NITI Aayog | ATAL INNOVATION MISSION

The Ingenious Tinkerers

Celebrating the superheroes of New India

TOP INNOVATIONS OF ATL MARATHON
2020-21

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“RESEARCH AND INNOVATION MUST BE TRANSFORMED FROM THE WAY OF WORKING TO THE WAY OF LIVING. INDIA OF THE 21ST CENTURY IS MOVING AHEAD WITH FULL CONFIDENCE IN ITS YOUTH.”

— SHRI NARENDRA MODI
HON’BLE PRIME MINISTER

Message from CEO

Atal Tinkering Labs (ATLs) are transforming the landscape of school education in India, promoting hands-on and experiential learning. ATLs are also providing the students with an exposure to 21st century skills and technology at a very young age, equipping them to solve the problems of the 21st century. With ATLs, Atal Innovation Mission (AIM) is striving to create an ecosystem where young minds are familiar with the concepts of innovation and entrepreneurship.

I am amazed by the brilliance of the innovations featured in this book and entirely confident that the India of 2047 will be an India of innovators and entrepreneurs. I would like to congratulate not only the top teams who made it to the book but all the 7000+ student teams who participated in the ATL Marathon 2020. You have taken an important step by participating and innovating to solve the problems you are passionate about. You are now the ambassadors and change agents who must take this movement ahead.

My sincere gratitude to the ATL mentors, AIM corporate partners, and Atal Incubators, for their continued support and enthusiasm in nurturing the young change makers of our country. I would also like to congratulate the ATL teachers, without whose sincere effort and all-round participation this program would not have been a grand success.

I appreciate the efforts of the AIM team members for leading this movement of innovation and entrepreneurship in the country. The fruits of their labour are already visible and will become more pronounced as we move into future.

Parameswaran Iyer
CEO,
NITI Aayog

Message from MD

The Atal Tinkering Lab (ATL), the flagship initiative of Atal Innovation Mission (AIM), Government of India, has been revolutionising the education ecosystem in India by introducing the students at school level to concepts of innovation and tinkering at a young age. It acts as a catalyst in their innovation and entrepreneurial journey by providing them access to the equipment, technology, and resources they need to bring their ideas to life. Besides access to equipment, ATL also acts as the conduit for the schools to access the AIM ecosystem. The AIM ecosystem brings together the mentor network, incubators, start-ups, and industry. Each of these elements is leveraged to provide the ATL students with a holistic learning platform in line with the National Education Policy 2020.

We are extremely delighted to see an overwhelming response from the ATL schools spread across the country for the ATL Marathon 2020–2021. The ATL Marathon had problem statements covering the pillars of Atmanirbhar Bharat. All the teams came forward with amazing ideas and prototypes, solving pertinent problems in this domain using technologies such as robotics, artificial intelligence, virtual reality, and so on.

I extend my heartiest congratulations to the Top 30 teams of the ATL Marathon who have been recognised through this book. They have undergone a tedious process of prototype development and have been selected at the end of a three stage process. In the first stage the students developed prototypes under the mentorship of their school teachers and Mentors of Change. Of these, the best prototypes were selected via the ATL Marathon. These student teams then underwent an extensive mentoring program with our incubators and corporate partners and the best 30 among them were selected. These 30 student teams were then offered access to more specialised mentoring and guidance to further develop their prototypes. The result of this three stage process is documented in this book for all to see. I am sure the story and ideas of these young minds will truly inspire countless others to be the agents of change in our nation.

The journey so far has been incredible, and looking at the hard work and collaborative efforts being made by all the people associated with AIM, my dream for a “New India” gets stronger day by day.

Dr Chintan Vaishnav
Mission Director
Atal Innovation Mission

Preface

Atal Innovation Mission (AIM) was started by the Government of India to foster an innovative and entrepreneurial ecosystem across the nation. AIM had a mandate to create Atal Tinkering Labs (ATLs) in schools across India to inculcate skills such as design thinking, computational thinking, adaptive learning, and physical computing. We are happy to announce the creation of more than 10,000 ATLs across 35 states and Union Territories benefitting more than 75 lakh students who are actively engaged in these ATLs.

The ATL program is a revolutionary step in bringing in the “Experimental and Project-Based learning” model in India. Students are getting opportunities to sculpt ideas through hands-on activities while having the required equipment to understand the concepts of STEM (Science, Technology, Engineering and Math).

AIM focuses on motivating students to innovate. This handbook is a compilation of the 30 grass root innovations, created by the students and their mentors. The innovations have been selected through a rigorous three step process. The ATL Marathon results in the selection of the top 350 innovations. These innovations are mentored by our partners through the Student Innovator Program (SIP) and the best of the SIP undergo the Student Entrepreneurship Program. This compilation is an attempt to showcase the most notable innovations that have come out of our ATL ecosystem.

A huge congratulations to all the teams!

This beautiful journey would have been impossible without the mentors, teachers and parents of students. Your tireless efforts, mentorship and guidance has indeed been a driving force for the students.

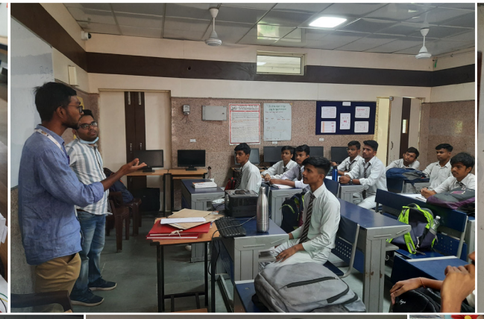
I would humbly like to thank NITI Aayog Vice- Chairman Shri Suman Bery, CEO Shri Parameswaran Iyer, and Mission Director Atal Innovation Mission Dr Chintan Vaishnav, for their strong leadership which has helped ATL to become a national movement across India. I also express my sincere gratitude towards all the members of the Mission High Level Committee (MHLC) for their spirited leadership and continuous support to the Atal Tinkering Labs.

I would finally like to thank my team, without whose commitment, hard work, and creativity this book would not have seen the light of the day. Ms. Vishnu Priya Bijapur and Mr. Dipyaman Sinha have provided invaluable support in the creation and editing of this book. My special words of praise and thanks to the entire ATL team - Ms. Tanvi Mishra, Mr. Prateek Deshmukh, Mr. Shubham Gupta, and Mr Suman Pandit for supporting the ATL program.

Happy Tinkering!

Deepali Upadhyay
Programme Director
Atal Innovation Mission





Atal Tinkering Lab
Nurturing Young Minds to Innovate.
GOOD LUCK SECONDARY PUBLIC SCHOOL
BEGUMPUR EXTN., BARWALA ROAD,
NEW DELHI - 110086

INNOVATION
CRITICAL THINKING





I AM AN INNOVATOR

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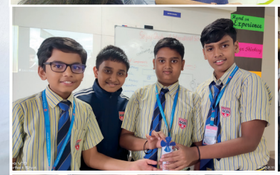



Atal Tinkering Lab







ATAL
TINKERING







Congratulations to our top innovators

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Atal Innovation Mission (AIM), NITI Aayog is glad to honour the Top innovations of Atal Tinkering Lab (ATL) Innovation Marathon 2020-21. This book is a compilation of some outstanding grassroot innovations by students and their mentors evolving from their ideas to a viable product, graduating them from tinkerers to innovators.

About ATL

With a vision to ‘Cultivate one Million children in India as Neoteric Innovators’, Atal Innovation Mission is establishing Atal Tinkering Labs (ATLs) in schools across India. The objective of this scheme is to foster curiosity, creativity and imagination in young minds; and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing etc. Till date, 10,000 ATLs have been established across schools. After compliance, each school receives a grant of Rs. 20 Lacs over five years to set up and maintain the ATL. The ATLs are based on the philosophy of incentivising innovations, which nurtures the growth mindset of young school children across the country. These students, when nurtured with mentorship support, address community challenges and create innovations that address them. They further deploy and test them with potential users. The effort has been to build an inclusive model for innovation by providing an equal opportunity to all regions and to all children irrespective of the rural-urban divide and government-private divide, by a public-private partnership, events and challenges, mentorship from industry and academia.

About ATL Marathon

Einstein believed that creativity is an output of a ‘combinatorial play’ thinking process. He constantly combined and recombined ideas, images, and other various thoughts into millions of different combinations. So, ‘Combinatory play’ refers to the process of innovation by drawing on new combinations of existing data, perceptions and practices. There are thousands of existing innovations which can and should be further developed to make them cheaper, faster and more durable. So, the question here is “How can we take what we have and make it better?” In our ever-changing world, there is a need to build on these existing structures and concepts in order to make them more accessible and appealing to the general public.

Atal Tinkering Labs gives a chance to all children to express their innovative spirit, and propose a novel, innovative solutions to India’s community and social problems, with the ATL Marathon.

The ATL Marathon 2020–2021 was launched in the year when COVID-19 bought the world to a standstill. It drew inspiration from Atmanirbhar Bharat and aligned itself with the 17 goals of “2030 Agenda for Sustainable Development” (SDG) adopted by the member states of the United Nations. The students got a chance

to vote on the problem statements under the 5 pillars of Atmanirbhar Bharat- Economy, Infrastructure, System, Demography, Demand. Two problem statements were finally selected under each of these 5 pillars. Over 7200 submissions from over 17,000 students were received from 32 states. This book brings to you a compilation of the top 30 innovations.

Contents

Team

Ease of Doing Business

School : **DAV Centenary Public School**

District : West Delhi

State : Delhi

The Covid-19 lockdown had taken a toll on local shopkeepers and small retailers. Due to social distancing rules, their business had come to a standstill, and so did their regular income. Vansh and Daksh were personally affected by this situation, as their fathers faced this problem too. One night, they were discussing this issue on WhatsApp. It was then that they recalled their schoolteacher briefing them about the ATL Marathon. This seemed to be a good opportunity to explore a technical solution for the problem.

They noticed that large e-commerce websites did not cater to smaller local businesses and retailers like theirs. Besides, they usually sold products in bulk quantity and not as per the customized requirements of the customer. When they did an in-person survey among nearby shopkeepers and jotted down their needs and expectations, the main thought on the dejected shopkeepers' minds was that they wanted to find ways to reconnect with their customers. The duo thought about building a website that would connect local shopkeepers to the customers in their vicinity—within a 3 km radius.

Their first hurdle was that they had next to no knowledge of how to design a website. But that didn't discourage them from proceeding with their idea. They tutored themselves by watching online videos on coding. Another challenge during programming was that Daksh's laptop could only run an older version that was unable to process complex lines of code, and thus, he had to find ways to keep the coding simple. But rising above this challenge, he soldiered on and created the interface.

Recollecting how he overcame the initial challenges, Daksh said, 'It was then that I learnt the lesson of simplicity. Keeping the code simple doesn't take away its utility.' Later, a glitch occurred in the list of options that made product recommendations to the customer. It went haywire and would suggest unrelated products that were not remotely connected to the user's search history and shopping. It took them a while to fix this glitch, and finally, they built their very first prototype.

Now they wanted to improve on the app on the basis of customer reviews from potential users of their platform. But when they talked to their neighbours, they got a lukewarm response and were even told that the activity they were doing was useless. Their parents also suggested that they focus on their studies instead of spending time on building the app, but the boys wouldn't budge! With two weeks of dedicated effort, they built a website: http://eodb.skyraja.com.

It showcased a list of daily use products and also provided an interface for customers to order them online from the local shops. The shopkeepers would then deliver the customers' purchases to their homes, and if they were unable to do so, Daksh and Vansh would ensure that they made the home deliveries themselves. They added a minor charge for delivering the ordered items.

