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Department of Electronics and Communication Engineering

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VISION

To develop the department into a centre of excellence and produce high quality, technically competent and responsible Electronics and communication engineers

MISSION

To create a learner centric environment that promotes the intellectual growth of the students.

To develop linkages with R & D organizations and educational institutions for excellence in teaching, learning and consultancy practices.

To build the student community with high ethical standards.

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AN UNFETTERED MIND

- Stephen Hawking

“He was a great scientist and an extraordinary man whose work and legacy will live on for many years. His courage and persistence with his brilliance and humour inspired people across the world.

“He once said: ‘It would not be much of a universe if it wasn’t home to the people you love.’ We will miss him for ever.”

The most recognisable scientist of our age, Hawking holds an iconic status. His genre-defining book, *A Brief History of Time*, has sold more than 10 million copies since its publication in 1988, and has been translated into more than 35 languages. He appeared on *Star Trek: The Next Generation*, *The Simpsons* and *The Big Bang Theory*. His early life was the subject of an Oscar-winning performance by Eddie Redmayne in the 2014 film *The Theory of Everything*. He was routinely consulted for oracular pronouncements on everything from time travel and alien life to Middle Eastern politics and nefarious robots. He had an endearing sense of humour and a daredevil attitude – relatable human traits that, combined with his seemingly superhuman mind, made Hawking eminently marketable.



But his cultural status – amplified by his disability and the media storm it invoked – often overshadowed his scientific legacy. That’s a shame for the man who discovered what might prove to be the key clue to the theory of everything, advanced our understanding of space and time, helped shape the course of physics for the last four decades and whose insight continues to drive progress in fundamental physics today.

Beginning with the big bang

Hawking’s research career began with disappointment. Arriving at the University of Cambridge in 1962 to begin his PhD, he was told that Fred Hoyle, his chosen supervisor, already had a full complement of students. The most famous British astrophysicist at the time, Hoyle was a magnet for the more ambitious students. Hawking didn’t make the cut. Instead, he was to work with Dennis Sciama, a physicist Hawking knew nothing about. In the same year, Hawking was diagnosed with amyotrophic lateral sclerosis, a degenerative motor neurone disease that quickly robs people of the ability to voluntarily move their muscles. He was told he had two years to live.

Although Hawking's body may have weakened, his intellect stayed sharp. Two years into his PhD, he was having trouble walking and talking, but it was clear that the disease was progressing more slowly than the doctors had initially feared. Meanwhile, his engagement to Jane Wilde – with whom he later had three children, Robert, Lucy and Tim – renewed his drive to make real progress in physics.

Working with Sciama had its advantages. Hoyle's fame meant that he was seldom in the department, whereas Sciama was around and eager to talk. Those discussions stimulated the young Hawking to pursue his own scientific vision. Hoyle was vehemently opposed to the big bang theory (in fact, he had coined the name "big bang" in mockery). Sciama, on the other hand, was happy for Hawking to investigate the beginning of time.

Hawking radiation

Hawking now embraced the idea that thermodynamics played a part in black holes. Anything that has entropy, he reasoned, also has a temperature – and anything that has a temperature can radiate.

His original mistake, Hawking realised, was in only considering general relativity, which says that nothing – no particles, no heat – can escape the grip of a black hole. That changes when quantum mechanics comes into play. According to quantum mechanics, fleeting pairs of particles and antiparticles are constantly appearing out of empty space, only to annihilate and disappear in the blink of an eye. When this happens in the vicinity of an event horizon, a particle-antiparticle pair can be separated – one falls behind the horizon while one escapes, leaving them forever unable to meet and annihilate. The orphaned particles stream away from the black hole's edge as radiation. The randomness of quantum creation becomes the randomness of heat.

"I think most physicists would agree that Hawking's greatest contribution is the prediction that black holes emit radiation," says Sean Carroll, a theoretical physicist at the California Institute of Technology. "While we still don't have experimental confirmation that Hawking's prediction is true, nearly every expert believes he was right."

Experiments to test Hawking's prediction are so difficult because the more massive a black hole is, the lower its temperature. For a large black hole – the kind astronomers can study with a telescope – the temperature of the radiation is too insignificant to measure. As Hawking himself often noted, it was for this reason that he was never awarded a Nobel Prize. Still, the prediction was enough to secure him a prime place in the annals of science, and the quantum particles that stream from the black hole's edge would forever be known as Hawking radiation.

Some have suggested that they should more appropriately be called Bekenstein-Hawking radiation, but Bekenstein himself rejects this. "The entropy of a black hole is called Bekenstein-Hawking entropy, which I think is fine. I wrote it down first, Hawking found the numerical value of the constant, so together we found the formula as it is today. The radiation was really Hawking's work. I had no idea how a black hole could radiate. Hawking brought that out very clearly. So that should be called Hawking radiation."

Theory of everything

The Bekenstein-Hawking entropy equation is the one Hawking asked to have engraved on his tombstone. It represents the ultimate mash-up of physical disciplines because it contains Newton's constant, which clearly relates to gravity; Planck's constant, which betrays quantum mechanics at play; the speed of light, the talisman of Einstein's relativity; and the Boltzmann constant, the herald of thermodynamics.

The presence of these diverse constants hinted at a theory of everything, in which all physics is unified. Furthermore, it strongly corroborated Hawking's original hunch that understanding black holes would be key in unlocking that deeper theory.

Hawking's breakthrough may have solved the entropy problem, but it raised an even more difficult problem in its wake. If black holes can radiate, they will eventually evaporate and disappear. So what happens to all the information that fell in? Does it vanish too? If so, it will violate a central tenet of quantum mechanics. On the other hand, if it escapes from the black hole, it will violate Einstein's theory of relativity. With the discovery of black hole radiation, Hawking had pit the ultimate laws of physics against one another. The black hole information loss paradox had been born.

