The manthan Award
Digital Inclusion for Development South Asia 2010

MANTHAN AWARD SOUTH ASIA 2010

NOMINATION FORM

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Product/Project Data & Details	
Name of the Project/Product in English:	Affordable, Indigenous Assistive Technologies for People with Disabilities
Name of the Project/Product in the Original Language:	Affordable, Indigenous Assistive Technologies for People with Disabilities
Language of the Product:	Products under this program currently support English, with options to include Indian languages.
URL (If Online):	www.mindtreefoundation.org
Category [e-Learning, e-Government, e-Health, e-Culture & Heritage, e-Business & Enterprise, e-Agriculture & Livelihood, e-Entertainment, e-Inclusion, e-Education, e-News & Media, e-Localization, e-Environment, e-Science, e-Travel & Tourism, Community Broadcasting]	e-Inclusion
Short description of the product/project: [Not more than 500 Words]	The project is currently working on the following three solutions that address the needs of the People with Disabilities in different ways. A) KAVI is a device that will help children with severe speech impairment to interact with their peers. The primary audience would be the persons with Cerebral Palsy (CP) that is a motor disability that severely limits control over limbs and speech. Children suffering from this condition are often unable to communicate even basic needs without dedicated human assistance. The product will also serve a significant section of children with Autism who find direct verbal means of communication quite stressful. The aim of building KAVI is to create a device that can be mounted on a wheelchair, and be controlled through a simple interface. The device will help the subject to express his/her needs, ask and respond to questions. The application software allows the selection of one letter or image at a time, string them together to form words, and use text-to-speech conversion to generate audio output. This product is in the prototyping stage at which the basic system architectures are refined to meet the cost and functionalities. The Prototype has been demonstrated at the AT conference in Bangalore in July.

	B) ADITI is an input device to a computer developed to enable the child suffering from cerebral palsy to access the computer. The ADITI is working on a capacitive interface called Theremin principle; if human body comes closer to the antenna plate of the ADITI it will create a left-click of a mouse on the computer. This will help people with severe muscular skeletal disorders – Cerebral Palsy, Arthritis etc to interact with computers more easily – to enter data, to write emails, to create documents and to play games - thereby opening up a whole new world for them This product is already in the pilot production stage in the quantities of 100s and distributed to NGOs for their usage and feedback. Continuous improvement on the design is ongoing to reduce the cost, increase the reliability and significantly revamp the aesthetics. C) Other products such as a Flash based learning game to understand and absorb critical language concepts such as concatenated consonants "ch", "sh" th", etc have also been developed and demonstrated. All products were demonstrated in the AT conference in Bangalore in July.
Additional Details of the Product/Project	
Platform of Product/Project [e.g. Broadband/Online, Mobile Content, Cross Media, Offline, Games Platform, TV/Interactive TV, Radio, Web/Internet, Blog, CD/DVD, Telephone, Wireless/WAP, Mobile/PDA, Mobile Van, Satellite, E-Mail/e-Groups]	KAVI : Offline, Wheel Chair Mountable, battery operated ADITI: is Plug and Play with PCs and Laptops or any system with USB port. Does not need batteries. Can be wheel chair mounted. This will also have a long-cable length option to mount the device behind the person's head. FLASH Game – Will be a downloadable, installable module, once this is packaged. Needs Desktop or Laptop or any platform that can run Flash player.
Installation procedure/Technical Requirements of the product/project: [e.g. User name & Password/step/ special browser/plug-in/any other information required to access & test the product/project]	KAVI : The initial software modules are embedded into the device. At present, they are programmed to be Plug & Play. There will be options to set the specific user profiles – name, gender etc to personalize the device. As the product matures, there will be options to add additional applications either through direct memory card interface or through web downloads. ADITI : Plug And Play Flash – Installable file to be downloaded from link.
If other, please specify:	Nil
Long description of the product/project: [Not more than 2000 Words]	KAVI helps children suffering from speech impairments, mainly due to conditional such as Cerebral Palsy. Cerebral Palsy is a motor disability that severely limits control over limbs and speech. Children suffering from this condition are often unable to

