BLIND POPULATION HELPED BY AFFORDABLE TECHNOLOGY

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ABSTRACT

The research is collected using methods such as human observation, open surveys, or using an instrument or sensor to monitor or use recorded information, e.g. by using data available on the Internet to justify something or to express a point of view.

The maximum not unusual place reasons of visible impairment globally are uncorrected refractive mistakes (43%), cataracts (33%), and glaucoma (2%). Other problems which could cause visible issues consist of age-associated macular degeneration, diabetic retinopathy, corneal clouding, formative years blindness, and some infections.

The Government believes that before they tend to expect the advantages of schemes like Digital India to increase to the blind population, they'd like to widen their view of individuals with visual impairment. Technology, and the increasing digital world, has created its potential for individuals with visual impairment to cross the boundaries of confinement and enter the mainstream. Access to helpful technology-enabled devices and the net makes it possible for blind people to operate severally and avail numerous services on their own.

There are various organisations in India who take initiatives to help the blind. They provide a variety of choices with schemes to assist the visually impaired resembling the attention health programmes covering schools, urban areas and rural settlements, to deliver good-quality eye care to everybody who wants it. Schemes provided by the organisations such as Fullerton India has the Jyoti-Save yojna the attention CSR initiative is to not solely provide access to quality eye care at the community' doorstep, but to enhance awareness and to address the incidences of 'avoidable blindness'. Moreover on the International Day of Education 2020, technical school Mahindra Foundation in association with Thinkerbell Labs put in Annie – the world's initial Braille acquisition device across completely different locations in India, etc.

The Idea of helping the visually impaired people through latest technology was implemented through a mobile app which is known as Google Lookout that uses AI to describe surroundings for the visually impaired. Google has launched its Lookout app, that uses computer science (AI) to assist the visually impaired see by pointing their phone at objects and receiving verbal feedback.

Also WHO contributes in many ways to help the visually impaired, for example it has development and implementation tools to support countries to assess the provision of eye care services.

There are 2.2 billion blind human beings within the entire world. China owes approximately 18% of blind human beings. Moreover, research based on the recent population for the entire age range, suggests that the number of blind people in India is currently over 18 million. As Through numerous researches over the years partially blind people have been able to overcome their disability with the help of eyeglasses/spectacles.

Introduction

Visual impairment, conjointly called vision impairment or vision loss, may be a shrivelled ability to visualise to a degree that causes issues not serviceable by usual means, love glasses. Some also embody people who have a decreased ability to see as a result of not having access to glasses or contact lenses. A visual defect is usually outlined as a best corrected acuity of worse than either 20/40 or 20/60. The term sightlessness is employed for complete or nearly complete vision loss. Visual defects could cause difficulties with traditional daily activities such as reading and walking while not accommodative coaching and equipment.

The maximum not unusual place reasons of visible impairment globally are uncorrected refractive mistakes (43%), cataracts (33%), and glaucoma (2%). Refractive mistakes consist of near-sightedness, far-sightedness, presbyopia, and astigmatism. Cataracts are the maximum not unusual place reason for blindness. Other problems which could cause visible issues consist of age-associated macular degeneration, diabetic retinopathy, corneal clouding, formative years blindness, and some infections. Visual impairment also can be resulting from issues with the inside of the mind because of stroke, untimely birth, or trauma, amongst others. These instances are called cortical visual impairment. Screening for imaginative and prescient issues in kids can also additionally enhance destiny imaginative and prescient and academic achievement.

The World Health Organisation (WHO) estimates that 80% of visible impairment is both preventable or curable with treatment. This consists of cataracts, the infections river blindness

and trachoma, glaucoma, diabetic retinopathy, uncorrected refractive mistakes, and a few instances of formative years blindness. Many human beings with good sized visible impairment gain from imaginative and prescient rehabilitation, modifications of their environment, and assistive devices.

As of 2015 there have been 940 million people with some extent of vision loss. 246 million had low vision and thirty-nine million were blind. The bulk of individuals with poor vision are within the developing world and are over the age of fifty years. Rates of vision defects have decreased since the 1990s. Visual impairments have extensive economic prices each directly thanks to the price of treatment and indirectly due to decreased ability to work.

A 2008 study tested the impact of exploitation factor medical aid to assist restore the sight of patients with a rare type of genetic cecity, called Leber' non inheritable visual impairment or LCA. Leber' non inheritable visual impairment damages the sunshine receptors within the tissue layer and frequently begins poignant sight in early childhood, with worsening vision till complete blindness around the age of 30. The study used a typical cold virus to deliver a standard version of the gene known as RPE65 directly into the eyes of affected patients. All 3 patients, aged 19, twenty two and 25, responded well to the treatment and rumoured improved vision following the procedure.