Since their prototype had been tested and worked well, they decided to submit it to the ATL Marathon 2020. It was a great moment of satisfaction when their project was selected in the top 30! Their parents and teachers were quite happy with their achievement. Though, even now, some of their peers dismiss their vision: 'This seems quite simple. Anyone can do it, and it's not worth bagging a prize.' However, Daksh and Vansh have decided not to get disheartened in the face of such comments and are working on developing their website further to extend its application to include rural areas as well.

They shared, 'There were many people who discouraged us. But all that they did was speak; no one could actually stop us. We had the resources, resolution and vision, so we kept going and will do so even in the future. All the knowledge that we have gained in this journey is being utilized even now. No new knowledge ever goes to waste!'

Daksh and Vansh are NCC cadets, and while it was difficult for them to find time and stay committed to their NCC-related activities, academics and the ATL Marathon project all at once, they remained dedicated and put in the work. They were repeatedly told to go slow and focus only on their studies. When asked about their key takeaways, they shared, 'The biggest lesson we learnt is how to manage our time well. It made us push ourselves to achieve our maximum potential. Initially, our website didn't attract a lot of traffic, but even then, we found out that the idea that we had met an existing need. That's sufficient for us to go ahead and make it even better!'

Team Covid Tinkerers

School : **Sarswati Vidya Mandir HSC School**

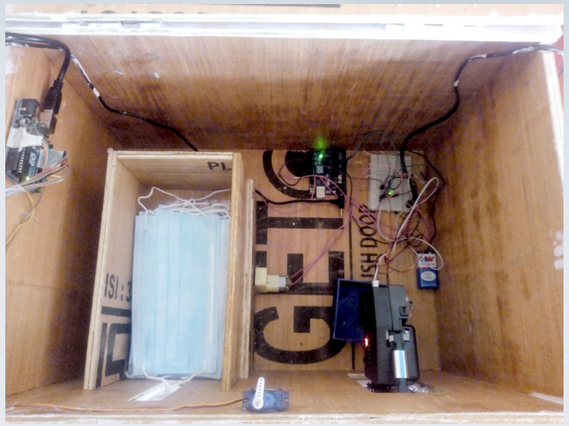
District : Harda

State : Madhya Pradesh

During the first wave of Covid-19, Shaunak and his mother were watching the local news channel that was being broadcasted in their hometown, Timarni, a remote corner of Madhya Pradesh. The channel was running a story that captured the difficulties Indian citizens were facing in metropolitan cities due to the outbreak of Covid-19. It triggered a conversation regarding the contrasting situation in remote areas like theirs. The infection rate in rural areas was relatively low compared to that in the cities, but so was the supply of commodities. While masks had become an essential commodity, Shaunak had observed people tying turbans, handkerchiefs or dupattas to cover their mouths because safe masks were not readily available and this meant that they were exposed to the risk of catching the deadly Covid-19 infection.

He noticed how foot-controlled sanitizer set ups had been installed at various places and become increasingly common. Shaunak thought the lack of availability of masks could be addressed in a similar manner by having a mask vending machine installed in public places. He researched his idea on the internet but couldn't find a suitable model. So, he decided to create such a machine himself.

He envisioned it having preloaded sanitary masks which would be supplied to the user once they deposited a ten-rupee coin. The reason behind having a coin-based machine instead of a paper currency was that the paper currency detector is quite complicated to build and also requires the currency note to be in extremely good condition lest it is rejected. Besides, since it was a good conductor of electricity, a coin would be immensely helpful in building a functional prototype in a simple way.



Soon, Shaunak was ready with his first prototype built out of a cardboard box when the ATL Marathon 2020 was announced. He teamed up with Yashika, who also went to the same school as him, and they decided to submit an advanced version of the prototype they had already built. At the ATL Marathon, they created the next version using a cardboard box, copper plates, copper wires, two DC motors and a 3D-printed coin collector. It also included Arduino based components like Arduino UNO, coin sorter, RFID card lock and Servo motor. The masks were sourced from e-commerce platforms. The coin sorter was used to get the masks from the machine using multiple-value coins and not just ten-rupee coins— an upgrade from their earlier version.

Coding for this coin sorter was the most challenging task of the project, but they gave it their best shot and were given support by their ATL assistant, Akhil Mahule. Another glitch occurred during the demonstration of their prototype. They had

to shoot a video for their project entry submission, and the deadline was just a day away when there was a sudden power cut. The machine stopped working, and they had to wait until the electricity resumed! The submission deadline was fast approaching, and the video had not yet been completed. Adding to their problem, the coin sorter malfunctioned while the video was being recorded and required an urgent repair. But they refused to relent, fixed the issue and successfully submitted the entry video.

When Shaunak talked about their entry to one of his relatives, they laughed at him. 'There is no use in making anything like this. No one will pay attention to it. You are wasting your time,' they told Shaunak. But his relative was proven wrong when the mask vending machine created by the Covid Tinkerers team not only got selected in the top 300 but also happened to land a spot in the top 30 teams at the competition! They were felicitated by their school and families for their achievements.

Well, Team Covid Tinkerers don't plan on stopping there. They are going to broaden the application of this vending machine to include sanitary pads and enable a futuristic e-payment system that is quite handy since we live in an increasingly cashless economy. Shaunak shared, 'Fall in love with the problem and not with technology that is the means to solving the problem. They are two very different things. If you fail to get access to the technology that can solve the problem, you shouldn't be disheartened. You can create a new technology of your own! So, don't get attached to the means of solving the problem but fall in love with the problem you want to solve instead!'

Team Ultra Innovate

School : **Annasaheb Kalyani Vidyalaya**
District : Satara
State : Maharashtra

Pranav and Shreyas were in Grade 7 in Annasaheb Kalyani Vidyalaya, Satara, Maharashtra. They used to see Piyusha, their senior, struggling a lot as she was blind. She had to be helped by her friends for her to engage in any physical activity. Instead of just sympathizing with her, they had a strong urge to empower her. When their ATL mentors taught them basic coding and technical know-how in school, they decided to build a guiding device for Piyusha so that she could move about independently.

First, they interviewed her and listed the hurdles she faced day in and day out. According to her, the most significant obstacle was her inability to gauge the obstacles in her path while she walked. This became their problem statement. They had discovered that scientists had made canes for the blind th at could sense hurdles automatically, so they decided to go one step ahead and make an automated sensing device that could also be fixed inside shoes. However, that wouldn't warn her about the hurdles that lay above the ground or at face level. So, they decided to add that device to the belt and the glasses worn by visually challenged people.

Their idea was to use an ultrasonic sensor that utilizes the principle of echolocation, found at work in nature among bats who navigate the world by sensing ultrasonic sound waves as they are blind.

The device has a transmitter and receiver, technically called trig and echo. The other main part was the Node MCU, which would work as the brain in this module. This assembly would be connected with Wi-Fi, working with a 3.3 V supply. So, when an object comes in front of the sensor, the ultrasonic sound waves would strike the object and trigger a signal to the Arduino board, which in turn would command the buzzer and vibrator to buzz or vibrate respectively and sound an alert to the user.

They sourced the raw materials from their school's ATL lab. They had begun by making automated sensing shoes. For that, the Arduino UNO net of wires was used and covered by cases made in a 3D printer. But those cases increased the module's weight. Their solution to that was to use the Arduino NANO. Then they added different beep sounds for different distances. Lastly, they added an Arduino NODE MCU covered by 3D printed cases and packed it properly. They faced a significant

challenge while constructing the device for spectacles. So, they decided to go for a spectacle-mounted device. The battery used was heavy, and its weight tilted the balance, which would immediately dislocate the sensor. They tried using button cells, but those didn't fit well, and the rechargeable cells were struck off their list as there was a possibility of them exploding. Instead, they opted to use the Arduino NANO, which addressed their needs well.

> **"Having come so far, we learnt the virtue of patience. If you make a hasty decision, you are bound to make mistakes. You have to calmly and patiently address the problem in front of you."**

Team Code Blazers

School : **Delhi Public School Nacharam Secunderabad**

District : Hyderabad

State : Telangana

The Covid-19 pandemic resulted in many people losing their jobs, so some of them decided to start their own businesses instead of seeking alternative jobs. However, not having sufficient know-how regarding the complications of starting a new venture was where the problem lay. Everything from the investment required and looking for the appropriate location to business registrations and sourcing raw materials proved to be challenging.

Sripadavi's uncle was one among those who had lost their jobs during the Covid lockdown. He wanted to start his own business and would ask his friends for advice on the same, but no one could offer him concrete guidance. It was a tough time for Sripadavi's family. And that was when she felt the need for a one-stop solution for business start-up guidance, registration and strategy. She thought of people based in rural areas, who were even worse hit and were deprived of resources. Thus, she decided to build an app that would provide the required counsel and would be readily accessible even to those in rural areas.

The perfect opportunity to manifest this idea came when the ATL Marathon 2020 was announced. Sripadavi teamed up with Esha, her schoolmate and they decided to call themselves Code Blazers. They discussed the idea and familiarized themselves with various facets of the business start-up with help from their elders and through the internet. They wanted to create an app for budding entrepreneurs who lacked business strategies and ideas for marketing and promotion. They sat with Sripadavi's uncle and listed out his requirements to start a business. After that, they developed an outline of the app's prototype and began designing it.

When they conducted an online survey to check whether such apps were in demand, they received a positive response, and that's when Sripadavi and Esha decided to go ahead and build the app, which they named SKY CLAN BUSINESS. It would have a login and registration page and would include business ideas, raw material vendors dealings, etc. as a database for vendors' details. Solutions would be just one click away for entrepreneurs!

Using the training they received for Python programming in the weekly sessions conducted by ATL, the two friends built their app and started implementing their newfound knowledge. They faced many problems while building the app. After all, they had to manage the ideation and all their other communication virtually. Another major issue they faced was ensuring user authentication. It extended to the registration process and requirements like location, type of business, etc. But the mentors who worked with them during their weekly sessions

suggested modifications that they needed to make while coding the program and helped them a lot. Sripadavi and Esha perfected the idea over a period of two months and pitched it as an entry in the ATL Marathon.

Project SKYCLAN BUSINESS soon bagged a place in the top thirty teams! Team Code Blazers rejoiced at this achievement. Speaking about the process, they said, ‘Our project mentors, Subash Sir, Rakesh Sir, Neetha Ma’am and the technical mentors from The Atal Innovation team and Jyothi Technologies, were always approachable and ready to help. In addition to that, our team collaboration led our project to success.

Be it in an urban city or town or a rural area, every small business needs to be nurtured and recognized. We are still building our app prototype and will launch it soon. We are grateful to have embarked upon this journey, which has opened multiple doors to multiple opportunities.’

“Our project mentors, Subash Sir, Rakesh Sir, Neetha Ma’am and the technical mentors from The Atal Innovation team and Jyothi Technologies, were always approachable and ready to help. In addition to that, our team collaboration led our project to success.”