Hawking staked his position in another ground-breaking and even more contentious paper entitled Breakdown of predictability in gravitational collapse, published in *Physical Review D* in 1976. He argued that when a black hole radiates away its mass, it does take all of its information with it – despite the fact that quantum mechanics expressly forbids information loss. Soon other physicists would pick sides, for or against this idea, in a debate that continues to this day. Indeed, many feel that information loss is the most pressing obstacle in understanding quantum gravity.

“Hawking's 1976 argument that black holes lose information is a towering achievement, perhaps one of the most consequential discoveries on the theoretical side of physics since the subject was invented,” says Raphael Bousso of the University of California, Berkeley.

Intelligence is the ability to adapt to change.

INNOVATION

Better Batteries Fuel a Surge of Electric Scooters in India

Two-wheelers – motorcycles and motorized scooters – account for the majority of vehicles on the roads in developing countries. China and India are the two largest markets for two-wheelers, which contribute to their air pollution problems. Thirty seven of the world's 50 most polluted cities are in India and China. And about 20% of the CO₂ emissions and 30% of particulate emissions in India are due to two-wheelers. One attractive solution is to replace combustion engines with electric. But for electric vehicles to become mass-market products, we need better batteries. We have studied what those requirements are.

MINIMUM DRIVING RANGE

We analyzed the battery requirements for electric two-wheelers to better understand the cost requirements to compete with gasoline-powered motorcycles and scooters.

We found that for a range of about 100 kilometers (60 miles), a battery pack of about 2.5 kiloWatt-hours is needed. This is about eight times smaller than the battery pack needed for driving the same range in an sedan. A distance of 100 km is the upper limit of the typical daily driving range for two-wheelers, although gas-powered two-wheelers can cover up to 300 km with a full tank of gas.

By understanding the battery needs of two-wheelers and projected battery costs – the other vitally important factor – one can get a better idea of when electric two-wheelers will be competitive with gas-powered vehicles. This means consumers can better evaluate when electric powered two-wheelers will meet their daily driving needs.

THE COST CHALLENGE

To move, a vehicle has to resist three forces: drag, or resistance from the wind; friction from the road; and inertia, or resistance to a change in speed. These factors all influence energy storage capacity – and thus battery size.

In an electric sedan or SUV, space and weight constrain the battery pack size. But this is not a bottleneck for electric two-wheelers because their total storage needs are substantially lower, as they are smaller vehicles and carry less cargo.

The specific energy of commercial batteries, or the amount of energy stored relative to their weight, is generally improving. These better batteries have a significant impact on the driving range of larger electric vehicles. But since the total energy capacity needs of two-wheelers are

lower, ongoing technical progress provides a negligible increase in driving range for a given scooter or motorcycle.

Of course, the cost of the battery pack matters, too. The average retail price for two-wheelers in India is (USD) \$1000. Currently, the battery pack cost is around \$180/kWh for small-volume markets, resulting in electric two-wheelers needing close to \$500 for just the battery pack.

The general trend on battery prices is downward, going at a rate few have predicted. The battery cell price broke the \$100/kWh barrier in 2018 for high-volume markets, such as electric vehicles, and cost declines are expected to continue over the next decade.

ELECTRIC MICROMOBILITY

There is a major push in India and China to drive adoption of electric two-wheelers. Electric two-wheeler sales reached 40 million last year, with China accounting for 90 percent of this. India has launched a program called FAME to provide financial incentives for 86 different models of electric two-wheelers.

Given the small battery pack, electric two-wheelers can charge easily from a regular wall socket. To explore these aspects, we worked with the CEO of electric scooter maker Ather Energy and the principal adviser to Indian policy think tank NITI Aayog to better understand charging in India.

Data from Ather Energy indicate that a large majority of electric two-wheeler owners tend to charge at home. Hence, a policy push toward establishing residential charging facilities, especially in large residential buildings like apartment complexes, would have a positive impact on adoption and utilization.

Advances in the performance metrics of batteries and cost reductions are spurring a revolution in micromobility in general. In addition to electric scooters, a market is emerging for electric mopeds, one-wheel scooters and skateboards, each with a range around 10-20 kilometers, or six to 12 miles. Vehicle trips under six miles are about 60 percent of total trips; in terms of person miles travelled, they make up only about 15 percent, according an analysis from Ark Investment, citing U.S. government data.

Our analysis shows that there are three key trade-offs when it comes to engineering electric two-wheelers: battery pack storage capacity, which translates into driving range; the average speed of the drivers; and the cost per kilowatt-hour. Electric motor scooters are already being purchased by hundreds of thousands of consumers in Asia – there’s even an electric version of the iconic Indian scooter called the Bajaj Chetak. Once manufacturers can make better batteries for two-wheelers that achieve a range of 100 kilometers at a comparable price to gas-powered vehicles, we believe even more consumers will opt for the electric option.

CURRENT ISSUE

THROUGH A RAPIST'S EYES

“Through a rapist’s eyes” . A group of rapists and date rapists in prison were interviewed on what they look for in a potential victim and here are some interesting facts:

- 1) The first thing men look for in a potential victim is hairstyle. They are most likely to go after a woman with a ponytail, bun, braid, or other hairstyle that can easily be grabbed. They are also likely to go after a woman with long hair. Women with short hair are not common targets.
- 2) The second thing men look for is clothing. They will look for women whose clothing is easy to remove quickly. Many of them carry scissors around to cut clothing.
- 3) They also look for women using their cell phone , searching through their purse or doing other activities while walking because they are off guard and can be easily overpowered.
- 4) The number one place women were abducted from or attacked is at grocery store parking lots.
- 5) The number two place is office parking lots or garages.
- 6) The third place is public restrooms.
- 7) The thing about these men is that they are looking to grab a woman and quickly move her to a second location where they don't have to worry about getting caught.
- 8) If you put up any kind of a fight at all, they get discouraged because it only takes a minute or two for them to realize that going after you isn't worth it because it will be time-consuming.
- 9) These men said they would not pick on women who have umbrellas or other similar objects that can be used from a distance in their hands.
- 10) Keys are not a deterrent because you have to get really close to the attacker to use them as a weapon. So, the idea is to convince these guys you're not worth it.