2 experimental treatments for retinal issues embrace information processing replacement and transplant of foetal retinal cells. There is not any high-quality proof on the impact of helpful technologies on academic outcomes and quality of life in kids with low vision as of 2015, neither is there evidence on magnifying reading aids in children. Low-vision rehabilitation doesn't seem to possess a crucial impact on health-related quality of life, tho' some low-vision rehabilitation interventions, notably psychological therapies and strategies of enhancing vision, might improve vision-related quality of life in individuals with sight loss.

Research Methodology

The Research paper is completely based on Observational Data i.e the data collected through the observation of a behaviour or activity. It is collected using methods such as human observation, open surveys, or using an instrument or sensor to monitor or use recorded information, e.g. by using data available on the Internet to justify something or to express a point of view.

The research paper involves practical observation of aids provided to the blind people and problems faced by the blind people and the organisation/NGOs in day to day life.

Secondly this research is a Quantitative method i.e to cope with numbers and measurable forms. It makes use of a scientific manner of investigating activities or data. It solutions inquiries to justify relationships with measurable variables to both explain, predict, or manage a phenomenon. Further this research specifically fits in the category of Survey and Descriptive Research which comes under the Quantitative method of Research

Technologies Review

1. Camera – A micro camera with the features like motion detector the use of it will be to detect moving objects near the person for. Ex cars, people, etc. moreover the camera will include night vision mode for better clarity during night and a minimum of 1080p resolution to work.

2. Micro Speaker – A micro speaker with a minimum wattage of 3 watts and a minimum battery life of 5 to 6 hr. Also it should include Bluetooth connectivity

3. Earbuds – The earbuds must have a minimum battery life of 8 to 9 hrs. The device should also support Bluetooth connectivity with few other features like water resistant, dust resistant with better fitting.

4. Bluetooth Receiver – The device must support connection in a range of 1 – 2 mts.

5. DC Accelerometers – Capacitive plates attached internally, the clock frequency should be about 500kHz, internal part like IC/Amplifier, bandwidth capacity up to 1500 Hz, accelerometer Arduino

6. Gyroscope sensor – The device will have good characteristic including scale factor, temperature-frequency coefficient, compact size, shock resistance, stability, noise characteristics etc., Attached to an Gyroscope sensor Arduino

Steps

Step 1 – To research about the features the device should contain such as motion detector, AI describing technique

Step 2 – To make a detailed blueprint of the device

Step 3 – Gathering all the resources needed to complete the making of the device (stated above)

Step 4 – To write up the code for the device to function using Python, Kotlin or JavaScript. The

coding will be such that the device does to require any manual operational work, it will be an all automatic functioning device

Step 5 – To create a prototype model to test the code written up

Step 6 – After the testing is successful, the first proper functioning device will be made. The device will be able to identify each of the objects within its range as well as to be able to record the distance, direction, speed, etc. whereas the Speaker will be connected to both the camera and the earphones, The work of the speaker will be to describe the detailed information given by the camera with the help of the AI to the earphones used by the user through Bluetooth.

Licences Required

At first it's obligatory to induce the sanction type of the Legal Metrology Department which is liable for making certain that devices attached to the examination of measurements and weights should be reliable and their manufacture, sale and repair must be monitored by correct protocols and authorities. This ensures uniformity among caliberable metrics and additionally conforms that a user will depend on the device.

The makers in the Republic of India ought to get the Licence as Manufacturer from the several State Legal Metrology Department within which the producing premises are located.

The Licence as a Manufacturer is obtained for a minimum amount of one year and most of five years subject to the prescribed fees to be paid and also the renewal of such licences must be filed three months before the date of expiry.

Next the following step is to induce the verification and stamping certificate that's regulated beneath the Model of The Legal Metrology (Enforcement) Rules, 2010 and also the (State) Legal Metrology (Enforcement) Rules, 2011.

Next to induce the sanction for the device in distinction to the technological changes and development within the branch of medical devices that are sorted as per the recent standards issued by the Ministry of Health and Family Welfare, Government of India.

The manufacturer of the product shall follow the security and efficaciousness principles arranged down in the rules.

The products shall adjust to the guidelines set by the Bureau of Indian Standards Act, 1985, or as per the norms placed forth by the Ministry of Health and Family Welfare.