	communicate even basic needs without dedicated human assistance. The product will also serve a significant section of children with Autism who find direct means of communication quite stressful. The aim of building KAVI is to create an electronic device that can be mounted on a wheelchair, and be controlled through simple interfaces (either Touch screen or switch interface) amenable to people with muscular skeletal impairments. The device will help the child to express his/her needs. The product is currently being tested with application software that use a scanning interface to allow the selection of one letter or image at a time, string them together to form words, use predictive approaches to speed up the process including allowing for prerecorded sentences for commonly used phrases and use text-to-speech conversion to generate audio output. Following are the system features: • Low cost – Target end Price ~ 10-12K • LCD Display Screen with Touchscreen capabilities • Built In Switch interface • Speakers • USB Port • Ethernet Port • 1 Head-phone Jack • Rechargeable Batteries-Powered • ~5 hours of battery stand-by operation • TableTop or WheelChair Mountable • Fan-less ergonomics enclosure design • Light weight • Linux OS (open Source) • Support for external devices to help selection of image icons by waving the human body • Portable design • Power ON/OFF Switch The KAVI currently boots with application software named as HOPE developed and supported by IIT Chennai. The HOPE Software displays alphabets and numbers on the screen and highlights each icon on a timely manner. The user may wait for the respective icon to highlight and then select a particular icon. Based this selection and through word prediction options, the correct words are selected. Additional words are selected till a complete sentence is constructed. After framing the sentence, the user may select the command on the screen to speak the sentence. The application also allows the user to access pre-stored messages for commonly used phrases and sentences. All these the user can do using user-friendly interfaces that can be operated with mouse, keyboard, or special access switches like ADITI. The ADITI (Analog and Digital Theremin Interface) is a computer input device developed to enable the child suffering from cerebral palsy to access the computer. The ADITI is working on the capacitive principle; if human body comes closer to the antenna plate of the ADITI it will initiate a click on the computer. The device was originally designed by Chetana.org and Vidyasagar of Chennai. MindTree was approached to take up the productization of the design and enable volume manufacturing of the unit. MindTree engineered it for reliability, manufacturability and transferred the technology to one of its manufacturing eco-system partners to deliver volume quantities. While the first version is being shipped, MindTree is also engaged in

	completely revamping the design for better stability, ergonomics and aesthetics to enable shipment to a larger and more distributed audience across India. The ADITI delivers the function of a mouse click (selection) to host system via USB port. (There is no cursor control). It can be mounted near any voluntary part of the body of the user such as arm or head or leg. Moving such voluntary parts near antenna will produce an action equivalent of a mouse click. ADITI will also give a small beep sound as a feedback to the user to acknowledge the click. This function can then be used in conjunction with relevant application – could be a simple game, could be a virtual keyboard on Windows 7 or the HOPE application on KAVI to play, to learn, to compose emails, to key in documents, to generate speech etc. Following are the system features: • Low Costs to consumer 500/- (INR) (Approx) • Comfortably sized and positioned antenna. • Switch option to choose waving as approach or withdrawal of the voluntary part. • USB cable and Port • beeper • Mountable on wheelchair • Portable design The approach or removal function helps to cater different types of users according to their convenience. This accommodates the kind of controlled movement most easily available to the child. The Flash Game provides a "Snake and Ladder" kind of game combine with a "Wheel of Fortune" kind of selector to help children with learning disabilities to grasp difficult concepts in English Language. This was a game developed on Paper by Spastics Society of Karnataka, which MindTree converted into s Software Format to make it more interactive and easily replicable so that more children can play and learn. In the first version, it is a two player game that lets children learn how to pronounce the sounds of "ch", "sh", "th" etc. by selecting words associated with this sound. The words are also attached with pictures to ensure that the child can easily remember the word and sound through visual means.
Short CV(s) of producer(s): [Not more than 200 Words]	MindTree Foundation was officially incorporated on 20th November 2007 under section 25 of Companies Act. The foundation is the channel for MindTree Ltd, a Global IT company, to realize its social engagement aspirations. MindTree Foundation Charter is to 'Support primary education and the cause of differently-abled people by leveraging MindTree's leadership, values, and resources'. (http://www.mindtreefoundation.org/) The foundation strives to achieve these charters primarily through development and dissemination of Affordable and Sustainable Indigenous assistive technologies for these communities. The foundation will also financially support effectively run NGOs that serve beneficiaries from the identified communities. MindTree's role in the Assisitive Technologies products are to design, build, the solutions in a cost effective manner for software such as HOPE which are specially designed for people with disabilities to run. MindTree at present is redesigning the hardware platform and the application software to make KAVI ready for mass-production. It