Points That Should Be Remembered:

- 1) If someone is following behind you on a street or in a garage or with you in an elevator or stairwell, look them in face and ask them a question , like what time is it, or make a general small talk: can't believe it is so cold out here, we're in for a bad winter . Now that you've seen their faces and could identify them in a line-up, you lose appeal as a target.
- 2) If someone is coming toward you, hold out your hands in front of you and they will stop or stay back! Most of the rapists this man talked to said they'd leave a woman

- alone if she yelled or showed that she would not be afraid to fight back. Again, they are looking for an easy target.
- 3) If you carry pepper spray (this instructor was a huge advocate of it and carries it with him whenever he goes) yelling I HAVE PEPPER SPRAY and holding it out will be a deterrent.
 - 4) If someone grabs you, you can't beat them with strength but you can do it by outsmarting them. If you are grabbed around the waist from behind, pinch the attacker either under the arm between the elbow and armpit or in the upper inner thigh-HARD. One woman in a class this guy taught told him she used the underarm pinch on a guy who was trying to date rape her and was so upset she broke through the skin and tore out muscle strands the guy needed stitches. Try pinching yourself in those places as hard as you can stand it; it really hurts.
 - 5) After the initial hit, always go for the groin. I know from a particularly unfortunate experience that if you slap a guy's parts it is extremely painful. You might think that you'll anger the guy and make him want to hurt you more, but the thing these rapists told our instructor is that they want a woman who will not cause him a lot of trouble. Start causing trouble, and he is out of there.
 - 6) When the guy puts his hands up to you, grab his first two fingers and bend them back as far as possible with as much pressure pushing down on them as possible. The instructor did it to me without using much pressure, and I ended up on my knees and both knuckles cracked audibly.
 - 7) Of course the things we always hear still apply. Always be aware of your surroundings, take someone with you if you can and if you see any odd behavior, don't dismiss it, and go with your instincts. You may feel little silly at the time, but you'd feel much worse if the guy really was trouble.

Finally, Please Remember These As Well....

- 1) Tip from tae kwon do: The elbow is the strongest point on your body. If you are close enough to use it, do it.
- 2) Learned this from a tourist guide to New Orleans: If a robber asks for your wallet or purse, **DO NOT HAND IT TO HIM**. Toss it away from you.... chances are that he is more interested in your wallet or purse than you and he will go for the wallet/purse. **RUN LIKE MAD IN THE OTHER DIRECTION!**
- 3) If you are ever thrown into the trunk of a car: Kick out the back tail lights and stick your arm out the hole and start waving like crazy. The driver won't see you but everybody else will. This has saved lives.
- 4) Women have a tendency to get into their cars after shopping, eating, working, etc., and just sit (doing their check book, or making a list, etc..**DON'T DO THIS!** The predator will be watching you, and this is the perfect opportunity for him to get in on

- the passenger side, put a gun to your head, and tell you where to go. AS SOON AS YOU CLOSE THE DOORS, LEAVE.
- 5) A few notes about getting into your car in a parking lot, or parking garage:
 - a) Be aware: look around your car as someone may be hiding at the passenger side, peek into your car, inside the passenger side floor, and in the back seat. (DO THIS TOO BEFORE RIDING A TAXI CAB).
 - b) If you are parked next to a big van, enter your car from the passenger door. Most serial killers attack their victims by pulling them into their vans while the women are attempting to get into their cars.
 - c) Look at the car parked on the driver's side of your vehicle, and the passenger side. If a male is sitting alone in the seat nearest your car, you may want to walk back into the mall, or work, and get a guard/policeman to walk you back out. IT IS ALWAYS BETTER TO BE SAFE THAN SORRY.
 - 6) Always take the elevator instead of the stairs. (Stairwells are the horrible places to be alone and the perfect crime spot).
 - 7) If the predator has a gun and you are not under his control, ALWAYS RUN! The predator will only hit you (a running target) 4 in 100 times; and even then, it most likely WILL NOT be a vital organ. RUN!
 - 8) As women, we are always trying to be sympathetic: STOP IT! It may get you raped, or killed. Ted Bundy, the serial killer, was a good-looking, well educated man, who ALWAYS played on the sympathies of unsuspecting women. He walked with cane, or a limp, and often asked for help into his vehicle or with his vehicle, which is when he abducted his next victim.

by

R.R.D.MANI MOHAN

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**How much wood would a woodchuck chuck
if a woodchuck could chuck wood?
He would chuck, he would, as much as he could,
and chuck as much wood
As a woodchuck would if a woodchuck could**

CAREER GUIDANCE

National and International Internship Programs for Indian Students – Opportunities

National and International Internships – Across the nation, many Indian students are receiving and, in turn, undertaking subject specific internships, both national and abroad, to prosper their chances of landing with their **dream jobs**. A good share of them provides funding and other allowances so as to support the qualified student properly during the stay. Each program requires different skill aspects from the applicants and the successful students are in fact highly competent in their field of study.

