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Techies with a mission

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Software that helps dyslexics comprehend, physically impaired exercise and rural residents reach a doctor online. These innovations not only impress with their brilliance, but also the fact that they have been developed by budding student entrepreneurs

In this day and age, where technology has become so ubiquitous, it is only a matter of time before existing gadgets and software are adapted to meet specific needs. Also, with a world gradually becoming more and more sensitised to the needs and challenges of the physically and mentally challenged, it's no surprise that many recent path-breaking innovations in technology have been in the realm of improving accessibility for the handicapped, making their lives easier. It is amazing, however, that this drive is being led by young boys and girls, a ready example of the compassion still present in the world. Some sterling examples could be seen at the recent Imagine Cup, a student technology competition hosted by Microsoft that gives students the opportunity to showcase their talents in innovation, engineering and technology. The India division of the Cup took place recently, on April 25, and one team was selected to represent India on the world stage, in Sydney in July. We talked to the top three teams about their projects, their plans, goals and, perhaps most importantly, their inspirations.

Laying it straight for the dyslexic

A software that creates tailor-made learning experiences for children with this disorder

How it works

The software considers all the things that a child does, how he spells, how he physically reacts, etc, and compiles that data. Subsequently, the artificial intelligence in the software uses the data to create learning experiences especially tailored for each child. This is done in an interactive manner and not forcefully

Taare Zameen Par may have brought the issue of dyslexia to the fore in India's public consciousness, but Team D-Labs learnt about it first-hand. At BIT Mesra, Ranchi, the students, apart from regular studies, also took part in societal work by teaching slum children the rudiments of English and Hindi. It was here that they came across dyslexia as a disease present in several children.

"We were amazed that when we asked some children to write 'ball' as b-a-l-l, they repeatedly wrote it as 'd-a-l-l'. And this wasn't the only word they were stumbling over; there were several others like 'believe', which would be written as 'beleev'. There was a problem with letters as well as problems with orientation. When we threw a ball to the child's left side, he would raise his right hand to catch it, and vice-versa, and they also could not gauge the speed of the ball," explains team leader Devesh Kumar

"We saw this as a problem and thought that we should work to fix it. We spoke to doctors in Patna Medical College Hospital and other specialists, and found that this was a problem of dyslexia—a disease, actually. That's when we teamed up to help those afflicted with the disease," he adds.

What their software does is consider all the things that a child is doing, how he spells, how he physically reacts, etc, and compiles all that data. Subsequently, the artificial intelligence in the software uses the data to create learning experiences especially tailored for each child. This is done in an interactive manner and not forcefully.

Again, Taare Zameen Par showed how forcing young Ishaan Awashti, a dyslexic child, to learn was an inefficient way forward; it was only when learning became fun and interactive did he truly benefit, and even shine.

"The team we formed was of four members. I led the team, and got the basic algorithms we worked with. Amit Kumar Sharma handled the technical parts. We wanted Abhishek Kumar to handle the business part, because we wanted to reach as many children as we could and Deepali Sinha handled the usability, user interface and user experience part," explains Devesh.

It took the team eight to nine months to develop the software for the Imagine Cup, and, like several other teams in the competition, they chose to incorporate Microsoft's Kinect system as it was eminently suitable for what they wanted to achieve. "The Kinect was a good software, since it tracks movement on a joint-by-joint basis, allowing 18 joints to be tracked, thus giving an accurate picture of how the child was moving."

It wasn't an easy task. "Each child is unique, the symptoms of dyslexia are different for almost every child, and so to design a software for that was tough. Forming the team was also a challenge, since we wanted the best people as it would become a business following the Imagine Cup," he adds.

So, having won the cup's India division, and R80,000, what are their plans for the future? "Of course, we are looking to compete in the Imagine Cup on the international level, but we also want to scale up our model. Do you know, there are around 250 million dyslexics around the world?" At the moment, the D-Labs software is focusing on children in classes VIII-IX, but the aim is to include all children afflicted in its ambit.

"We need to increase the business viability. Abhishek is talking to people. We are releasing the software in July. It is tentatively called D-Labs right now, but we are still working on a name for it. It was a great overall experience working on this project. Every day was a different day. We fought, ate, hung out together, made friends, etc. And on our way here, we made sure everybody on the train knew what we were doing!"

With work like theirs, it is only a matter of time before everybody in India, if not the world, will know what they are doing.

Flexing the right muscles

The software helps people undergo physical therapy through fun games, which they can do sitting at home

How it works

The software increases balance and coordination while walking, improves hand-eye coordination, upper and lower body awareness and space coordination through interactive games. The patient is to follow a set of instructions for each game, and if he/she fails to do so, immediate feedback is given about the wrong move and how to correct it

The name of the team itself suggests what their product is all about—therapy through Microsoft's Kinect system. More specifically, as team members Yash and Sonali say, the software enables the physically impaired to go through physical therapy by playing simple games on the Kinect system, thus making what is usually an onerous ordeal into something fun. Basically, the Kinect system makes the player the controller, with a camera following his/her every move, enabling motion-based games and software without the need for special hardware.