DEMOGRAPHY

Team Skill Development

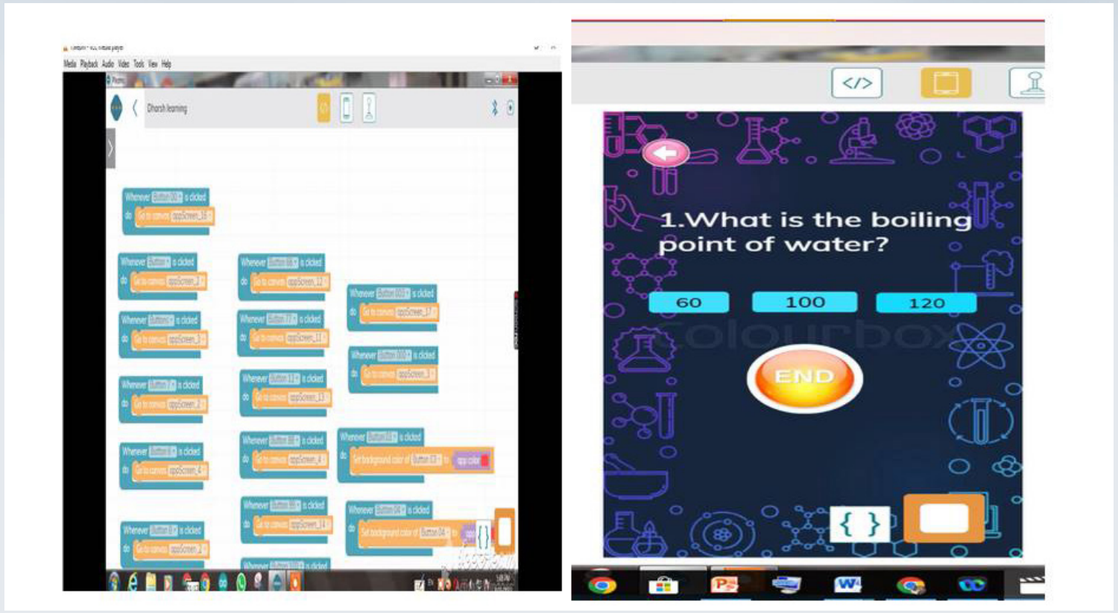
School : **Kamlavati Secondary School**

District : Thoothukudi (Tuticorin)

State : Tamil Nadu

Anis Sankar, a student in Grade 8, was learning from home during the Covid lockdown. Live classes were being conducted by his school with the aim that their students would understand the lessons while they were being taught by their teachers. But even so, Anis found that later on, whenever he would sit down to revise or do his homework, he would get stuck on certain concepts. He couldn't get his teacher's guidance immediately, so he would approach his sister, Darshini. But she was in Grade 12 and was busy preparing for NEET—a pre-medical entrance test—and couldn't help him go through the entire syllabus. None of the online apps that Anis surfed through met his requirements. He figured that if he was facing this problem, other students must be too. He discussed this with his sister and thought of creating an app that would address the students' queries then and there.

Darshini curated the videos, questions and model answers while Anis started coding the app through



Plezmo. The uniqueness of this app was that it gave you solutions according to the marking system applied to the questions that are commonly asked in the CBSE board exams. They also added inbuilt direct access to Google within the app. They named the desktop-based learning app Darsh and coded it in a way that the app would learn, develop and update itself every day.

A major glitch they kept encountering was the loss of search history: previously attempted questions or videos that had already been viewed would disappear. Despite this, they were confident about the functioning of the app as a whole

and decided to submit it in the ATL Marathon. The app landed in the top 30 and it was just the kind of encouragement they needed to keep going. Darsh is still under construction and will be broadened to include the syllabus of other state and national boards.

Anis feels that as long as technology is used wisely, people need not fear it—after all, it is an indispensable part of our lives. He said, ‘Patience and empathy are the fundamental values I have learnt during this journey. I hope to better the e-environment to help underprivileged students prepare for competitive exams.’

ECONOMY

Team
Rani Innovators

School : **Rani Public School**
District : Kozhikode
State : Kerala

Lakshmi and Gopika, both students in Grade 11, were brainstorming on the topic for their project for the ATL Marathon 2020. The discussions with their faculty members and peers had highlighted a plethora of issues faced by people in rural India.

The Covid-19 pandemic had hit the unorganized sector pretty hard. Many rural women found themselves unemployed and were left without a source of income. There were very few alternative occupations that could provide them with any substantive employment. Parallelly, they also noticed that a lot of trees were cut to produce paper. It largely depleted the natural resources in forests, which always take a long time to be replenished. Both these issues had to be addressed.

While mulling over these problems, a solution occurred to them. Kerala has an abundance of banana trees. The banana stems could be processed and converted into paper! It not only involved an already available cost-effective raw material but could also prove to be a cottage industry for unemployed women in rural India. They could be trained to process the stems and produce paper in their own homes. Thus, the concept of Ecopaper was born.

At first, the two classmates doubted if it would even work. They were apprehensive about people's response and their own skills of persuasion—both for convincing people to manufacture it and shopkeepers to distribute it. Yet, with the guidance of their teacher, Lakshmi and Gopika began their work on Ecopaper. The paper they created was thick, durable and eco-friendly. It proved to be an excellent option for packaging material that could be used by local confectioneries, bakeries, medical stores, offices and more. They finally submitted their idea and prototype to the ATL team.

It was a moment of blissful surprise for them when they were shortlisted

in the top thirty teams. They were applauded by their parents, teachers and friends. While speaking about the key takeaways from this journey, Lakshmi said, 'We are more confident in our abilities now. It has made both of us eager to take up more initiatives and put ourselves out there. School should not just be about the lessons taught within its four walls. We need to step beyond it. Every student, especially young girls, should take the initiative to go the extra mile. They should work towards what they are passionate about and refuse to take "no" for an answer. Even if there are hurdles along the way, and however crazy the idea seems, be passionate about it. Get it to work. It can do wonders!'

"Even if there are hurdles along the way, and however crazy the idea seems, be passionate about it. Get it to work. It can do wonders!"

She further added, 'Another thing is to not expect too much from it. We, too, didn't expect a lot from our project. We just gave it our best and left it at that. And it turned out wonderfully. Doing your best is what you need to focus on.'

Team Agri Simplify

School : **Delhi Public School Nacharam Secunderabad**

District : Hyderabad

State : Telangana

Palak from Pallavi Model School, Boduppal, was mulling over a few things she had come across in the newspaper. It seemed that approximately 87 per cent of farmers in India lacked education. And since agriculture is the backbone of the country, with 65 per cent of the Indian economy depending on it, the lack of awareness of the appropriate technological tools to be used among farmers was quite an issue. They even lacked knowledge of the nature of the soil, which is the primary information needed to treat diseased plants or use the right medicine. Similarly, the weather of a particular place is a rather important parameter to be kept in mind while practicing farming. According to the statistical data in a newspaper article that they read, when floods happened across India, farmers would incur total losses of Rs. 100 crores. Not just that, over 20–25 per cent of the crops may be lost too.

Palak figured out that it was essential for the farmers to be aware of the weather forecasts and the technologies that could enhance crop output immensely. She felt that a one-stop app which could give the farmers the necessary information required—from the pre-farming stage to the post-harvesting marketing—would be a game changer. The neglected farmers' communities needed to be catered to. So, she approached her computer science teacher, Madhuri Ma'am, and discussed the idea. Madhuri Ma'am encouraged her to build on it and even suggested that she should participate in the upcoming ATL Marathon 2020.

Excited, Palak, her classmate Rajvi, and another friend, Nithya, from Delhi Public School, Nacharam, teamed up to build an app that they called 'Agri Simplify'. They wanted to tackle the lack of progress in the agricultural sector even as India is developing at a tremendous pace on the whole. Though there was self-sufficiency among the farmer community, the available resources weren't being used to their full potential. They wanted to marry the field of Indian agriculture with technology.

This type of app required a very robust database. Palak and Rajvi, both students in Grade 10, would stay back after school hours and source the information they needed to build the basic foundation for their app. Soon, they finalized the design of the app and began the process of coding. But suddenly, the pandemic struck, and they were restricted to their homes. The major problem now was communication. Online planning and discussions weren't as effective as face-to-face conversations. But they pushed on regardless; they had to submit their prototype idea in the marathon, which was fast approaching.

One of the features of the Agri Simplify app was conveying the required crop health diagnosis and optimum level of nutrients to be provided to the plant. Nithya, who led the team on that front, faced a lot of problems in sifting through the bulk of the information available on the internet. It was a tedious task despite dividing the work among the three. But, after weeks of hard work, their prototype was finally ready.

The main features of Agri Simplify were: suggesting the appropriate amounts of pesticides and fertilizers; water for irrigation to be used according to the soil type; crop type; and other environmental conditions for the major

> **"Whenever you have an idea that has the potential to help society, don't hesitate. Even if the idea is small, it may have great potential to change society"**

food crops of Telangana (bajra, wheat, millets, ragi, rice, etc.). Procedures to make natural manures at home were also added. The app even had a separate section with links that led to portals from where they could buy the required items and tools. In addition, live details of the local temperature and humidity, minimum support price of each crop and running government schemes for farmers were made available. Another unique feature of the app is to train those interested in home gardening. At a later stage, they plan to add a system where crop diseases can be detected merely by scanning the crops.

Their project bagged a place in the top 30 teams of the ATL Marathon 2020. They are grateful to their friends, parents and teachers who supported them through their entire journey. Rajvi said, 'Working on this project taught me actual research protocol. I got trained to research the information and sift through it in a structured way. It also made me confident about putting forth my idea.' While sharing her opinion, Nithya said, 'Before this project, I underestimated the importance of statistical data. It is only now that I understand the role it plays in creating awareness about the seriousness of a problem. Apart from that, I enjoyed being part of a team. The most joyful part was actually doing the work; that was even better than bagging the place in the top 30 teams.'

'Whenever you have an idea that has the potential to help society, don't hesitate. Even if the idea is small, it may have great potential to change society,' the team advised.

[In an unfortunate turn of events, Palak passed away in the year 2022. She was the leader of Team Agri Simplify. According to her friends and mentors, she will always be remembered as a very bright student and a wonderful friend who inspired them to follow their hearts and keep smiling.]

INFRASTRUCTURE

Team
Disha

School : **DAV Public School**
District : South West Delhi
State : Delhi

During the Covid-19 lockdown, Vandana Ma'am told her students, Aparna and Tania, about the ATL Marathon 2020. It was a breath of fresh air for the disappointed eleventh graders who sorely missed going to school and attending classes. They were excited to come up with an innovative idea and prototype. Like most of us, Aparna and Tania had been quite confused while choosing their respective academic streams after Grade 10.

Tania felt clueless about her future career options whereas Aparna, who aspired to be a fighter jet pilot couldn't get the clarity she needed about it from the internet. They shared, 'Each website has a differing version of available career options and how to get on the right track to follow a particular career path. Most of the time, they are not backed by any credible authority either, and that just adds to our confusion!'

In addition, Tania had noticed that a crucial link was missing in students' minds, which she discovered during visits to her native village in Haryana. Students from rural backgrounds didn't see their dreams and careers as natural extensions of their academic experience. They felt that building a career begins 'after' Grade 10. Apart from that, unlike students from cities who are driven by their personal choices, rural students prioritized their family's needs and social compulsions. These students needed personalized guidance and counseling to identify their interests.

> **"The fact that we could apply for a patent made us realize the immense potential of our app. We can now reach every student in the world and simplify the process of making a career choice!"**

Both Aparna and Tania had a burning desire to address this. The ATL Marathon 2020 became the perfect conduit. After sifting through various ideas for solutions, they decided to develop a career counseling app that could be installed on mobile phones, since that would ensure that students in rural areas could also access it. The app would administer a detailed questionnaire to gauge the students' interests and then provide a diverse range of career choices. In case the student had already decided on a career option, they could get more details on it, like the skills that are required for it, upskilling options and the pay scale range associated with their chosen career. Other prominent features included access to short biographies of success stories and authorized counselors. Since the app guides students towards the right direction, they named the app, Disha.