International Internships

Most of the developed countries, like the USA, UK, Germany, Japan, Australia etc. provide some of the best platforms to undertake internships and gather the state-of-art skills required to progress in the field. Some of the interesting ones are:

DAAD – WISE internships

The German institutions offer short-term training and internship opportunities to Indian students in the field of Science and Engineering in the undergraduate level. The students are assumed to be studying in the institutes or Universities recognized by the scholarship team. Check the list of colleges accepted **DAAD-WISE Internships**

The student must be enrolled in programmes dictated under Engineering, Maths, and Natural Sciences. They must also be in their 5th/6th academic semester of 4-year B.Tech or 5th/6th/7th/8th semester of 5-year Integrated Masters/Dual Degree programme. The grant is given for 2-3 months during the May-August period and constitutes a total value worth EUR 750, supplemented with a travel grant of EUR 1,050 and insurance coverage. The selection process is stringent and is mainly focussed on academic accomplishments as well as other extra-curricular activities relevant to the application.

USC Summer Internships

The **University of South California** (USC) sports the Viterbi School of Engineering, which in association with the **Indo – US Science and Technology Forum (IUSSTF)** offers special training internship opportunities in their campus to Indian students for a period of 8 weeks. The main objective is to provide state-of-art facilities and develop research orientation in the field of Engineering and Technology. Indian students who are currently studying in their B.Tech/M.Tech programme from reputed institutions is eligible to apply. The stream of interest of the committee is Electrical Engineering, Computer Science and Computational Sciences. The scholarship covers stipends and airfare expenditure.

S N Bose scholarship programs

The Department of Science and Technology led Science & Engineering Board (SERB), Govt. of India, along with IUSSTF and WINStep Forward provides student exchange programs between accredited Indian institutions and top US institutions. The programme aims to deepen the

research culture of the nation by giving the selected students the exposure to the rational methodologies prevalent in their field of study. Indian students enrolled in a B.Tech/M.Tech programme, in the home country, at those institutions recognized by the committee are eligible to apply. The main domains of research include Atmospheric and Earth Sciences, Chemical Sciences, Engineering Sciences, Mathematical and Computational Sciences, and Physical Sciences. The last date for the submission of the application form is on 31st October each year. A three-month program follows suit from May to July the following year.

Khorana program

IUSSTF in association with the Department of Biotechnology, Govt. of India and WINStep Forward conducts the famous Khorana programme for Indian students to commence research undertakings in the University of Wisconsin-Madison (QS world rank: 53) and other participating institutions. These scholarships are granted for a time duration of 10-12 weeks. Students currently in their pre-final year studies in B.Tech/M.Tech, B.E, B.V.Sc./M.V.Sc, B.Pharm/M.Pharm, Integrated B.S – M.S, MBBS, and Master in Medical Science and Technology (MMST) at the institutes registered under this scholarship scheme can apply for it. These scholarships are more focussed on students with research interest in the area of Biotechnology and allied disciplines. The deadline for submission of the application is on 31st October, and the three-month-long programme will start the following year from May – July.

SUR internship programme

The prestigious School of Biology, Faculty of Biology and Medicine, University of Lausanne (UNIL), Switzerland, provides Summer Undergraduate Research (SUR) internships to selected international students of any nationality to promote R&D culture among the participants. Every year the SUR internship offers 20 positions to students engaged in the field of biological and medical studies. The selected candidates are expected to commence independent research works on a specific topic in the Faculty of Biology and Medicine. The programme also highlights the importance of leisure time to balance professional and personal work in the form of excursions to some of the important tourist destinations like the Alps, Lac Lemman, and other mesmerizing locations in the Swiss soil! Participants who are undergraduates in their second and third year of studies can apply. Students from the field of Life Sciences are more preferred for screening. Scholarships of CHF 1500 are provided to compensate living expense, and limited funds of CHF 1700 is provided to cover travel expenditures.

RTC Summer internship

The Lunenfeld-Tanenbaum Research Institute, Canada, offers a special research programme for international undergraduates to work in their world-class laboratories under a supervisor. The programme aims to orient and promote research interest among the participants. Students are expected to have passed the second year UG academic studies in one of the Universities identified by the programme management as of May the same year of commencement of the programme. The screening process is highly competitive and the deadline for submitting the application is on the 4th of March of the same year. The students will perform a 3-month research work, which includes a poster presentation towards the conclusion of their work.

UTokyo Amgen UG scholarship The University of Tokyo and Kyoto University, Japan, in collaboration provides the prestigious UTokyo Amgen scholarships for well-qualified students pursuing UG studies in top colleges of the nation, in the field of Science, Engineering,

Pharmaceutical Sciences, Agricultural, and Life Sciences, and Industrial Science. The 8 week, usually from June – August, program covers visits to the graduate departments undertaking Biomedical research, seminars, Japanese traditional classes, and excursions. The participants are required to qualify English Language examination of international reputation, like TOEFL (iBT), IELTS, Cambridge English etc. and must be well-motivated to pursue a career in research in the future. The applications for participation in the scholarship competition starts from 1st November and concludes by 1st February the following year. A grant of JPY 350,000 is given to students from Asia, which covers transportation fees and accommodation charges.

National level internships

The top Universities of the nation in the field of Engineering, Information Technology and Sciences provide some of the best platforms to undertake independent research and innovative projects for a short term basis. Some of the exemplary opportunities are as follows:

IIT Bombay Research Internship

One of the premier institutions of our nation, IIT Bombay provides research opportunities in the different fields of study offered by the institute. The candidates will be selected as per the vacancies available in the projects proposed by the team of faculties from the institution. A monthly stipend of INR 10,000 is provided to the students, exclusive of accommodation and other allowances. The applications usually start by 1st August and end by 10th September the same year. The program has a total span of 4-6 months starting from December till June the following year.

IISER Pune Summer Student Programme

Indian Institute of Science Education and Research (IISER) Pune hosts specific training and internship programmes during Summer break. The major fields of emphasis are Biology, Chemistry, Mathematics, Physics, and Earth Sciences. The participants must be in their 2nd/3rd/4th/ year of Bachelors or 1st year of Master's studies. Accommodation is provided, while no stipends for covering travel and other allowances are given. The candidates are usually informed regarding the selection results close to March 31st. The internship starts around the 15th of May the same year and lasts for 4 weeks.