"Motion-based rehabilitation game systems have been in use earlier, and are still in use, but they require a lot of training on the patient's part. Also, they require the presence of a supervisor or specialist to watch over the patient, and most also require sensors to be attached to the patient, which make them feel uncomfortable and bound. This means that the patient can't do the exercises at home, and must go to a clinic or hospital to complete their treatment. Most don't like that, and do their routines half-heartedly," explains Sonali Dubey, who is attending Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, along with team-member Yash Soni.

The team developed a set of games designed to recreate physical therapy in a fun, new way, without the need for any external hardware except the Kinect system itself, which is already readily available for home use. "We went and met several physiotherapists who were very happy about the idea, and asked us to get in touch with them as soon as the software came online!" But the reaction was very different when they broached the topic at government hospitals. "At government hospitals, they were apprehensive, asking how will the disabled learn to use the new software? But that's exactly the point of KinectoTherapy, you don't need to learn anything; it's so simple to use! You just play games, and in playing them, you exercise the right muscles in the right way. Disabled people use technology like anyone else, they're no different," says Sonali.

The objective of the software is to increase balance and coordination while walking, improve hand-eye coordination, upper and lower body awareness and space coordination through interactive games. The patient is to follow a set of instructions for each game, and if he/she fails to do so, immediate feedback is given about the wrong move and how to correct it.

The team went to Delhi and Jaipur not only to meet physiotherapists to sound them out about the idea, but also to get expert advice on how to design the games, since, in the end, it is a medical tool, and has to be calibrated and designed to work well, and not do damage to the patient by straining the wrong muscles in the wrong way.

The team also had to try out the software to see if it works. "Of course, we tried it on four-five users, and so great was their response that it proved to be our motivation for the entire project! There was this deaf and mute girl who could not move properly, and just seeing her smile when she used our software was motivation enough," says a smiling Sonali.

KinectoTherapy won the second place in the Imagine Cup's Software Design (Accessibility) segment, which comes with a prize of R70,000, and is now gearing up for the future. What is the economic viability of such a project? "There is a lot of economic viability," says Sonali, "we are talking to experts on how to take it forward."

Healthcare at a click in remote areas

Software allows people from all over India to reach medical experts anywhere in the country

How it works

The software, called Remote Doctor, provides an intelligent healthcare system that allows people from all over India to reach medical experts across the country and get their problems solved. On top of that, the second component of the software, iDoc, can also be used as a predictive tool to prevent future illnesses and gives a broad picture of the occurrence and spread of various diseases by geographical location

The Maharashtra-based team Imaginary has come up with a concept that can do wonders for the penetration of medical services into the hinterland of India. As the team itself questions, what would the world be if everybody had 24x7 medical services for free? That tall task is what Team Imaginary, comprising three students from VES Institute of Technology, Mumbai, set out to accomplish as their entry for the Imagine Cup M Goutam, Mihir Sathe and Nishkam Razdan say that the "main problem with medical care in rural India is that on most occasions, people in these areas are just too far away from any medical centre, and they also neglect regular check-ups and only go to the doctor when they are very sick".

The team has developed a software, called Remote Doctor, that provides an intelligent healthcare system that allows people from all over India to reach medical experts across the country and get their problems solved. On top of that, the second component of the software, iDoc, can also be used as a predictive tool to prevent future illnesses and gives a broad picture of the occurrence and spread of various diseases by geographical location. Undoubtedly a stunning innovation, but what brought a group of young students to address an issue of such great importance, one that policymakers have been trying to wrap their minds around for quite some time?

"My father is a doctor, and I got the idea from looking at his work," says Mihir, "and we also got inspired by the work Bill Gates has done in the healthcare area." The spread of Internet and technology also proved to be a factor in their consideration, and indeed, in the success of their product. "The aim is to be of equal use in both the remote areas, where there might be only one PC per village and to the urban citizen who can afford a smartphone and can download our app."

So, how exactly did they go about it? How did they create a database of diseases and manage to get doctors on board to be accessible online regularly? "Well, at the moment we are using the World Bank database as our main source of information about diseases, and we have designed our own software to have the latitude and longitude of the areas in India scripted into it." So, at any given point, when a disease is found in one area, the range and spread of its occurrence can quickly be mapped on a computer, which could provide invaluable information for large agencies like the World Health Organisation, UNICEF, etc.

It also predicts the occurrence of diseases by analysing the symptoms mentioned, along with multiple factors such as age, gender, location, season, profession, etc. "We went and met several doctors to get them on board

on the project, and we found them very receptive to the idea. We are also going to collaborate with the National Rural Health Mission to push the project further."

Such is the applicability and great use of team Imaginary's software that it won third place in the Imagine Cup's Software Design (General) category, with a prize of R60,000.

And what are they going to do with the money? Party? Of course not, the dedicated boys that they are, it's all going to go into scaling up their software.

Excited as the team was about winning, there was only one more question to be asked before they bounded of to call their near and dear ones: what was the inspiration for the name of their team, why Imaginary? "Well, we were inspired by the complex and imaginary numbers found in maths."

Short and sweet, quite unlike their software, which has the potential to do great good across the length and breadth of India for a long time to come.