	invests efforts to add new features and refine the existing features. MindTree utilizes the services of its vendors and partners for the enclosure designs and manufacturing processes.
Important Milestones through the product/project:	• KAVI Program was started in August 2009 to re-target MindTree's in house Telemedicine Platform to address the needs of people with disabilities as an AAC (Augmentative and Alternative Communication Device) • MindTree's full functional KAVI prototype successfully started working on 1-July-2010 with HOPE. • KAVI was first demonstrated with HOPE in International Assistive Technology conference held in Bangalore on 23 and 24-July-2010. In this demonstration, it could create good traction from the visitors and academia. • It has also subsequently been demonstrated to Government agencies like National Trust. • Expected production and shipment of Production version of KAVI – JFM quarter of 2011 --- • First set of 10 ADITI devices were assembled within MindTree to assess the feasibility in July 2009. • The vendor identification and finalization was completed in February 2010 • First commercial order for ADITI (100 units) was received on March 2010 • First commercial shipment of ADITI (25 units) was effected on • ADITI was externally demonstrated in July 23-24 at the international AT Conference • Version 2 of ADITI with a better form factor and more stability prototyped in August 2010 • It has also subsequently been demonstrated to Government agencies like National Trust. • Product engineering for the Version 2 is currently on going. • Expected production and shipment of Version 2, production version – JFM quarter 2011. --- Flash Game – Packaging of the game for remote down loading and licensing from a server/link is currently underway. This version will also enrich the user experience w.r.to user registration, game level selection and personalization. Expected date of release – December 2010.
Important Use Cases: [Not more than 500 Words]	KAVI is an Augmentative and Alternative Communication device that enables people suffering from Speech and Motor Impairments and children with Autism to communicate with others in an easier manner. Its mobile nature frees-up the differently-abled people to communicate with the external world. Use Cases: - - Richer Interaction with family members - Communicate and hold a conversation with outsiders - Communicate with shops, services providers, bus operators to convey needs, destinations, requests etc - Interact in class rooms with fellow class mates - Participate in the class proceedings by asking and responding to queries - Interactive and self paced learning --- ADITI is a computer input device developed to enable the child suffering from cerebral palsy to access the computer. Using ADITI, a user can play games designed for switch interface, type emails, launch applications on the desktop, type documents, on a host computer and communicate anywhere. It allows the user

	to form single sentences, compose messages of arbitrary length, or use pre-stored messages along with the KAVI product.
The background & motivation behind this product/project: [Not more than 500 words]	MindTree considers it important for an organization to be socially engaged as a way of giving back to the society. This has been embodied in our Five Year Vision statement which includes the aspiration that "We will touch and improve the lives of the differently-abled, through leadership in Assistive Technologies" Under its Social value, MindTree is committed to the pursuit of better living for people with disabilities and enhancement in the quality of primary education. Working on the leading edge of technology innovation, MindTree firmly believes it can add significant value through assistive technologies in achieving these goals. In India, the concept of Assistive Technologies has been limited to mostly hearing aids, prosthetics and wheelchairs. More sophisticated AT is needed help the person with special needs to perform many of the tasks required to function independently, communicate and be productive in today's world. Such technologies have been around in the western world for almost 40 years. However, these are out of reach to those who need them in India. Since 70% of our people with disabilities are from the rural areas the high price of imported equipment is a huge hurdle. Then there are issues of availability, training, localization, service etc even for those who can afford them. With numbers ranging from 70-100 million people with special needs, pure philanthropic means of distribution are not viable. Considering the business models for these devices in the Insurance driven western world, it will be very difficult to for international makers to either sell current devices at the required price points or invest in research to make devices targeted to our needs. Hence the case for affordable, sustainable and indigenous technologies for our needs. However, in a country where basic data on disabilities is still not reliable and where the community of the disabled is yet to be perceived as a viable buying force, this is a challenging goal. Just two examples: The imported equivalent of KAVI costs approx. INR 2,00,000.00 An Indian equivalent, AVAAZ, currently retails @ ~ INR 30,000.00 MindTree aims to make this device available to the market at the price point of ~ INR 10-12,000.00 The Imported equivalent of ADITI costs more than INR 5000.00+ The price of ADITI is approx INR 550.00
What do you deliver (Content/Services) to your customer/target group through this initiative? [Not more than 500 Words]	MindTree's leverages its technical competencies and world class product realization capabilities to develop high quality solution for this community, instead of just donating money. Through the involvement of MindTree Foundation the development costs are defrayed, thereby avoiding this being loaded on to the product pricing. MindTree Foundation leverages MindTree's Ecosystem partners in the areas of World Class Industrial Design, Electronic Manufacturing services etc. In many cases, when the eco system partners are made aware of the cause, they also willingly do the work at very affordable commercials, thereby ensuring that the overall cost to