SURGE programme

IIT Kanpur conducts annually the Students Undergraduate Research Graduate Excellence (SURGE) programme for students from the home institute as well as other institutions. The program supports innovative projects in the field of research and development and takes in 300 students under it, among which 60 are SURGE funded and the rest are funded via 3 means: Institute Project, Self-Funded, and Industry-IIT Kanpur joint funding.

A grant of 12,500 is provided to each SURGE funded candidate for 8 weeks. The last date of application to the program is on the 14th of February. The program usually begins by 13th May and concludes by 10th of July. The candidates are required to have completed their 3rd year of studies (both IIT & Non-IIT Kanpur students).

LIMERICKS

- 1. I don't need a hair stylist,
my pillow gives me a new
hairstyle every morning.*
- 2. Don't worry if plan A fails,
there are 25 more letters in
the alphabet.*
- 3. Life is short, smile while you
still have teeth.*
- 4. Always remember you're
unique, just like everyone
else*
- 5. Money can't buy happiness,
but it sure makes misery
easier to live with.*
- 6. Experience is a wonderful
thing. It enables you to
recognise a mistake when
you make it again.*
- 7. Doing nothing is hard, you
never know when you're
done.*
- 8. The best part of going to
work is coming back home
at the end of the day.*
- 9. When you're right, no one
remembers. When you're
wrong, no one forgets.*

FROM BOOKS TO CANVAS



kanksha
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“You Learn More From Failure Than From Success. Don’t Let It Stop You. Failure Builds Character.”



JOKES

Patient: Doctor, I have a pain in my eye whenever I drink tea.

Doctor: Take the spoon out of the mug before you drink.

Headmaster: I've had complaints about you, Johnny, from all your teachers. What have you been doing?

Johnny: Nothing, sir.

Headmaster: Exactly.

Son: Dad, what is an idiot?

Dad: An idiot is a person who tries to explain his ideas in such a strange and long way that another person who is listening to him can't understand him. Do you understand me?

Son: No

Customer in a restaurant: I would like to have a plate of rice and a piece of fried chicken and a cup of coffee

Waitress : Is it enough Sir?

Customer : What? Do you think I can't buy more?

"I was born in California."

"Which part?"

"All of me."

Why do we park our car in the driveway and drive our car on the parkway?

PROJECT IDEA

SIGN LANGUAGE TO SPEECH TRANSLATION

INTRODUCTION

Nowadays embedded system emerging as an important trend in all applications. More recently developed embedded applications are changing our lifestyle in a smart way. Sign language is an expressive and natural way for communication between normal and dumb people (information majorly conveys through the hand gesture). The intension of the sign language translation system is to translate the normal sign language into speech and to make easy contact with the dumb people. In order to improve the life style of the dumb people the proposed system is developed. Sign language uses both physical and non-physical communication. The physical gesture communication consist of hand gestures that convey respective meaning, the non physical is head movement, facial appearance, body orientation and position. Sign language not a universal language and it is different from country to country. America developed American sign language (ASL), British developed British sign language system (BSL) and Thailand developed Thai sign language system (TSL).

Most of spoken English countries follow same sign language but Same sign represents the different meaning and depends upon to their own language. Research in the sign language system has two well known approaches are 1.Image processing and 2.Data glove. The image processing technique using the camera to capture the image/video. Analysis the data with static images and recognize the image using algorithms and produce sentences in the display, vision based sign language recognition system mainly follows the algorithms are Hidden Markov Mode (HMM), Artificial Neural Networks (ANN) and Sum of Absolute Difference (SAD) Algorithm use to extract the image and eliminate the unwanted background noise. The main drawback of vision based sign language recognition system image acquisition process has many environmental apprehensions such as the place of the camera, background condition and lightning sensitivity. Camera place to focus the spot that capture maximum achievable hand movements, higher resolution camera take up more computation time and occupy more memory space.

User always need camera forever and cannot implement in public place. Another research approach is a sign language recognition system using a data glove. User need to wear glove consist of flex sensor and motion tracker. Data are directly obtained from each sensor depends upon finger flexures and computer analysis sensor data with static data to produce sentences. It's using neural network to improve the performance of the system. The main advantage of this approach less computational time and fast response in real time applications. Its portable device and cost of the device also low. Another approach using a

portable Accelerometer (ACC) and Surface Electro Myogram (sEMG) [10] sensors using to measure the hand gesture. ACC used to capture movement information of hand and Arms. EMG sensor placed on the hand, its generate different sign gesture. Sensor output signals are fed to the computer process to recognize the hand gesture and produce speech/text.

The proposed system using the data glove technique [9] [10] [4], Data glove especially made up of electronic glove worn by the user. It consists of flex sensors that used to detect finger gestures and transmit the information to a PIC microcontroller. Microcontroller processes the gesture of the user and plays the audio file corresponding gesture. The voice signals are stored in APR9600. This system avoids PC intervention for processing and all operations are controlled by microcontroller. Its lead in fast response of the system. Most of the commercial sign language system uses the glove technique. It's simple to attain data concerning the bending of finger flexure and three dimensional position of the hand. Computer analysis the data and produces the output like sentence or voice, compared with existing data glove and image processing technique, low computational power, highly portable and real time operation much easier to attain.