The thought of the device conferred during this analysis paper comes below the section of class A and class B devices, thus below are the steps to induce the approval of the device

- Application for the approval of the licence or loan licence to the State Licensing Authority.

- Licence application under sub-rule (1) through the website of the Ministry of Health and Family Welfare in form MD-3 for licence or MD-4 for loan licence.

- The application should be accompanied by the fees and supporting documents as specified in the second schedule and part II of the fourth schedule, respectively.

- An undertaking stating that the quality is managed as per the fifth schedule shall also accompany the application form.

- The State Licensing Authority, if satisfied after scrutinising the documents, will grant the licence for the manufacture of class A medical device in Form MD-5 or Form MD-6 in case of a loan licence. The application may get rejected if the authority is not satisfied and the reasons will be provided in writing. The process of approval or rejection is completed in forty-five days after the receipt of the application form under sub-rule (1).

Analysis

Of India's large disabled population of 29 million i.e 2.1% of the total population, 12 million of its people are blind.

Benefits By Indian Government

SSI Programs - The SSI program is a needs-based program. Your income and resources must be below certain dollar limits. Income of people vary from state to state. You do not have to have worked for Social Security to qualify for SSI.

People are eligible for SSDI benefits or SSI payments if they are blind. The government believes that blind people if their eyesight cannot be corrected to more than 20/200 in their better eye. If the person's field of vision in the better-seeing eye is 20 degrees or less for a period of at least 12 months or is expected to be at least 20 degrees, they are considered blind and benefits are available.

Digital India - Disability is created by barriers that exist in processes and structures.

Digital India has the potential to break through these barriers.

Poor accessibility within the past has created a large divide for the disabled population, pushing them to the margins. they're excluded from thought activities and services owing to the shortage of access.

The Government believes that before they tend to expect the advantages of schemes like Digital Bharat to increase to the blind population, they'd like to widen their view of individuals with visual impairment. They think they should always be ready to understand potentialities that exist for persons with blindness.

Technology, and the increasing digital world, has created its potential for individuals with visual impairment to cross the boundaries of confinement and enter the mainstream. Access to helpful technology-enabled devices and the net makes it possible for blind people to operate severally and avail numerous services on their own. It also opens up a large arena of employment opportunities for them. With voice-over-enabled good phones, screen reader-compatible computers, audio books, etc., blind people realise themselves capable of dealing with keen-sighted peers.

There are many accessible apps that are creating lives easier for blind people. For instance, the Uber app allows a visually handicapped person to hail a cab, moreover the Paytm app allows him/her to create the payment to the Uber cab driver, or the other marketer who accepts digital payments.

In contrast to the above technological advantages the idea of the device presented in this research allows blind people to do work on their own, roam around on their own, also with the new job fields open for the visually impaired people the device will allow the individual to go to the workplace all by himself. Also, not only for work but the person can enjoy going to places without the help of others.

COMPETITORS

Sightsavers -

They provide a variety of choices with schemes to assist the visually impaired resembling the attention health programmes covering schools, urban areas and rural settlements, to deliver good-quality eye care to everybody who wants it. Our low vision program aims to diagnose and treat folks with cataracts and different eye conditions, whereas our truckers program offers eye checks and treatment to India's five million truck drivers.

conjointly comprehensive education and social inclusion programmes ensure that folks who are blind or produce other disabilities are able to move to school, earn a living and participate totally in society.

TCS (Tata Consultancy Services) -

Tata practice Services is empowering visually impaired individuals, by providing a sophisticated pc coaching programme to boost their employment opportunities. This CSR programme conducts 2 batches during a year, one at National Association for the Blind, Bombay and therefore the alternative at Hindu deity Jyothi, Bengaluru.

This CSR initiative, while raising the prospects of India's visually impaired workforce, aims to redefine the views of employers concerning their potential and versatility.

Fullerton India -

Eye diseases are one among the prime reasons for several rural households to be laid-off or unskilled and depriving them of their daily livelihood. The correct eye care check-up facility isn't out there in the rural Republic of India and folks got to travel an extended time thanks to nearby cities that provide the facilities. Fullerton India Jyoti-Save the attention CSR initiative not solely provides access to quality eye care at the community' doorstep, however additionally enhances awareness and addresses the incidences of 'avoidable blindness'.

Fullerton India has partnered with varied NGOs to determine fifteen Vision Care Centres (VCC), that may be a static setup for screening of patients for addressing the preliminary eye-related problems and to supply comprehensive primary eye care services to the patients in urban and rural areas. Most of the VCCs are equipped with tele-ophthalmology facilities which give consultations with ophthalmologists based mostly at the nearby base hospital. every VCC additionally conducts specialty screening camps hebdomadally in abutting villages whereby patients with cataract and different serious eye ailments are taken to base hospital for additional treatment.