	the system is controlled. Thus, MindTree's involvement creates a virtuous cycle of goodness in this process.
Does your Project/Product provide enough interactivity to the users? How? [Not more than 500 Word]	The user can interact with KAVI in the following four aspects: The whole concept of KAVI AAC is to construct sentences through interactive means and enable communications through text to speech converters. The special features include: Communication with Pre-stored Messages: KAVI allows faster communication using a set of pre-stored messages. The messages are displayed to the user in the form of text and icons. Moreover, selection of a message by the user (using either mouse or keyboard or special access switches) automatically speaks out the message, making it speech enabled. Personalization: The icons used in the iconic communication or the stored messages (both icons and texts) used in the pre-stored message based communication can be personalized according to the user's likes and dislikes. A personalization interface is provided with the system for the purpose. Language Support: At present, the HOPE software supports English language. The system interfaces for all these languages are the same with minor variations in the software.
Do you think your product/project is unique? [Please explain the innovativeness of the idea]	Yes. It is one of the first devices designed ergonomically suit the conditions of children in local context. Extensive studies have been undertaken to understand the usage patterns of local users to integrate these needs into the industrial design, rather than just directly copying a western design. The major value in KAVI will also be its affordability, in providing the best-required features such as customization, and languages to suit our Indian culture to enable our Indians to overcome their disabilities. The products are offered at affordable cost range, upto ten times lower than the state-of-the-art products available in the marker at present. For example: The imported equivalent of KAVI costs approx. INR 2,00,000.00 An Indian equivalent, AVAAZ, currently retails @ INR 30,000.00 MindTree aims to make this device available to the market at the price point of around INR 10,000.00 The Imported equivalent of ADITI costs more than INR 5000.00+ The price of ADITI for is approx INR 550.00
Quantitative & qualitative impact of product/project in diverse locations and people [Not more than 200]	MindTree aspires to touch and enrich the lives of a million differently-abled people in the next 4-5 years. The products are ground up designed to support multiple Indian Languages and support as low a price point as possible. This ensures that the products can be used across the country and also internationally. Almost the entire cost of purchasing KAVI can be borne through government assisted schemes such as ADIP. At the cost of INR 500, the ADITI becomes accessible to a majority of