The first step in developing Disha involved acquiring a deeper understanding of how their peers approached the decision-making process while thinking about potential career paths and zeroing in on one choice. Tania conducted an online survey for students that asked them about their priorities, apprehensions and

options. Under the guidance of Vandana Ma'am and ATL's Tech team, Aparna came up with the app's prototype. They submitted the project to the ATL Marathon and awaited their approval with bated breath.

While building this prototype, they had undergone hurdles like poor internet connectivity and having to collaborate virtually because of the successive lockdowns in the pandemic. They were even discouraged by their peers who said, 'Nothing significant will be achieved by doing such a project.' But the narrative changed when the Disha app got shortlisted—first in the top 300, then 100 and finally the top 30! And it didn't stop there. The NITI Aayog team took things further ahead and filed a patent for the app. Aparna and Tania's school and families were delighted when they were informed about this exhilarating development. Aparna exclaimed, 'The fact that we could apply for a patent made us realize the immense potential of our app. We can now reach every student in the world and simplify the process of making a career choice!'

Tania and Aparna are grateful to Vandana Ma'am and feel blessed to have had a teacher, who stood by them and gave them unconditional support throughout their journey. When asked about the key takeaways from the ATL Marathon, Team Disha says, 'Not only did we learn about the process of making a functional prototype and app development but also that we need to keep moving forward despite the initial setbacks that we face. Ideas hold the power to change the world!'

Team Ideators

School : **Delhi Public School Greater Faridabad**

District : Faridabad

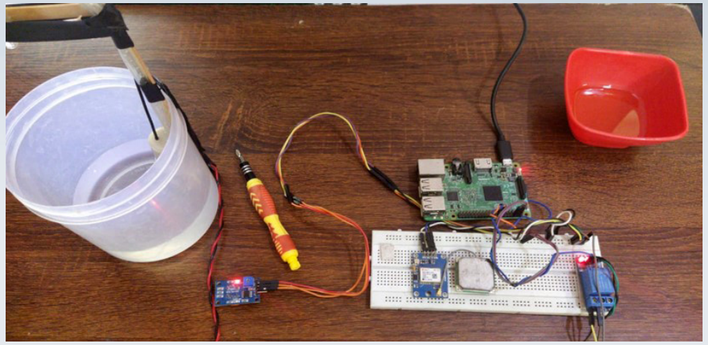
State : Haryana

Grade 11 students Rachit, Kriti and Advait from Delhi Public School, Faridabad, were attending an event about artificial intelligence (AI), in the academic year 2019-20, where they participated in a competition to come up with an AI-based prototype to address a problem of their choice. The trio mulled over the current hot topics. They wanted to create an innovation that would address some 'real' issues in society.

All three of them came up with their own individually conceived projects and submitted them, but the judges rejected them all and even had critical feedback for the three. One of their teachers, Nitu Gupta, suggested they team up instead. Though they weren't familiar with each other before this, they considered their teacher's suggestion and formed a team. Abandoning their original topics, they decided to start afresh.

They had noticed that the road accidents that occurred in India happened majorly due to drunken driving and speeding. India reports as many as 1,34,000 fatalities in road accidents every year, of which nearly 70 per cent are caused because of drunken driving. Rachit came up with the idea of a speed monitor, while Kriti and Advait added an alcohol sensor (breathalyzer) in order to address this issue.

They proposed a technology called RAODS (an acronym for reducing road accidents caused due to over speeding and drunken driving), wherein a car could be fitted with a GPS sensor that would act as a speedometer. It would detect the speed of the vehicle; if it exceeded the specified speed limit, the driver would be notified, and an alarm would be set off within two minutes. And in case the speed still isn't reduced, an automated email via an SMTP server would be sent to the nearest police station with the vehicle number and driver information. In addition, the alcohol sensor in the device would detect the amount of alcohol vapors in the driver's breath.



If the driver consumes more than the legal drinking limit (40 ml of pure alcohol) before driving, a solenoid valve (which is electronically controlled) would be triggered, thus restricting the fuel flow to the engine and stopping the car. As a further safety precaution, an automated email would be sent to the nearest police station with the location of the halted vehicle and driver information. This project would aid not only the drivers and passengers but also those outside the vehicle, who are susceptible to such accidents.

The trio worked on their prototype for nearly a year. They wanted to submit their project to the ATL Marathon 2020. By now, they were in Grade 12 and had to juggle their classes, studying for competitive exams and the project. They needed to know advanced coding for the AI sensors they had thought of using in their device. However, they weren't well versed in it and had to learn it themselves.

They also thought of applying AI to classify the face of the driver as drunk or sober through thermal sensing. The technology even included installing a breathalyzer in the steering wheel. They could successfully make the breathalyzer but couldn't

make the thermal camera because of a lack of budget and resource availability. Despite these hurdles, Team Ideators managed to enter the competition with a functioning prototype.

During this process, their parents and peers were extremely supportive. The families also ensured that their children commuted safely to each other's residences even during the Covid lockdown. Once, when Advait's laptop crashed midway through the project, his parents bought him a new laptop as soon as possible so that there would be no more delays. Another wonderful thing was that they had peers at school who were also their fellow participants. The shared camaraderie encouraged them all and led them to helping each other with their projects. So, everyone rejoiced on seeing the trio find a spot in the top 30 teams of the ATL Marathon.

Speaking about his experience, Advait said, 'I was quite enthusiastic about working in a team. It was more fun rather than just nerdy work. At times, we would fight over silly things as small as which font type to use. We spent nearly half an hour on it! Once, we even had a heated argument over one of us forgetting to source a hot glue gun. We were pretty mad at each other and stopped communicating. When our teacher came to know of it, she intervened; she called us on a video call and made us sort it out. But these things never really impacted the quality of our work. The only thing that I wasn't happy about was our procrastination. Our prototype could have been more refined had we not waited till the last moment to complete it.'

While speaking of the message they want to give their fellow youngsters, Kriti said, 'Step beyond all your barriers and comfort zones if you have to do something. Keep going until you reach the end. Be confident. Happiness and a sense of achievement lie at the end of it.'

Team Hercules

School : **Air Force School**

District : Bengaluru (Bangalore) Urban

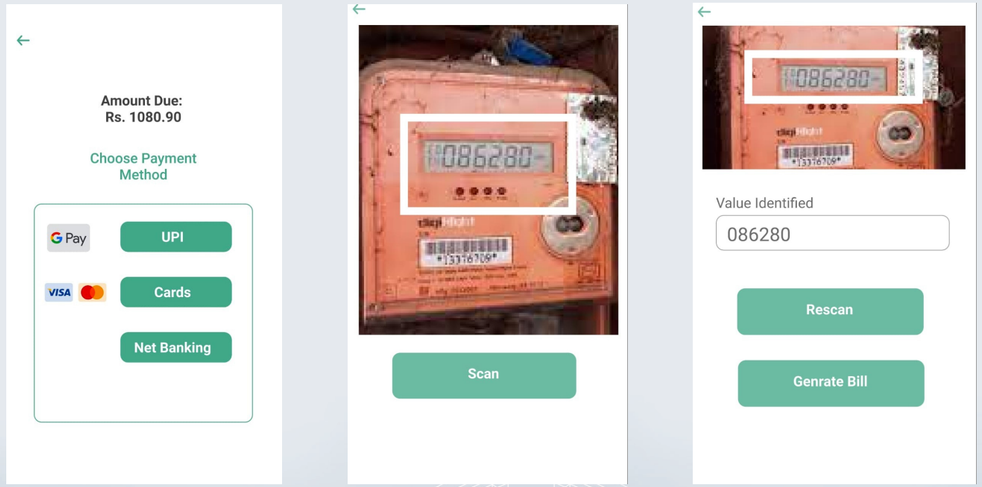
State : Karnataka

Vishal Bangrae, a student at Air Force School, Bangalore, was shocked to see his family's electricity bill—a whopping Rs. 10,000 for a mere month of electricity usage! He was quite disturbed, and after discussing it with neighbours and people around him, he realized that it was quite a common glitch that had been happening in multiple households.

Soon after that incident, the ATL Marathon 2020 was announced, and Vishal decided to team up with his friend, Sanskriti Tyagi, and tackle the billing problem. All electricity, water and gas meters in India are read by the meter-reading personnel, who visit each unit and take the reading manually. Of course, there's a possibility of human error while entering the values, which could result in an exponentially high or a very low value of the bill. So, Vishal suggested making an app that would help automate the process of recording the meter readings. According to their research, the amount of money paid to the meter readers was approximately Rs. 833 crores. This meant that automating this process could also save a good amount of revenue that might then be utilized for the betterment of those staying in rural areas.

Their solution helped cut down all these costs and made it highly economical for distribution companies. It employed the usage of a smartphone app in which people could scan their own meters and pay their bills digitally. The customers would be asked to register themselves in the app by providing their credentials and meter ID. Then they would have to scan their meters and allow the app to extract the meter value using OCR (Optical Character Recognition Method). The app would then give the customer a time stamp, post which they could click a live picture of the meter reading. And voilà, the bill is generated! This solution could be deployed in rural and urban areas where traditional meters are used (which is a high majority). People with smartphones and access to the internet could easily use the app.

As they ideated and coded the app's proof of concept, it was also time for them to take their Grade 12 board exams. They had to study for their exam, attend the ATL Student Innovator Program (SIP) and work on their project as well. A few of their peers even said, 'Why are you wasting your time on such things? You have your exams coming up. It is a crucial time in your life, and you'd be better off focusing on studying instead.' But Vishal was extremely enthusiastic about



extracurricular activities and gaining hands-on experience in the application of all that he'd learnt.

Sanskriti felt that even if others don't have faith in your idea, you need to believe in yourself and not let their doubts affect you. So, they kept at it. They were tutored about the business perspective in the SIP by Mahindra Tech and other ATL collaborators. Even their fellow students who were attending the SIP lectures would share their views, which added immense value to their knowledge. It was a great moment of satisfaction for Team Hercules when their project idea bagged a place in the top 30.

Sanskriti said, 'We used to have our pre-board extra classes till 4 p.m. and then the mentor–ward meetings at 4.30 p.m. So, reaching home and attending the online meetings was quite a task. There were times when we had to attend the meetings from school. But in all this, we learnt an important life lesson of time management.'

Vishal seconded this and added, 'We were working under a lot of pressure and had to walk on a tightrope. I had to skip my swimming schedule and also prepare for competitive exams like CET and JEE. So, time management while working under stress was something great that we learnt. My advice to my fellow student community is that no matter how many hurdles you face, how many ever times you fall, when you stand back up and finish your work, you will have the sweet taste of victory awaiting you.'

Team Regenerators

School : **DC Model Sr. Sec School**
District : Ferozepur
State : Punjab

Tanush, Vikramjit and Vrinda had been teamed up by their teacher for the ATL Marathon. They were brainstorming for their project topic when they heard one of the students joke, 'Us students are full of energy; we should invent something that would convert this energy into something useful.' A thought struck them: power cuts were common in their area and created a hurdle in their schooling. They also noticed that students their age did not engage in as many physical activities that they should, of late, and that impacted the physical well-being of the students.

The Covid-19 pandemic had worsened the situation and the younger generation which was earlier glued to their screens to play games online, now sat in front of the screen for learning and studying. Outdoor exercise, playtime and walks had become negligible. And this lifestyle change was experienced by both the children and elders in every family. These thoughts converged into the idea for their device, which they named Regenerator. They envisioned it converting the physical (mechanical) energy of students' bodies into electrical energy!