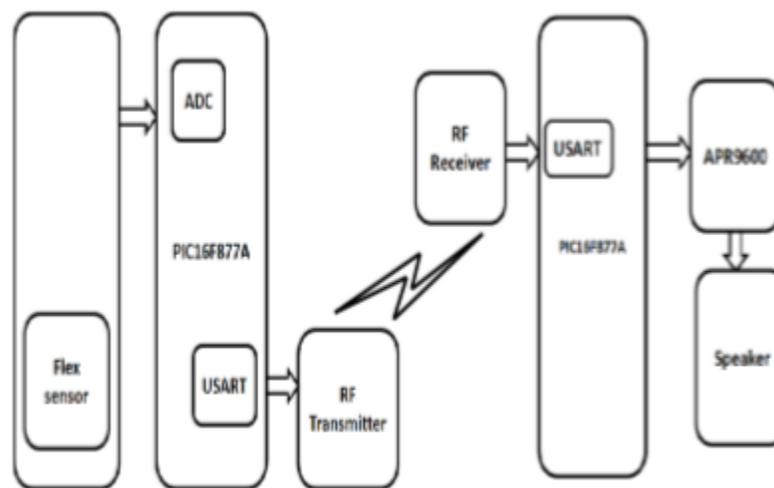


Fig 1. Block Diagram of SLT

A. Systems Description:

In this system microcontroller receives data from the glove, it consists of 4.2 inch flex sensors and gyro sensors. These sensors provide a corresponding signal of finger flexures and hand motion. PIC microcontroller contain 10-bit inbuilt ADC and use to receive the analog value from the sensor. An ADC converts analog to digital value and store the value in the buffer. Then Controller compares the static data and digital value for processing to determine the gesture. According to the finger movements microcontroller play the voice (speech). Voice is stored using APR9600 is a single chip used to store high quality voice recording and Non-volatile flash memory, playback capacity for 40 to 60

seconds. APR provides random and sequential multiple messages and designers can adjust storage time depends upon user needs. The chip integrated with microphone amplifier, Output amplifier and AGC circuit. TAPE mode provides the Auto Rewind and normal option. The six pins of APR use for voice storage and playback capability, each pin plays the voice for 60 second duration. The voice transmitter to receiver by the help of RF transmitter and it also a portable device. The RF transmitter and receiver used for long distance communication which are specifically designed for wireless speaker and earphone.

B. Hardware setup:

Figure (2) shows the hardware model of automatic sign language translator which consists of transmitter and receiver modules. The transmitter module contains a flex sensor and RF transmitter, the flex sensors are connected to analog channels(AD0-AD4) in PIC microcontroller and RF transmitter connected to Port B(RB0RB7). Each pin transmits different sign language signal.

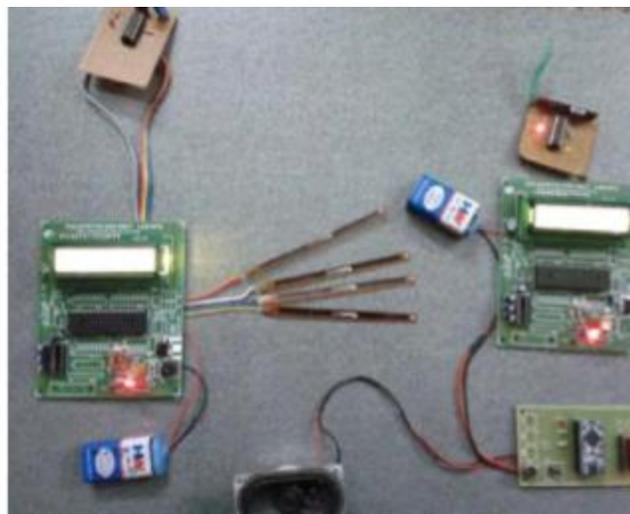
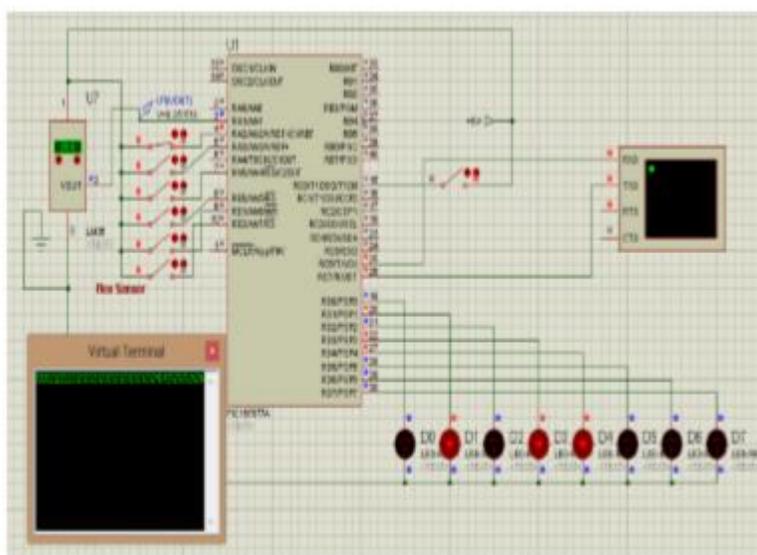


Fig 2. Hardware Setup of the System

Receiver module contains PIC microcontroller, RF Receiver and APR9600.

The RF Receiver connected to PORT B(RB0-RB7) in PIC Microcontroller, received signal depends upon the sign to enable the Pin of PORT B. APR9600 is connected to PORT D (RD0-RD7) and plays recorded voice depends upon the RF enable pin.



