to communicate through pictures. Basically, this is a text-speech application. Using this application, one can choose a series of pictures to form a grammatically correct sentence and make it read aloud. Since it is based on pictures, AAC-SPEECH-ANDROID is very effective for children with limited communication skills. What makes it more relevant is that only a few applications like Avaz and Proloquo are available in this realm, and these are purely commercial.

We have made AAC-SPEECH-ANDROID compatible with Android version up to API 24 (Marshmallow). It is now operational in tablets and smartphones. Some of the old and redundant libraries were replaced with similar functionalities provided by latest Android frameworks. Currently, the application has no crashes and works smoothly in different platforms.

Also, the word set included with the program contains several language errors. These were partially fixed and some form of cultural adaptation was done with locally relevant words included in the database of the application. The revised code base was submitted to the original author for review and incorporation. The code was released on the Gitlab site. Once the developer accepts the change, it can be pushed to the App stores. The feedback so far has been positive. In case the original developer is not able to do it, we shall fork and release the application. Pilot testing started at Insight Project.

The software is available for free download at:

https://gitlab.com/space-kerala/Android-Applications/aac-speech-android

Women Hackathon

Women Hackathon, an initiative launched by SPACE last year for empowering students of professional colleges technically to introduce them to free software, expanded its wings this year with the involvement of ICFOSS as an organising partner. This initiative was launched for addressing the gender imbalance in the tech sector and for showing how the concept of free software can be used as an effective way to address the disparity.

We conducted two residential hackathons at ICFOSS in April and September respectively with a total participation of 60 students from all over Kerala. College-wise women hackathons were conducted at Munnar and Kannur in the months of August and November respectively with a total participation of 80 students across different semesters. The women hacker community was strengthened considerably with these programmes and it is now reshaping itself as a progressive movement across professional colleges all over Kerala.

Lekha OCR v2

Last year, we had developed a Malayalam OCR application named Lekha. Through different explorations and experiments, we had made it the best performing OCR in Malayalam. But new possibilities and the need for further enhancement had emerged after the release. It was in this context that we initiated Lekha OCR development Phase 2 with the objective of improving the recognition rate further, based on some of the learning from the previous stage. In Lekha 1.0, we recognise the document letter by letter. For this, we had generated a database that ignored line characteristics, which could provide a lot of information for recognition. The design of the earlier software eliminated this information during the learning stage. Hence we had to make substantial changes to our training tool, training set and database.

We were able to achieve the objectives mentioned above, even though serious challenges were faced at different stages. Lekha OCR currently achieves very high levels of recognition. Based on the results of experiments, the software was refined, and it currently achieves an accuracy of up to 97%. Now it needs to be turned into a consumer-level tool for a wider user base. The only component that it currently lacks, which prevents the common user from benefiting from Lekha OCR, is a layout analysis tool. More work needs to be done on the same.

The software is available for free download at:
https://gitlab.com/space-kerala/LEKHA_OCR_VER2.0

Faculty Development Programme

Introducing teachers to free software and enabling them to realise the benefits and need for it will enable its mass adoption in the education sector. With the revised syllabus of KTU itself envisaging the adoption of free software in achieving many of its curriculum objectives, we found the need for getting teachers equipped with free software. It was in this context that a faculty development programme was organised at SCT College of Engineering in December for three days. We covered various relevant topics during the programme and the feedback was extremely positive.

In December, ICFOSS also organised a similar programme for engineering college teachers under Kerala University and we were able to conduct the sessions based on the experience drawn from our previous programme. With these two programmes, we were able to build a solid reputation in the teacher community and we believe more programmes and activities can be formulated using this network.

Internship Programme

We conducted an internship programme for three students in the month of July. They were second year students from Government College Of Engineering, Kannur. They were given training in web technologies and they contributed towards developing the interactive games for the Insight project.

Conclusion

It was definitely a great year for SPACE. We were able to continue our existing projects, enhance them by incorporating new dimensions, explore the unexplored domains and make significant contribution to both the digital and social world. We were able to forge ahead with our plans to make a difference in the communities we work with and to strengthen our visibility considerably during this period. We thank all of those worked hard for the organization and supported us in our activities.