Their end goal was to generate free energy at no cost while also creating an opportunity to increase physical activity which would automatically lead to a healthier lifestyle. That's how they came up with the idea of making a pedalling system to generate power. The energy generated by pedalling the device could be used for purposes like charging phones or laptops too. With the help of their mentors and the facilities available in the ATL lab, they created a prototype that was easy to pedal and simple to gauge.

It was made from the pedalling system, motors, LEDs, voltmeter, etc., and looked similar to the pedals we see on bicycles. It could be attached to the school benches or work desks, and could be pedalled as and when one had the time to do so. The electrical energy thus created could be stored into the batteries (chemical energy) or used to charge electrical devices. It took them a month to build a functioning prototype. While they were working on it, an amusing incident took place.

> **"We benefited tremendously from sharing our knowledge with each other. Secondly, we pushed ourselves to be creative and think out of the box. This process refined our intellect and helped push us forward by leaps and bounds."**

Their device suddenly stopped working and they couldn't understand what exactly the glitch was. They tried to see if there were any bugs in their coding. Then, they checked the wires to see if it was a failure in the electrical system's set up. After quite some time had passed in conducting these preliminary checks, they still couldn't figure out what the issue was. Finally, they realized that they hadn't checked the motor at all, which had become defunct. It was an unforgettable moment through which they learnt that even when you reach a more advanced level with your prototype, you should never forget the basics!

Moving ahead, they tested their prototype and submitted their entry into the ATL Marathon. Their joy knew no bounds when they got selected as one of the top

30 teams. Everyone around them rejoiced. Team Regenerators shared, ‘We truly understood the importance of teamwork only after working on this project. When one of us didn’t know something, our other teammates pitched in immediately to help. We benefited tremendously from sharing our knowledge with each other. Secondly, we pushed ourselves to be creative and think out of the box. This process refined our intellect and helped push us forward by leaps and bounds. While juggling the project with our academic schedule was challenging, our project became a source of joy and it was our stressbuster. We realized that when you are dedicated to something, you’ll find a way to achieve it.’

They believe in the famous quote by basketball coach, Tim Notke, ‘Hard work beats talent when talent doesn’t work hard!’

Team
Health Supporters

School : **Rainbow International School**
District : Kangra
State : Himachal Pradesh

Nidhish, Sejal and Tanish from Kangra, Himachal Pradesh, were trying to pick the topic for their ATL Marathon project. They had chosen the theme ‘health system’ so they could contribute to society during the pandemic. Through their many discussions, they figured out that people didn’t pay much attention to the techniques of washing one’s hands, which could be hazardous during the Covid-19 pandemic.

They conducted a survey consisting of specific basic questions related to hand hygiene techniques. Looking at the responses, they figured out that many people were unaware of the automatic hand sanitizing machine that could come in pretty handy during a pandemic. Thus, they decided to make the ‘Automatic Hand Hygiene Machine’. But their Grade 10 board exams were just around the corner and they barely had a week to submit their prototype! The three set to work immediately. It was possible to meet in person due to the proximity of their residences; thus, the ideation and building phase became easy.

While making the prototype, they were jeered at by their peers, who said, ‘This is quite a common thing nowadays. You are merely wasting your time.’ They didn’t let it impact their efforts, however, for they were clear about their goal. Having accepted the commonality of the idea, they wanted to create something that could be easily made from unsophisticated materials. They were, after all, making it for the masses!

They chose to make a tri-compartment wooden prototype unlike any found in the market. Amongst the three, Nidhish was the most skilled at scientific methodology, and he would explain the way ahead to the other two. While they were using water pumps to dispense the soap, it malfunctioned due to the high viscosity of the soap solution. When the same thing happened with three different pumps, they realized they had to fix the issue as soon as possible.

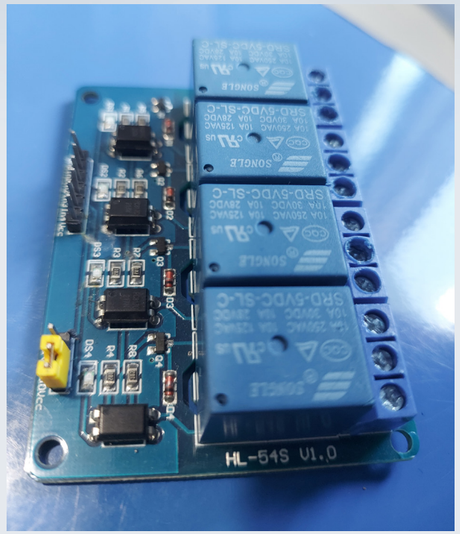
> **“We are satisfied with our work, which though simple, is useful for everyone. Reaching the top 30 is really inspiring. We learnt that teamwork is a must for victory.”**

Recalling the scenario, the team said, ‘The board exams were fast approaching, and we were quite anxious about the project. With the pumps malfunctioning, we almost panicked. We even had some arguments about it. But then we just calmed down and thought of a solution: We diluted the soap and brought it to a consistency that went well with the pump. That solved the problem!’ Sejal also overcame the fear of coding and gained the confidence needed to create original, resourceful products. Though Tanish had always been more adept at biology, he was now convinced that adapting to and learning technical solutions is essential. Not being technically savvy cannot be an excuse when one is involved in innovating and coming up with solutions to the world’s problems.

The Automatic Hand Hygiene Machine was built with infrared sensor technology to kill 99.9 per cent of germs. It was a sturdy wall-mounted dispenser and budget-friendly to boot. This automatic touchless sanitization machine could be used in all

entrances and exits of railways, airports, bus stops, malls, schools, cafeterias, food courts, meeting rooms, employee desks, transaction counters in banks, etc.

They had completed and submitted the project in about eight days! Now when their peers looked at their unique prototype, they applauded them. The appreciation heightened even further when they made it to the top 30. Speaking of their key takeaways from this journey, the team said, ‘We are satisfied with our work, which though simple, is useful for everyone. Reaching the top 30 is really inspiring. We learnt that teamwork is a must for victory.’

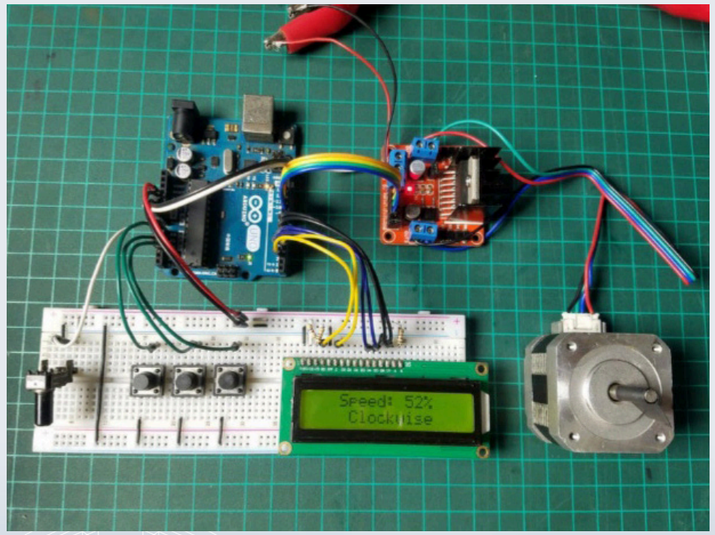


Team
Neon Stars

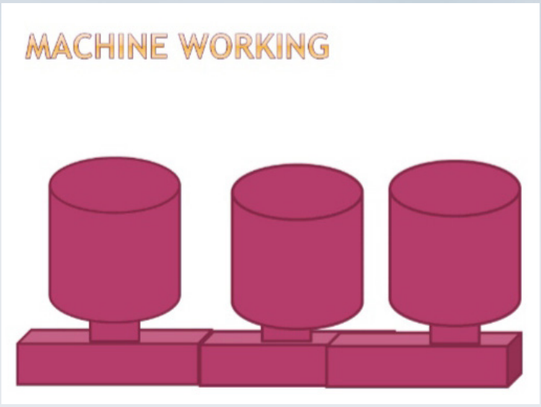
School : **St Georges H S S Puthenpally**
District : Ernakulam
State : Kerala

Benjamin V.B. and George Alenso were students in Grade 9 at St George HSS Puthuppally, Kerala. During the Covid-19 lockdown, they attended a Google Meet organized by their teacher. She wanted them to come up with some suggestions to battle the tough situation that they all were in. Post that meeting, Benjamin was sitting with his grandmother and discussing the excessive use of soap and handwash. She started telling him stories from her childhood days. She mentioned that buying synthetic soap was not an option in those days.

Instead, they would use soapberry seeds (*ritha* seeds) to clean clothes and even bathe. It was readily available locally and thus was an affordable and safe option for them. This ignited an idea in Benjamin. He had noticed that his mother faced a huge problem in ensuring the safe cleaning of vegetables and fruits brought from the market during the Covid-19 Lockdown. Washing them with synthetically made chemicals was not a good idea. It required an organic cleaning solution. Connecting these two dots, he envisioned creating a cleaning solution made of soapberry!



He approached his teacher with this idea. After further discussion, they decided to make a prototype of a vegetable and fruit cleaning machine along with the soapberry-based cleaning solution. Benjamin teamed up with George Alenso and started ideating on their prototype. Soapberry was a better choice as its solution is acidic in nature and would function better than the alkaline-based products for cleaning the pesticide residues and microbes on the surface of the vegetables.



They couldn't construct the prototype due to a lack of raw materials and the strict lockdown in their area. So, they pitched the idea as their ATL Marathon entry. The cleaning machine would have three chambers. Each of them would be rotated by a 0.5HP electric motor controlled by an Arduino microcontroller ATmega328P. The stepper motor would ensure clockwise as well as anticlockwise rotation. Additionally, the soapberry solution, with pH 5.6, would be made by crushing a selected number of seeds with water in a mixer. Assembled together, this would be the complete cleaning solution, and they named it 'Agroclean'.

> **"This experience made me more confident than ever before. I am grateful to my teachers for their constant encouragement and support."**

The major hurdle the students faced was the language barrier. English wasn't their forte, but it was the language used by the ATL mentors and science experts. Thus, though they got exposure to a variety of other ideas, they couldn't express themselves as well as others could. They began to avoid conveying their ideas.

This changed when they made the device and presented it to the people. It helped them elevate their confidence and gave them the courage to face the world openly. Their anxiety dissolved after joining ATL and interacting with their fellow participants. They now want to expand their technical skills and improve their English to ease interaction with people. Alenso said, 'This experience made me more confident than ever before. I am grateful to my teachers for their constant encouragement and support.'

Sharing his message with his fellow innovators, Benjamin said, 'As students, we should use available resources like electronic gadgets and the internet constructively. We need to face the problems in our life with a positive approach and never give up. If you have any financial or social limitations, you should try to overcome them and not hesitate to seek help from those who can provide it to you. Even if you live in a rural area, don't let it lower your confidence. Prepare yourself for what you aspire to be.'