	Indian population)
Is your product/project sustainable on its own? How scalable it is? Please explain. [Not more than 500 Words]	MindTree Foundation sponsors KAVI development and support activities. It creates a production-ready KAVI product after the necessary testing, validation, and certifications. MindTree will make the KAVI product commercially viable for third party entities such as Electronics Manufacturing Services (EMS) companies to make in large volumes and sell as well to sustain throughout its product lifetime. The next version of KAVI will support software upgradability from the field or at end-user premises. This will extend the product-lifetime considerably. By means of its robust development and testing process and procedures, the product can be scalable in features such as changing the display from 7" to 10", or adding new features, as well as scalable in quantities through its very good network with EMS partners in Bangalore and throughout India.
Please explain your project users experience with your technology/media services across platforms [Not more than 500 Words]	KAVI helps the children suffering from Cerebral Palsy. Cerebral Palsy is a motor disability that severely limits control over limbs and speech. Children suffering from this condition are often unable to communicate even basic needs without dedicated human assistance. The product will also serve a significant section of children with Autism who find direct verbal means of communication quite stressful. KAVI is in the prototype stage at present. Even the prototype had received very positive responses at the AT conference. Before development, MindTree will collect the end-user experience and validate with the help of NGOs. MindTree is planning to begin the user trials for KAVI from January of 2011. ADITI is being used at Vidya Sagar Chennai and Spastic Society of Karnataka. There are parents who are evaluating their children's usage of imported switches to gain motor control and cognitive improvements. The imported devices are usually out of reach for them. The children have been able to adapt to the ADITI usage almost immediately. This is a huge relief for the Parents and the Special Education teachers. The predominant use currently for therapy use at NGOs. Some children use it to appear for tests and exams. There have been some important and useful feedback on ADITI Version1 regarding tuning, distance and ergonomics etc – these have been addressed in the Version 2, slated for release in the next quarter. With these changes, the product can even become useful in a corporate setting for emails etc.
There is a serious gap between Content & services and the citizens or consumers. Does your product/project solve the problem of digital and content gap? How? [Not more than 200 Words]	Actually, the huge gap between Content/Services and Citizens/Consumers is further aggravated for the people with disabilities. This community, for example – people with Visual impairment, mobility impairment, muscular-skeletal disorders, hearing impairments etc cannot reliably access digital content even if they have access to computers and bandwidth. Because the normal means of accessing digital content are not of much use for this community. Devices such as ADITI and KAVI actually narrow this gap by

	providing people with disabilities better access to content and also better access to interpersonal communications. For example, with when a person accesses the Internet through ADITI and starts interacting through channels like email, facebook etc, she become one among the millions of netizens with equal rights and access to information and networking, without having to feel isolated due to her disabilities. By making these devices affordable at 1/10th the cost of imported devices, the project further closes the gap by enabling access to much larger section of the population than would have otherwise enjoyed these technologies through imported means.
What is your Vision of Digital content for Development and how do you think ICT (Information Communication Technology) tools can be used towards this end at large?	To ensure that the PWDs in India get a better deal and are emancipated in the way the ills of gender gaps and untouchability were addressed, we need to ensure that: a) Children with disabilities join and progress through the education system in an integrated and inclusive manner b) they can follow their aspiration to pursue Higher education in a stream of their choice c) all corporate careers are accessible to all people, irrespective of their disabilities, as long as they meet the relevant qualifications for a job Sheer apathy and ignorance have kept PWDs away from enjoying the fruits of the society for too long. However, there are some genuine practical issues that need to be defeated. For example: A) How will a teacher ensure a child with visual /hearing impairment absorb the learning with the rest of the class? B) How does she seek and respond to their feedback in the classroom? C) How does a child with such problems interact with other children? D) How do you teach a child with visual impairment the nuances of geometry and other visual aspects so integrated to our ways of exploring science and math? E) How do children with Cerebral Palsy with no way of holding a pen or pencil in their hand and with a speech impediment to boot, communicate their feelings and write exams? F) How does a person with total visual impairment interact with a computer terminal and be involved in high quality ICT development or financial analytics processes? G) With a public transport system that is unfriendly to majority of us, how can these people commute to their jobs? Here is where IT can help. More appropriately, this is where AT (Assistive Technology) can help. There is a wide range of AT- Low tech & High Tech. From Ramps to White Canes to Prosthetics to hearing aids to Speech Generation Devices to motorized wheel chairs to screen readers to eye trackers to cochlear implants to brainwave triggers. As we go higher on the level of inclusion we seek to accomplish, ICT becomes more and more integrated into the AT required. And ICT has the power to deliver on this promise. The Blind can "see", deaf can "hear", mute can "speak" and lame can "walk". Even people with Autism and Cognitive challenges have access to AT that help them organize their lives more effectively and independently. AT has been around for more than three decades in western world. Differently-abled people have integrated in the education system, have access to all streams of higher education and are integral part of many successful corporations and businesses. Rather than just