Galalite -

'Be the Lite' is a CSR initiative through the producer of cinema projection screens, Galalite. From eye care camps to enticing the visually impaired in artwork workshops to elevating recognition and education communities, Galalite has been engaging in diverse sports and contributing in large part to saving the eyesight of the impaired beneath near 'Be the Lite'.

The production commercial enterprise partnered with NGO Sightsavers to now no longer offer remedy to the visually impaired, however additionally to unfold recognition on preventive blindness.

Tech Mahindra -

Since 2006, technical school Mahindra CSR has been unrelentingly operating with numerous teams to cater to the wants of the visually impaired students through ARISE+ and SMART+ programmes. On the International Day of Education 2020, technical school Mahindra Foundation in association with Thinkerbell Labs put in Annie – the world's initial Braille acquisition device across completely different locations in India. Annie could be a revolutionary answer to the normal teaching ways of Braille and also the lack of special educators. it's a digital device that helps the visually impaired learn to read, write, and kind in Braille, on their own through interactive audio-guided content.

Hindustan Zinc -

Hindustan Zinc has been with success conducting CSR programme Jeevan Tarang specialising in over 800 children with special desires who have hearing/visual impairment or have special intellectual needs. The target is to create the kids self-directed through improved education opportunities as well as technology-based learning.

PROS AND CONS

With the advancement in technology many researchers and companies have worked on and created several projects to help the problems faced by the visually impaired people, with the latest success being the Google Lookout App.

The Idea of helping the people was implemented through a mobile app which is known as Google Lookout that uses AI to describe surroundings for the visually impaired.Google has launched its Lookout app, that uses computer science (AI) to assist the visually impaired see by pointing their phone at objects and receiving verbal feedback

The idea is implemented through an Android mobile app that focuses on voice assistant, image recognition, currency recognition, e-book, chat bot etc. The app is capable of using voice commands to recognize objects in the surrounding, do text analysis to recognize the text in the hard copy document.

The problem with an mobile app is that in India not every person is handy with an mobile device

or even network which are the important necessities for the device to work

Also it will be hard for the visually impaired people above a certain age to use app with these type of features which will again increase the dependency rate of those people as someone needs to be there with them to help with the mobile device and app

But it isn't easy for visually impaired people to be able to use the app through the phone. What if the phone's battery dies, the phone is not able to function properly moreover the consistent need of Wi-Fi/Data is a bigger issue.

The Idea is to make it easy for the visually impaired people. The device presented in this research will be an easy handy device which will allow the people to use it without any problem. Moreover to solve the issue of battery the device will use the basic small solar panel which will allow the device to charge itself during the day and use the saved energy and the battery during night time.

APPROX. COSTING OF THE MATERIAL

The camera cost will be according to the quality and features of the device – Rs. 2000/- (Minimum)

Micro Speaker – Rs. 100/-

Earbuds based on the quality – Rs. 1000/- (Minimum)

Solar panel – Up-to Rs. 400/

WHO

Over the past 30 years, the proportion of visually impaired and blind people worldwide has decreased. However, population growth and ageing mean that the challenge of ending preventable blindness is now greater than ever.

The combination of a growing and ageing population will result in a massive increase in the number of people who are blind or have MSVI. Two other factors that also pose a significant risk for the future are the dramatic increase in the number of people with diabetes (which can cause diabetic retinopathy, a potentially blinding condition) and people with high myopia, now occurring in all parts of the world.

Considering the above situation WHO's has advanced their projects for the service of the

visually imapried people such as -

- Working with Member States and other partners in the field to provide recommendations on feasible global targets for 2030 on integrated people-centred eye care;

- Observing and promoting World Sight Day as an annual advocacy event;

- The ongoing development of technical tools to support the implementation of the recommendations of the World report on vision:

  - Guide for action for integrated people-centred eye care (IPEC)

  - Package of evidence-based eye care interventions to facilitate the integration of eye care interventions into health systems

  - Mobile health toolkit for myopia to increase awareness and health literacy of modifiable risk factors, potential irreversible consequences of myopia and the importance of spectacle compliance and regular eye examinations

- The development and implementation tools to support countries to assess the provision of eye care services:

  - Eye care services assessment tool

  - Tool for Assessment of Diabetes and Diabetic Retinopathy Services

  - Tool for the Assessment of Glaucoma Services

  - Tool for the Assessment of Refractive Services

  - Tool for the Assessment of Rehabilitation Services and Systems

Comparison

There are 2.2 billion blind human beings with inside the entire world. And China is taking the primary area of this problem. China owes approximately 18% of blind human beings. Most of them can't stay independently; all of them want someone's help. Also we will recognize that 90% of blind human beings are dwelling in current cities. For example: Beijing (capital), Shanghai etc. Moreover, research based on the recent population for the entire age range, suggests that the number of blind people in India is currently over 18 million. According to the internet, we can know that the reason for blindness in China is not only cataract but also cornea

diseases

As stated above, in the whole world the main problem of blindness is cataract. Because solely cataract visual defects account for 2.5 million folks within the world. Annually 400,000 people become blind in one moment due to it. Cataract is predominantly a disease associated with ageing., trachoma, and glaucoma.

The two types of Blindness that are partially blind which means you have limited vision for example, you may have blurry vision or the inability to distinguish the shapes of objects and complete blindness which is the inability to see anything, including light.

Through numerous researches over the years partially blind people have been able to overcome their disability with the help of eyeglasses/spectacles. Eye glasses which was discovered in 1268 by Roger Bacon are is said to be considered in the top five important inventions of all time as for the first time in human history, tens of thousands and thousands of humans had been capable of revel in exact imaginative and prescient notwithstanding issues with their visual problems

Whereas on the other hand the people with complete blindness were left with nothing and had to depend on other people in order to survive. But as the hunger for new inventions continued and the idea of guide dogs aroused. The first guide dog was issued to a blind veteran in 1916, later the British pioneers Muriel Crooke and Rosamund Bond continued the ideas of guide dogs, moreover the use of guide dogs were much higher and schools for training dogs which issued them to people at free of cost was founded by Five community leaders in New York during 1946.

Also one other idea for helping the people with complete blindness was the white cane in 1921 by James Biggs of Bristol. The purpose of the white cane was to help the person navigate and avoid obstacles on the road. Further with new technologies and updates the white cane was an upgraded version of the white cane, the smart stick, invented by Shantanu Gangwar, from India in 2011.

Beside these equipment's the Governments of different countries provide services like adjustment to blindness counselling, peer counselling, support groups, and training in independent living, mobility training, low vision services and various educational and recreational activities. These activities help them to become less dependent and to spread awareness among other people on how to help blind people in a proper way.

A beautiful flower can also dry one day, similar to that not everything is always perfect and has some drawbacks. Such as the white cane cannot be used properly because of the increased

interference from the general public looking to assist, or the weather conditions which negatively affects cane travellers also the guide dogs need to be properly handled by the handlers to preserve their dog's training, even though the dogs are well trained, they're still dogs and can sometimes do something naughty also if the dogs get sick, and their veterinary expenses aren't cheap.

Conclusion

Among the whole blind population it is hard to provide aid to each and every person at their doorstep. Everyday a lot of blind people suffer different problems which makes it hard for them to perform their day to day tasks.

Moreover in many parts of the world it's hard for visually impaired people to live with people because of their disability. Discrimination, getting bullied, harasment are few of many problems which may affect the person metally and to think blind people have to face these problems almost everyday.

But in this 20th century countries are taking as much as measures to provide help to the blind population at their place through the help of technology, awareness camps, feasible and good quality treatments.

With the increasing population in the world the population of visually impaired people is also increasing making it harder for the government to take measures. But still governments of different countries, NGOs, organisations are trying to help as much as possible.

Also WHO has an important role in helping the countries with providing inventories for medical services, helping in spreading more awareness, nonetheless providing advanced technological medical devices and instruments.

To talk about India not only the government but different organisations, NGOs, help the blind population with different methods. Awareness camps are arranged with the help of celebrities or sports icons to spread the importance of helping the blind because of the challenges faced by them.

With the advancement in technology Google launched a mobile app to help the visually impared people with features to help them in as many difficult situations as they face.

But to think of India which is a developing country or other underdeveloped countries it is not possible for people to afford medical services for themselves or to buy a phone with a network to

use the new apps made to help them.

The idea of the device presented in this research cuts out all the problems stated above. As first of all the device will be a lot cheaper than most of the assistive devices, moreover the device will include the latest AI technology to help the user in every possible way, with no requirements such as network or carrying extra battery backup because the device will work on bluetooth connections, and as of battery the idea is to use solar energy to make the device work during the day and use the stored energy during night time with a battery backup for emergency purposes.

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