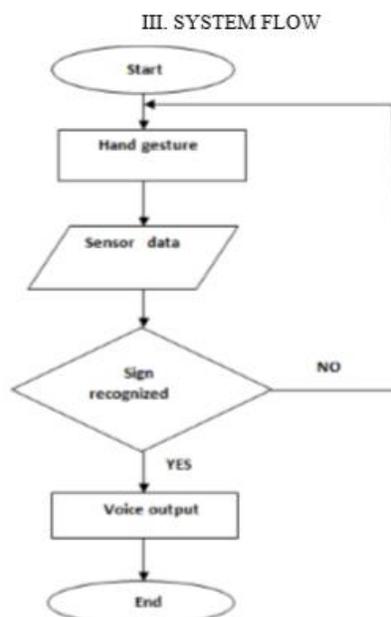


Fig 4. Flow chart of system execution

IV. RESULT AND DISSCUSION:

Output data are directly obtained from data glove and each sensors produce different resistance value through the combination of resistance value. Then the respective voice plays according to the combination of resistance value. Figure (3) shows the simulation output of the sign language translator , switches are consider flex sensors and connected to the analog voltage generator. On the opening and closing of switch produce some analog voltage and feed to the controller. It depends upon the switch input led glow (it's similar to play s voice) at the same time virtual terminal shows the analog value

V. CONCLUSION AND FUTURE WORK:

The proposed method translates sign language to speech automatically and satisfy them by conveying thoughts on their own. The system overcomes the real time difficulties of dumb people and improve their lifestyle. System efficiency is improved with the help of PIC microcontroller and APR9600, also integrated with RF wireless transmission is help in long distance communication. By implementing this system speaking dream of dumb people becomes true.compared with existing system its possible to carry to any places. We have currently developed more reliable and flexible system. Which manufacture at low cost sign language translator for commercial purpose. In future work of the proposed system supporting more no of sign and Different language mode.

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RIDDLES

Q. What is it that given one, you'll have either two or none?

A. A choice.

Q. If eleven plus two equals one, what does nine plus five equal?

A. 11 o'clock plus 2 hours = 1 o'clock

9 o'clock plus 5 hours = 2 o'clock

Q. Who is that with a neck and no head, two arms and no hands?

What is it?

A. A shirt

Q. Can you write down eight eights so that they add up to one thousand?

A. $888 + 88 + 8 + 8 + 8 = 1000$

Q. The more you take, the more you leave behind. What am I?

A. Footsteps.

Q. When does Christmas come before Thanksgiving?

A. In the dictionary.

Q. What has many keys, but can't even open a single door?

A. A piano.

Q. Re-arrange the letters, O O U S W T D N E J R, to spell just one word.

What is it?

A. Just one word.

Q. What can point in every direction but can't reach the destination by itself

A. Your finger.

Q. What has six faces, but does not wear makeup. It also has twenty-one eyes, but cannot see?

A. A die (dice).

Q. This is as light as a feather, yet no man can hold it for long. What am I?

A. Your Breath.

Q. I am white when I am dirty, and black when I am clean. What am I?

A. A blackboard.

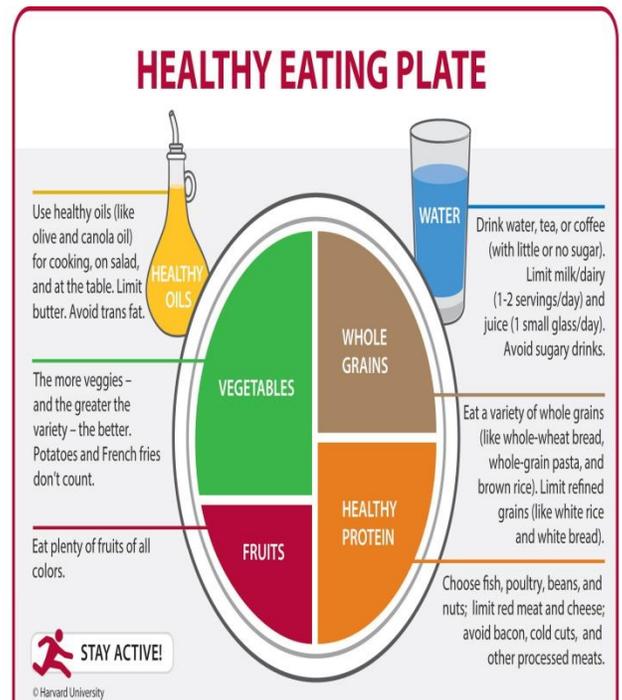
WHAT YOU EAT IS WHAT YOU GAIN

Healthy eating (diet and nutrition)

All humans have to eat food for growth and maintenance of a healthy body, but we humans have different **nutrition** requirements as infants, children (kids), teenagers, young adults, adults, and seniors. For example, infants may require feeding every 4 hours until they gradually age and begin to take in more solid foods. Eventually they develop into the more normal pattern of eating three times per day as young kids. However, as most parents know, kids, teenagers, and young adults often snack between meals. Snacking is often not limited to these age groups because adults and seniors often do the same.

Tips:

- Eat three healthy meals a day (breakfast, lunch, and dinner); it is important to remember that dinner does not have to be the largest meal.
- The bulk of food consumption should consist of healthy foods, such as fruits, vegetables, whole grains, and fat-free or low-fat milk products.
- Incorporate lean meats, poultry, fish, beans, eggs, and nuts (with emphasis on beans and nuts) into a healthy **diet**.



- Choose foods that are low in saturated [fats](#), trans fats, [cholesterol](#), salt (sodium), and added sugars; look at the labels because the first listed items on the labels comprise the highest concentrations of ingredients.
- Control portion sizes; eat the smallest portion that can satisfy hunger and then stop eating.
- Healthy snacks are OK in moderation and should consist of items like fruit, whole grains, or nuts to satisfy hunger and not cause excessive [weight gain](#).
- Avoid sodas and [sugar](#)-enhanced [drinks](#) because of the excessive calories in the sodas and [sugar](#) drinks; [diet](#) drinks may not be a good choice as they make some people hungrier and increase food consumption.
- Avoid eating a large meal before sleeping to decrease gastroesophageal reflux and weight gain.
- If a person is angry or [depressed](#), eating will not solve these situations and may make the underlying problems worse.
- Avoid rewarding children with sugary snacks; such a pattern may become a lifelong habit for people.
- Avoid heavy meals in the summer months, especially during hot days.
- A [vegetarian](#) lifestyle has been promoted for a healthy lifestyle and [weight loss](#); vegetarians should check with their physicians to be sure they are getting enough [vitamins](#), [minerals](#), and iron in their diet.
- Cooking foods (above 165 F) destroys most harmful bacteria and other pathogens; if you choose to eat uncooked foods like fruits or vegetables, they should be thoroughly washed with running treated (safe to drink) tap water right before eating.
- Avoid eating raw or undercooked meats of any type.