	sympathy, these individuals have played key roles in increasing the social fabric of their organizations, enabling higher customer acceptance, higher level of innovation by bringing in wider perspectives and fostering universal design. All these have been possible through a combination of statutory requirements laid down by enlightened governments and excellent progress and availability of AT. The irony in India is that a big gap in perception and understanding regarding ICT's role in disabilities exists in both directions. The community of people with disabilities is not still aware of the full potential of ICT to integrate them into the society. At the same time, our professionals in the ICT business in India have shown very limited understanding of the plight of people with disabilities and how ICT can help in closing the gap. Nor have they shown significant inclination towards getting formally involved in solving these issues at the technology levels. For a country that boasts of arguably the largest and best technology talent pool in the world, this is a sorry state of affairs. Paradoxically, almost all institutions of technical education have excellent programs to develop socially-relevant solutions as part of their curriculum. Highly-relevant technical solutions that can potentially address the problems of our millions of disabled are sitting on the shelves of these institutions through decades. Many new ones are being developed everyday. MindTree Foundation's vision is to bridge this gap through inspiring more corporate involvement in this process, bring in the strengths of technical and process excellence, financial, marketing and manufacturing muscle to bear on this critical program and ensure a wider section of our population gains access to this technology to enable the PWDs a better access to the resources of the world, thereby ensuring their independence and dignity of living.
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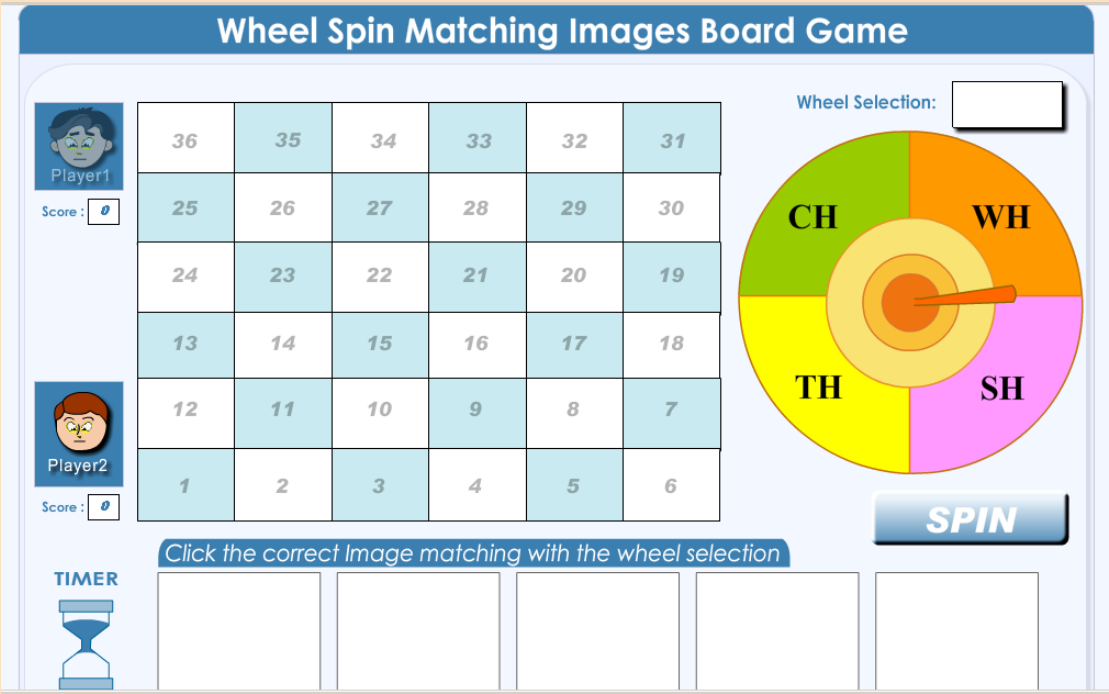
Appendix – A. Product Pictures

KAVI Version 1.0 Functional Prototype with 7.5” LCD Screen

ADITI Version 1.0 Functional Product

ADITI Version 2.0 Functional Prototype

ADITI 1.0 Usage Scenario



Game Software Screen