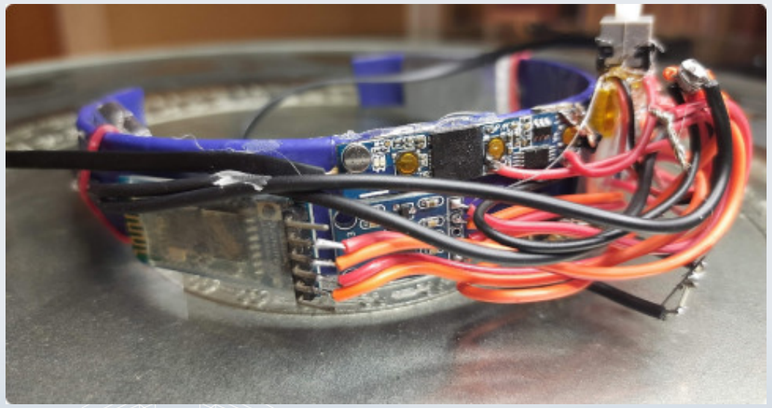
Team Aayush Arnav

School : Delhi Public School
District : Gautam Buddha Nagar
State : Uttar Pradesh

Aayush from Delhi Public High School, Noida, was in Grade 9 when he saw his maternal uncle undergoing severe cervical pain because of incorrect posture. He wanted to help his uncle and wondered what he could do. Suddenly, he was struck with an idea: *why not build an automatic device that would set off an alarm when one didn't have the correct posture and could help patients in an efficient manner?* He set up a home-made laboratory with everything he needed, built a prototype device and started testing it.

Two years later, the Covid-19 pandemic hit the world and billions of people had to study and work from home. Adults and children alike spent most of their time sitting in front of their laptops or desktops. Debilitating back pain caused by incorrect posture while sitting for hours on end became a commonly widespread issue. Observing these lifestyle changes, Aayush felt that the posture detector prototype he had built for his uncle could be customized to fit all age groups!

Around the same time, the ATL Marathon was announced at his school, and Aayush teamed up with Arnav from Delhi Public High School, Greater Noida. Though they hadn't met in person, they bonded instantly. This would prove to be of great help in overcoming challenges together while building their product. Aayush briefed Arnav about his working prototype and they discussed the improvisations required to broaden its applications.



> **We thoroughly enjoyed the process and learnt so much. We feel our experience developing the Upright neckband will help us as we gear up to achieve our goal of becoming future scientists and innovators!**

After researching the existing solutions, they found that there were back support belts available in the market for rectifying the body posture but they were too uncomfortable to wear and often increased back pain instead of reducing it. That's when they realized that there was a gap, and they could bridge it by creating something that would be comfortable to wear and carry for longer periods. They even decided to use a Gyroscope for the purpose of posture detection.

There were a couple of major roadblocks that they faced while making this variant in the device. During the lockdown, it became impossible for Arnav to manually handle or study the prototype since Aayush stayed quite far. This created a slight issue in coding the app to monitor the device's reading. They also struggled to schedule time for their discussions and experiments. Since Aayush had to attend coaching classes that went on till 9 p.m., they could touch base only after 11 at night. Though, in the end, nothing could stop the duo from achieving what they set out to do!

Within nine months, they created an improvised neckband version of the Wearable Posture Monitoring System that they called 'Upright'. The latest model (Version 3) comprises a neckband that can be worn by users and actively monitors the users' posture and alerts them as soon as they slip into an improper posture. It is comfortable to wear and has an extended battery life, enabling users to wear it for longer periods. It is also accompanied by an app that shows the user various statistics like good posture to bad posture ratio, time spent in bad posture, current

posture, etc., using graphs and charts, so that they have a comprehensive overview.

The data collected on the app also allows users to track their progress over time and encourages them to control their posture. They have now incorporated Machine Learning in their device to increase its accuracy, which has significantly reduced the number of false alerts. The accompanying app allows users to calibrate the device to suit their specific needs. It even has a version with Bluetooth earphones, so that users can attend meetings or listen to songs while using it!

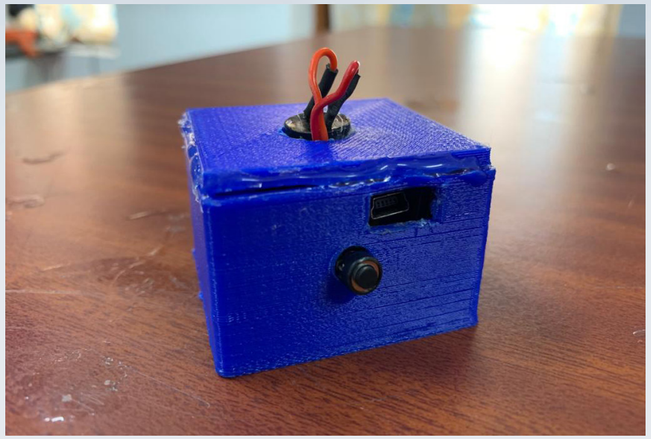
After several rounds of testing the Upright neckband prototype on various users, Aayush and Arnav gained confidence in its accuracy. They submitted their project in the ATL Marathon 2020 and were overjoyed when they received an e-mail announcing that they had reached the top 30! It was a moment of pride and satisfaction for their parents and teachers.

Aayush and Arnav are looking forward to making this device even more compact and easier to carry. Reminiscing about the experience, they said, 'We thoroughly enjoyed the process and learnt so much. We feel our experience developing the Upright neckband will help us as we gear up to achieve our goal of becoming future scientists and innovators!'

Team AND Tech

School : **Bhavan's Vidya Mandir**
District : Ernakulam
State : Kerala

Dhruv was in Grade 8 when he first learnt about Alzheimer's disease—a condition in which patients suffer from acute memory loss. One of his close relatives was affected by it, and the impact was felt by their relative's entire family. Dhruv was curious to learn more about this condition and the way the patients' families coped with it. In modern nuclear families, if working professionals are



the primary caregivers, they can't always stay home to look after the patient. He also realized that the caretakers of these patients had a very difficult time managing them and things had only worsened due to the Covid-19 pandemic. He talked about this issue with his friends Abhishek and Nandagopal. When they understood the gravity of the situation, they unanimously decided to work towards a solution that would help caregivers and patients.

First, they conducted surveys in their neighbourhoods. Following the completion of the surveys and research, they moved on

to ideation and modeling. They began by drawing rough sketches of how the innovation would look before turning it into a 3D model that they named 'Trackpod'. The most challenging task was to detect coding errors which consumed a lot of time. It was also hard to procure all the electrical parts they required during the pandemic. After addressing all the bugs and making additional design changes, they began their internal rounds of testing.

The device they eventually created was a pocket-friendly GPS tracker that could detect falls and provide live visuals. It was connected to an app from which the caretaker could monitor the patient from anywhere in real-time. Since this model was designed mainly for senior citizens, safety was a major factor. The tracking system would be placed inside a lightweight 3D-printed console. None of the components used required a high voltage of power to work. It used only 3.7 volts to function! This made the Trackpod energy efficient.

Their model was easy to use and portable. If one placed the GPS tracker in their shoe and turned it on, it would connect to the nearest Wi-Fi network. In case Wi-Fi was unavailable in the area, it would connect using the GSM. The total time needed to set up this device was less than 5 seconds! All the user had to do was push the switch to turn it on, and the tracker would do the rest. They carefully considered the metrics of user experience and satisfaction. After the testing and ideating phases were completed, they decided to incorporate the Trackpod device into footwear as it is an integral part of our lifestyle and one would always have

it on. After two months of hard work, they finally had a working prototype that could be used for testing!

The purpose of the prototype they created aligned well with the theme of the ATL Marathon 2020, so they decided to submit their project. Trackpod, created out of concern for the well-being of primary caregivers and patients, bagged a spot in the top 30 projects at the ATL Marathon! The journey not only inspired them to do more but also opened their eyes to consider taking an entrepreneurial route in the future.

Nandagopal said enthusiastically, 'Every student can make their dream project a reality. Nothing is impossible. By solving problems, we learn to never give up. Be confident, follow your heart and mind. Explore the world and proactively identify the gaps and needs that exist in our society. Understand how you can address them through your idea and project. Then, just go ahead and do it!'

"Every student can make their dream project a reality. Nothing is impossible. By solving problems, we learn to never give up. Be confident, follow your heart and mind. Explore the world and proactively identify the gaps and needs that exist in our society. Understand how you can address them through your idea and project. Then, just go ahead and do it!"

Adding to this, Abhishek said, encouragingly, 'No idea is dumb or too small. Every idea has its own importance and even a small idea can become successful and attract a lot of customers. My message to the student community would be to spend their time wisely in developing innovative ideas and working prototypes that can contribute towards changing our future for the better.'

Team Rani Laxmibai

School : **M E S Rani Laxmibai Mulinchi Sainiki Shala And Jr College**

District : Pune

State : Maharashtra

Geeta Dhanavade was in Grade 6 at Rani Laxmibai Girls Sainik School when a relative caught Covid. Mr Adinath Nagane, a policeman in Pune, Maharashtra, had just recovered from Covid and returned home, so Geeta and her family decided to visit him. Her younger sister insisted on playing with the uncovered police whistle that hung from Mr Nagane's uniform. She really wanted to blow it. Alarmed, Mr Nagane snatched it away and told her it might be infected. This incident left a profound impact on Geeta. She felt that if such a small thing was so dangerous for her sister, then it could just as easily be dangerous to those policemen who used such whistles on a daily basis. She felt a strong urge to do something about it.

Inspired by the masks we used to cover our mouths and nose during the pandemic, Geeta came up with the idea of providing a safety enclosure for the police whistle. The ATL Marathon was around the corner, and Geeta teamed up with Girija Jogalekar, her classmate. But due to the pandemic, they couldn't meet and had to communicate via WhatsApp video calls. Geeta, who lived in Pune, was able to access the ATL Lab and create her prototype with the help of the materials provided there, while Girija helped in designing and testing the prototype. They were encouraged by their ATL in-charge, Mr Anant Kulkarni, and Science Department Head, Smt. Manjiri Patil. They guided the students throughout their project, and at last, the prototype was ready!

> **"We can now pitch our ideas fearlessly. The confidence we have gained is extremely empowering. We want more girls to come up and talk about their ideas confidently.'"**

Now to put it to the test. The two got an opportunity to showcase their project to Mr Krishna Prakash, the Hon. Police Commissioner of Pimpri-Chinchwad, Maharashtra. He was impressed with not only the idea but also the efforts the students had put into designing the product. He suggested a few changes that could be introduced to the prototype and asked them for 300 such whistle enclosures. With this welcome boost to their confidence, Geeta and Girija were off to the races.

While speaking about their journey, they said, ‘We have a huge amount of gratitude for our school and our ATL mentors. This project gave us great exposure to the world of innovation. We can now pitch our ideas fearlessly. The confidence we have gained is extremely empowering. We want more girls to come up and talk about their ideas confidently.’

Hailing from humble backgrounds, these girls are the perfect example of the outcomes that focused guidance from institutes and mentors can yield. We hope many more girls feel inspired by Geeta and Girija’s achievement and succeed in finding a platform for their own innovations.