Tips for special situations:

- People with [diabetes](#) should use the above tips and monitor their glucose levels as directed; try to keep the daily blood glucose levels as close to normal as possible.
- People with unusual work schedules (night shifts, college students, military) should try to adhere to a breakfast, lunch, and dinner routine with minimal snacking.
- People who prepare food should avoid using grease or frying foods in grease.
- People trying to [lose weight](#) (body fat) should avoid all fatty and sugary foods and eat mainly vegetables, fruits, and nuts and markedly reduce his/her intake of meat and dairy products.
- Seek medical advice early if you cannot control your weight, food intake, or if you have [diabetes](#) and cannot control your blood glucose levels.

FACULTY ARTICLE

To Be a Truly Effective Teacher: Learn Something that is Difficult for You



I have been teaching various levels of reading skills and composition to native and non-native speakers, to immigrants and U.S. citizens, to people with talent and interest, and I have one thing to say:

In order to teach well, you need to learn something that does not come easy.

We need to be able to teach *all* of our students. Our students come to us with various levels of interest in actually attending our class. Some are confident about their fluency and ability in the subject matter and are ready to jump in. Usually, I find those that are eager to engage are easiest and

most enjoyable to teach. However, some of my students are not in that space of confident curiosity, and even sitting in my class arms folded, head down, is an exercise in vulnerability.

What must that feel like? Do you remember?

Many of us can understand that level of vulnerability intellectually by reading about teaching. We have read many articles on how to engage both students who are labeled, either by us or others, as “successful” students and “at-risk” students. However, in order to truly understand it, we need to experience it.

In our undergraduate experience, most of us took a class or two that was not part of our skill set. Maybe we remember those moments, and maybe we don't. Maybe those moments were years ago.

To continue to be effective teachers, in addition to reading, writing, and researching about teaching, we also need to put ourselves in learning situations where we are not sure if we will be successful. Continually, coming in contact with our own vulnerability and failure will shape our teaching with empathy and other communication skills that we can use to reach students that are harder to engage with.

For many of us, in our classrooms, we teach a subject that comes easy to us, or at least a subject matter with which we are now some level of expert as we read, write, and research that area.

How would it be to sit in a classroom where you are not known as a teacher, an “intellectual,” or a “good student” and try to learn something that you are not sure you can?

How would that experience impact you? Your teaching?

For me, it impacts me dramatically. Because many of my students are non-native speakers of English and are learning, speaking, and communicating at a college level in a language that is not their mother tongue, I decided that I, too, would work at learning languages.

I chose Spanish for its beauty and practicality—for many of my students their first language is Spanish—and Russian because it, for me anyways, is truly difficult with its Cyrillic alphabet and culture that for many reasons has been mystified and at times vilified by American culture.

Sitting in a classroom in another country has taught me so much about the “fish out of water” feeling that I know my students must routinely have.

I had the nervousness of finding the school—is this the right corner to turn left? Is this the correct bus? I experienced being hungry but nothing that was offered tasted right, and nothing really fed me in a way that food from home did. I sat in a class and was completely mystified by what the teacher was saying and what I was supposed to do with what appeared to be instructions. I looked around and saw other students seemingly understand. What did this mean? What was I doing here? I worked for hours on homework only to be told what I did wasn’t quite the assignment. I got so hungry in the middle of a lesson that I thought I was going to faint. I couldn’t find the bathroom and was too shy to ask. I wore the wrong shoes and had blisters on my feet that made it hard to do anything but sit. I just wanted to hide.

What I learned:

- Things that I think are intuitive probably aren’t for some of my students. To accommodate this, I try to over explain and explain using as many mediums as possible.
- I try to be approachable. It’s scary not to know, and it’s scary to ask for help. Those two facts of living make it hard for our most vulnerable students to ask questions.
- I walk students to the bathroom, to the library, to the academic success center, to the water fountain. Students have probably been shown these things once and feel “dumb” because they have forgotten. However, being in a new situation where everything is new means you don’t retain everything because your brain is on overdrive. Yes, my hosts told me which numbered busses would get me to school, but do you think I remembered them all? No. Probably because they also showed me the grocery store, the market, and which corner to turn on to get to the school all at once. Something was going to give.

This is also true for our students, and although I knew this in my head before experiencing it; I had read the brain research that talked about retention, nerves, and new things.

But after experiencing it, there is a way I walk with my students. I understand in my bones what it is like to board a bus in an unfamiliar city, hope you are on the right one, and be too tired to form the question to ask in a new language. I know what it’s like to walk across the threshold to a classroom and be unsure if you belong, or even if you even want to be there.

From these experiences, there is now a kinder way that I tell my students something I have already told them three times. I realize that they don't remember, not because they weren't listening the first three times, but because even when they were listening, it didn't stick.

There is a way I talk to the student whose project is completely different from the expectations of the assignment. This student isn't trying to get away with something, and they were probably listening when I explained it. In other words: everyone was doing everything "right" and still here we are. There's a quality of gentleness and respect one uses with someone who you think has been doing something right and still ends up with more work to do.

And yes, I have read what new students need and what students who come from different languages and cultures need in order to be successful in a different classroom, but when *I* was the new student, and was the one who was scared, the one who still didn't quite understand after the third explanation, it lands not only in my head, but in my heart.

And truly, that's where the best teaching happens, isn't it? When the head and heart are married, and we push through our exhaustion to explain something one more time to another human being.

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