Team COMET

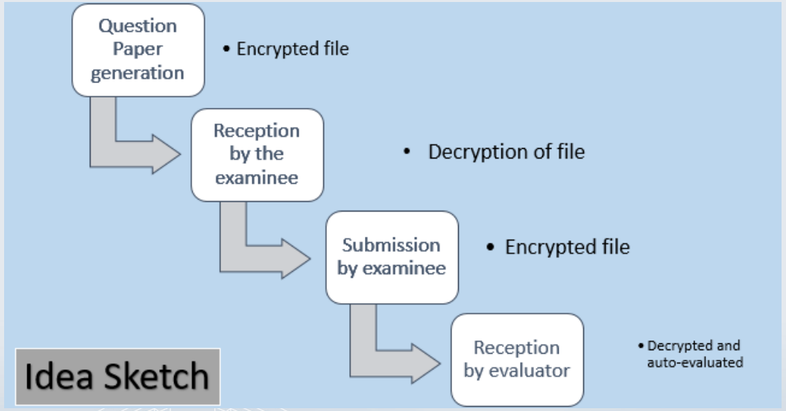
School : **Dr Kalmadi Shamarao High School**

District : Pune

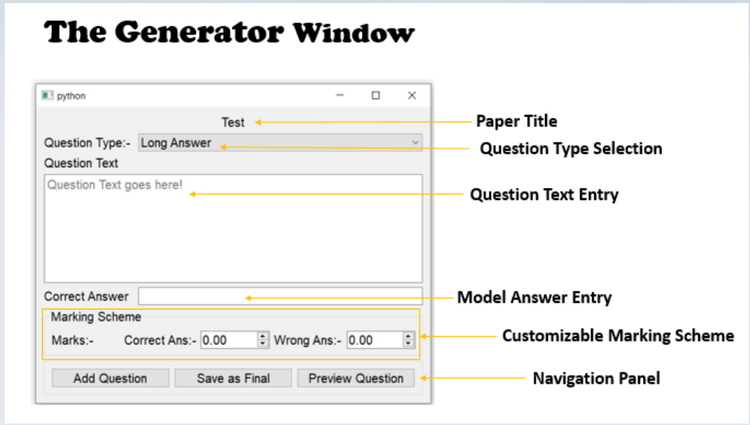
State : Maharashtra

As per the guidelines given by the authorities during the Covid-19 lockdown, Vihang's first semester exams for Grade 9 were supposed to be conducted online. Halfway through the test, there was a sudden power cut. The server went down, and the computer screens went blank. The students didn't know what to do. As the power supply resumed, they realized that the answers they had typed out had completely disappeared! To top it all off, the exam timer had continued to tick, and the students lost that exam attempt.

Though they were allowed to sit for the exam again, this incident left Samruddha, Vihang and Sudhanwa feeling quite unsettled. It was disheartening to see their peers so stressed and worried about their tests. Even the teachers felt deeply unhappy with the technical errors that kept cropping up while they assessed the papers. The students knew that the situation had to be addressed somehow. After lots of discussions, they had an idea—building an alternate assessment application that wouldn't require internet connectivity. Vihang and Samruddha were already learning Python programming. The two of them, along with Sudhanwa, conducted a preliminary survey of issues faced by students who had appeared for online exams during the Covid-19 lockdown in Maharashtra.



Analyzing the responses that they had received, they deduced that such problems weren't unique to them. In fact, the situation was even worse in rural areas. A student from Amravati wrote, 'Our school tried conducting online exams, but many of us couldn't answer them as access to the internet had been blocked due to a public protest.' There were also times when the files submitted by the students got corrupted or distorted. The teachers had to manually go through each file and try to recover it. This took a long time and delayed the process of assessment results.



> **"Working on the project has been an invaluable experience as it has given us the confidence to believe in ourselves. Ideas can be manifested; all you need to do is to believe in yourself and the cause you are working towards."**

The trio informed their school authorities about their problem statement and were encouraged to go ahead with their idea. They were even told that the solution built by them would be implemented by the school, which was quite a motivational boost! Excited, they started developing the app. Its main highlight was that students could answer the pre-loaded test papers without an active internet connection, which would then be submitted online later on.

They envisioned a GUI (Graphical User Interface) which would allow the proctoring process to continue using the camera. Everything went off smoothly until a glitch occurred. For the virtual proctoring they needed to run the GUI and the video camera simultaneously, but somehow, they weren't able to achieve that. They spent nearly eleven weeks trying to figure out the coding solution and were disheartened when they reached a dead end each time. Right before they hit upon this roadblock, they had applied for the ATL Marathon and bagged a spot in the competition. Luckily for them, it was well-timed and a blessing in disguise as help arrived swiftly!

The ATL mentors from the Learning Links Foundation guided them on how they could overcome their challenge and the team was able to fix the glitch. Finally, the desktop-based app prototype was tested thoroughly with their peers and school teachers. They optimized their app after receiving suggestions and submitted it. They were thrilled to be among the top 30 teams of the ATL Marathon 2020, and are now looking forward to developing the app further to include different formats of exams like competitive entrance exams as well. According to Team COMET, 'Working on the project has been an invaluable experience as it has given us the confidence to believe in ourselves. Ideas can be manifested; all you need to do is to believe in yourself and the cause you are working towards.'

Team Techie Gang

School : **Kendriya Vidyalaya One Rewa**
District : Rewa
State : Madhya Pradesh

Harsh's grandmother was quite unwell. She required personal attention at all times and needed to be taken to the doctor frequently. Harsh's parents would have to apply for time off from their offices and accompany her to the doctor. He noticed that most of the times, the doctor would just check vitals like her body temperature, pulse rate, etc., and then prescribe the necessary medicines on the spot. It occurred to Harsh that if the details of these vitals were made easily accessible to their doctor, perhaps he could help out remotely as well. It would not only prevent his ailing grandmother from a stressful trip to the doctor but would also mean his parents did not need to take a day off from work so often.

Soon, the ATL Marathon 2020 was announced. Harsh, and two of his classmates, Dhruv and Pratimesh, were brainstorming the problem statement that their project would address. Harsh brought up his grandmother's frequent visits to the doctor and suggested they build a device that would remotely monitor a patient's physical vitals and communicate these to the doctor. They set out to work on it. All the necessary equipment needed for the project was provided by the ATL in-charge, Mrs Chandrakiran Gupta.

One of the major challenges they faced was that none of them knew how to code and this type of device definitely needed them to develop their skills in advanced coding. To increase the reach of the device, they wanted it to be accessible through Wi-Fi instead of limiting its access through Bluetooth. But who would help them program the device? As it turned out, their teacher Mr Sanyam Chhajed, came to their rescue in the nick of time and they were able to create a model for their device, which they called 'EZ Health', within four months!

EZ Health is an IOT-based healthcare device in the form of a handheld box. When they tested it, they found it was effective and accurate in monitoring the patient remotely. It collected the information through the sensors embedded in it including the patient's heartbeat rate and temperature. Then, it would share the information on the ThingSpeak Database with the patient's current status and complete medical information. Their system could also share an email and automatically make a phone call if a health-related issue needed immediate and urgent attention like when the patient has an increased temperature beyond 37 degrees Celsius, or if the pulse rate had risen above 140.

EZ Health helps doctors monitor their patient from anywhere and they can access the status of the patient's health directly through the OLED Display without the patient even visiting the hospital. Their innovation can have a widespread impact once deployed at all major hospitals and medical institutes. The data generated from each sensor is sent to a database server accessible by the hospital where the data can be further analyzed by doctors and medical experts.

Now it was time to test EZ Health! They had to connect the doctors with the patients through their device, but as luck would have it, since there was a lockdown, none

of the doctors were available. The team faced a lot of difficulty in getting their device reviewed. But finally, they managed to make it happen when Harsh's aunt tested positive for Covid-19 and had to stay in isolation. She couldn't allow visitors inside her room or come in contact with the rest of her family. Harsh's family was worried about her health as she already had underlying medical conditions and complications. Harsh saw this as a perfect opportunity to put his prototype to use. He handed the device to his aunt and connected it to the hospital's Wi-Fi. It gave them immense relief as they could now monitor her vitals while sitting at home!

They submitted their prototype to the ATL Marathon 2020. It was an indescribable feeling to see their project find a spot among the top 30. And it didn't stop there. They got an opportunity to demonstrate this innovation to the Prime Minister of India, Hon'ble Narendra Modi. After that, as the winner of Clever Harvey's incubator program, they were awarded a seed funding of Rs. 25,000. EZ Health also bagged seven international awards and won national competitions including the top 30 at IIT Guwahati Tech-Expo and the top 75 in the ATL Space Challenge. Here they expanded the device's implementation to include applications for space astronauts!

Harsh shared, 'We attended an online student internship program by Centre for Cellular and Molecular Biology (CCMB), Hyderabad, and that taught us a lot not only about the technical side of creating an innovation but also the business side of things, from pitching to scaling a business.' Pratimesh chimed in, 'We learnt the virtue of patience and the importance of teamwork. And we hope to continue innovating and learning. After all, our journey has just begun!'

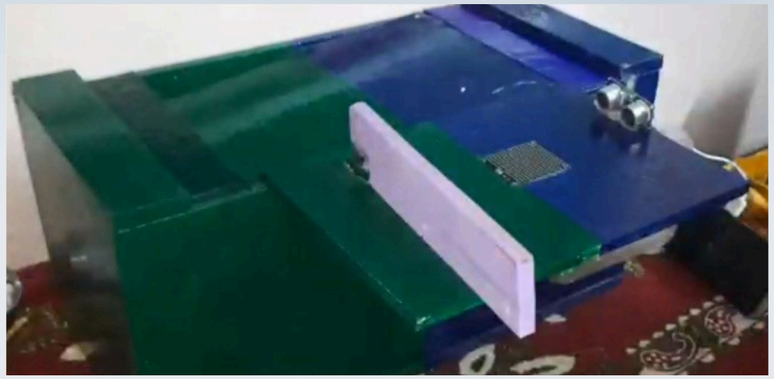
Team Workers Helpers

School : **Kendriya Vidyalaya Khargone**
District : Khargone
State : Madhya Pradesh

The Patidar sisters, Prachi and Pragya, were traveling to a nearby ISKCON temple in Khargone, Madhya Pradesh with their family. The road to the temple passed by the Khargone landfill. The sisters saw workers manually segregating the garbage despite the disgusting odour and filth emanating from the landfill while animals like stray dogs and cows ate food scraps. They could see them ingesting plastics as well and realized that they were also consuming other hazardous materials. This sight disturbed them deeply as they felt that it was quite derogatory for any human being to be working in such conditions. They even felt bad for the innocent animals who were unsheltered and had to feed themselves in such an unhealthy way.

Both Pragya and Prachi couldn't overlook this problem and were determined to find a way to resolve the issue. They created many social awareness campaigns about the hazardous effects of the unhygienic practices followed and tried to discuss it with the residents in their colonies and workers at the landfill. But no one paid any heed to their efforts. At times, they were shooed away and told to mind their own business. Through it all, they didn't lose heart. They thought of coming up with another alternative to attain their goal.

They found that the Khargone landfill receives almost 40 tons of garbage daily. This would be impossible to segregate manually in one day, leading to the creation of a garbage mountain similar to the Ghazipur landfill. The workers there also hand-picked the garbage and often got injured by broken pieces of glass or infected by diseases. The same thing happened with the animals who came to feed off the garbage. It even impacted the nearby areas and water resources.



They had noticed that people hadn't even bothered to segregate their domestic waste, and that's why all of the waste just went into the landfill as it was, and it was the manual workers who got impacted the most because of the lack of segregation. They decided to address this problem at its root. Their solution was to build an automatic system for segregating waste, a Garbage Separating (GS) Dustbin.

As they were working on the project during the pandemic, their access to the right resources was severely restricted. They couldn't visit any labs and had to create their prototype at home. First, the GS-mini segregated household waste. Then the GS-mega segregated the waste in garbage collecting vehicles. After that, wet waste would be sent to the composting sites whereas the dry waste was sent directly to local recycling sites. By doing this, they realized that the

mountains of waste lying in landfills could be reduced, and it would solve multiple problems in one go!

They showed their project to the Nagar Palika officials at Khargone and got the correct feedback for addressing the purpose they had set out to solve. They even contacted the landfill workers and asked them for their inputs. The major challenge for them occurred while coding for the segregation platform to move differentially. They weren't well versed in the C++ programming they were using. That affected the main garbage segregation process. Eventually they received some help with the coding and fixed the bug.

There came a point where they were unsure of their efforts and their impact. Luckily, at that time, they got an opportunity to interact with the former DRDO Chairman Dr Subir Kumar Chaudhari. He was impressed when he heard about their initiative and encouraged them to have faith in their idea and keep going. When their friends came to know about their project, they made fun of them, teasing them for making a dustbin. But instead of reacting to their taunts, they kept calm, believed in themselves and focused on their project.

It was a super exciting moment for them when after six months of hard work, their prototype finally functioned properly. The sisters couldn't sleep the entire night as they rejoiced in their success. They submitted the project to the ATL Marathon 2020. Their hard work won them a place among the top 30 teams! This feat encouraged them immensely. The empathy that the sisters have for the manual worker community and stray animals is commendable. Such students are role models and will definitely leave a mark on the world as future scientists and innovators.

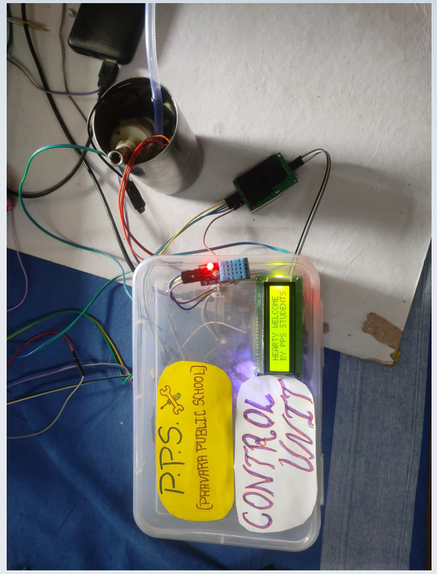
Team Innovation Geeks

School : **Pravara Public School**
District : Ahmednagar
State : Maharashtra

At an ATL brainstorming session at Pravara Public School, Loni village, Maharashtra, Thejas Elandassery and Tejas Bhoye (Grade 11) were asked to come up with different social problems that they could address. They had to finalize the problem statement and work on it as a project for the upcoming ATL Marathon.

Thejas Elandassery and his sibling often fell sick with frequent fever and nausea. For nearly 2–3 weeks, they couldn't diagnose the cause of their sickness. It was then that their doctor suggested that it might be due to the consumption of contaminated water. Thejas's family squashed the suspicion, saying they consumed the water from freshly pumped water stored in the water tank at their house. But when the boys fell sick again, they finally agreed to check the water tank. They were shocked to notice the amount of dirt that had accumulated on the inner surface of the water tank. They realized it was the dirty water tank and not their immune system that was to be blamed. Thejas shared this with his classmates, and Tejas Bhoye highlighted a similar problem of contaminated water that his family had experienced.

India loses 73 million working days due to water-borne diseases. The two classmates deduced that if people were warned about the water quality before they consumed it, they could avoid such diseases. In most cases, the water tanks are situated on the roofs of buildings. So, it's usually not feasible for people to take a proper look inside the tanks and check whether it is clean. To solve this problem, Thejas and Tejas decided to try their hand at making a water quality sensing device named 'Jal Aarogyam'.



They also brought another friend into the fold. Deepak Pandore, who attended a different school, joined them on this journey. They would have their meetings after school hours, though it was challenging to sync their timings due to differing school schedules. Another hurdle they faced was accessing the keys to ATL when the teacher who was in-charge of the ATL lab was absent. They would have to go about requesting the watchman. Only after numerous such requests would the keys be handed over to them.

> **"Don't worry about the problems that crop up on your way to getting things done. Just do your thing, and the rest will start to fall into place."**

As they were also preparing for competitive entrance exams, their teachers also insisted that they focus on their academic studies. So, they wouldn't allow the boys to work in the lab during school hours. But determined to finish their project before the deadline, they would stealthily sneak out of their classrooms and rush to the ATL lab. Sometimes, they would work till 3 a.m. to complete the project.

Midway through the project, the 3D printer suddenly stopped working, which delayed their project. Another issue was the availability of raw materials in the rural area where they lived; something as simple as a soldering wire, when ordered online, would take 5–6 days to reach. During such times, instead of waiting for that long, they would reuse the materials by re-melting them from old and rejected prototypes present in the lab. Finally, after six months of hard work, they completed their project.

Their peers teased them for working on something like a water quality sensor. After being selected in the top 300, before their entry was selected as a part of the top 30, they were even sidelined by their competitor teams for a while. While this did impact them, they just brushed it off and set to work again. Their self-confidence was fuelled by the solid support of their school principal, Adsul Sir, teachers like Sandeep Khuperkar Sir, the ATL Lab in-charge, Arrangale Sir, and their parents. They encouraged them to keep working hard despite all the obstacles.

As students, they learnt a lot through the exchange of ideas amongst themselves. They even learnt the distribution of tasks, which was the backbone of their teamwork. Resilience was another virtue that they strengthened in themselves. Thejas Elandassery says, ‘Don’t worry about the problems that crop up on your way to getting things done. Just do your thing, and the rest will start to fall into place.’ All three team members look forward to seeing their innovation reach every household in India and want to free the country of diseases caused by drinking water as soon as possible.

Team Equitized Entropy

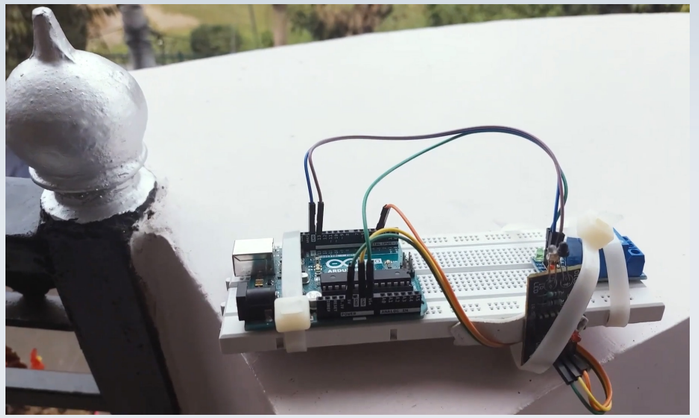
School : **Apeejay School**
District : Jalandhar
State : Punjab

Covid-19 distorted the day-to-day lifestyle of most people. Every tangible thing was viewed with suspicion. Extreme care needed to be taken to prevent the infection from spreading through households. Though people's movement was majorly restricted to their homes, they were still at risk from those who supplied essential goods, like the grocery and food delivery agents, health surveyors, etc.

Gopesh Gupta from Grade 11 and Siddharth Cheema from Grade 10 in Apeejay School, Jallandhar, Punjab were brainstorming in their school's ATL sessions about the possible solutions they could provide to ease people's lives during the pandemic. That was when one of their teachers suggested creating a contactless doorbell.

They thought that such a device would facilitate a safer environment for social distancing, and people could avoid touching things that were otherwise handled by a large number of people on a daily basis. It would also ensure that visitors don't touch the doorbell, keeping them safe. At its best, it would address the root cause of the spread of the virus, which was physical contact with other things and people.

They worked on the main features of their device prototype and decided to use simple technology and readily available raw material so that the device would be affordable for most. Their prototype included an attachment that could be physically connected to an existing doorbell—converting any standard doorbell into a contactless one. If a visitor had to ring the doorbell, they would merely have to hover their hand near the button instead of pressing it.



This system worked on the principle of detecting IR (infrared) energy waves emitted by the human body. These, when detected in a short radius of 5–10 cm of the IR sensor, triggered the doorbell via a relay switch controlled by a pre-programmed microcontroller. To avoid unintended triggering of the doorbell, the device only detects IR radiations emitted by humans. Therefore, using these three different components in the contactless doorbell attachment prototype, a regular doorbell could be converted into a contactless one.

They didn't face any difficulty while building the prototype because of the simplicity of the project. It may sound plain, but it also showcased an advantage in manufacturing and marketing at a large scale. Siddharth shared, 'To be honest, we did not expect this project to get selected because we never faced any problems building it, nor did we feel that this was our best entry. In fact, we had submitted another idea named "Social Distance System", which was way tougher to build than this one. And we thought that would definitely get selected.

But to our surprise, it was the contactless doorbell that got through and not the other one! It also taught us that, as innovators, we should not judge the idea in terms of its technical complexity. Instead, we need to understand that an idea should be simple, easy to implement and doesn't need to be fancy because that would lead to it just staying in the prototype stage. As long as it addresses a gap or need in the market, it is a valuable innovation.'

The team adds, 'This has been an unexpected yet amazing journey. We may not have gained a lot of technical experience going through with this project, but we did learn about life, people and the true meaning of solving a problem. And that is—your innovation is for the people, by the people and with the people. Sometimes, the simplest solutions solve the biggest problems.'

Team Innovation Group

School : **SECAB PU College for Boys Vijaypur**

District : Vijayapura (Bijapur)

State : Karnataka

Sadaf, Saniya and Muskan, studying in Grade 11 at SECAB PU College, Vijayapura (Karnataka), were walking home from college one day. Suddenly they noticed a bus hurtling towards them. They panicked when the bus driver didn't slow down even once he was extremely close to them. They froze and thought that their life was going to come to an end. Luckily, the driver managed to swerve away from them at the last moment. They had just had a terrifying brush with death!

Back at school, with the memory of this incident fresh in their minds, they decided to work on a project to ensure the safety of pedestrians and vehicles. They researched the safety laws made in India by the National Highway Authority of India (NHAI). In addition, they also did a comparative analysis with other countries. During this research, they came across an online article that said the US was planning to make the country free of road accidents by 2025 using automation and safety tech.

The team decided to keep the prototype for their automatic braking system simple and cheap. They wanted it to be affordable for everyone. Their prototype was made of ultrasonic sensors to detect objects or people in front of the vehicles, plus two batteries, two DC motors and a motor driver. Whenever the sensors detect an obstacle, the car would slow down automatically and stop at a safe distance. Even if the driver tried to accelerate, the car wouldn't move due to the activation of an automated system that disengaged the power transmission to the car engine.

They had to make the whole prototype more than three times as they encountered one glitch or another each time. It was pretty disheartening for them to see the prototypes fail to perform whenever they presented one to their teachers. A tech team from Pune who helped them with the technical aspects, like assembling the Arduino, wires, etc., enabled them to complete the prototype within a week!

> **"The harder you work for something, the greater it feels when you achieve it. So, stop doubting yourself and never ever miss an opportunity."**

When it was time to shoot the video for the entry in the ATL Marathon 2020, all the participating teams from their school gathered. When it was Team Innovation Group's turn to present, the tyres in their prototype stopped working. One of the visiting teachers said they were the weakest of all the teams present there and would never reach far in the competition. The girls felt humiliated and were moved to tears. Their project, built after a lot of self-learning and hard work, was being publicly laughed at. They still went ahead and submitted the project.

It was a moment of great surprise when their automatic braking system was selected in the top 30 teams all over India. They couldn't believe that it was happening to them. It was quite rewarding to see everyone applaud their work. They were even felicitated with the SECAB National Award in 2022. When speaking of their takeaways from this journey, Saniya said, 'I learnt the importance of technology in our life. It can be a great and useful tool for saving lives. Another thing that I learnt is not to lose hope even if people discourage you.'

Muskan added, 'Though we faced many obstacles while doing this project, it made us believe that actions speak louder than words. Instead of arguing with those who don't believe in you, do your work. Show them that you are way better than they think.' Sadaf Anjum said, 'The harder you work for something, the greater it feels when you achieve it. So, stop doubting yourself and never ever miss an opportunity.'

Partner Recognition

Atal Innovation Mission would like to thank all its partners for all the support in making the ATL Marathon 2020-21 successful.

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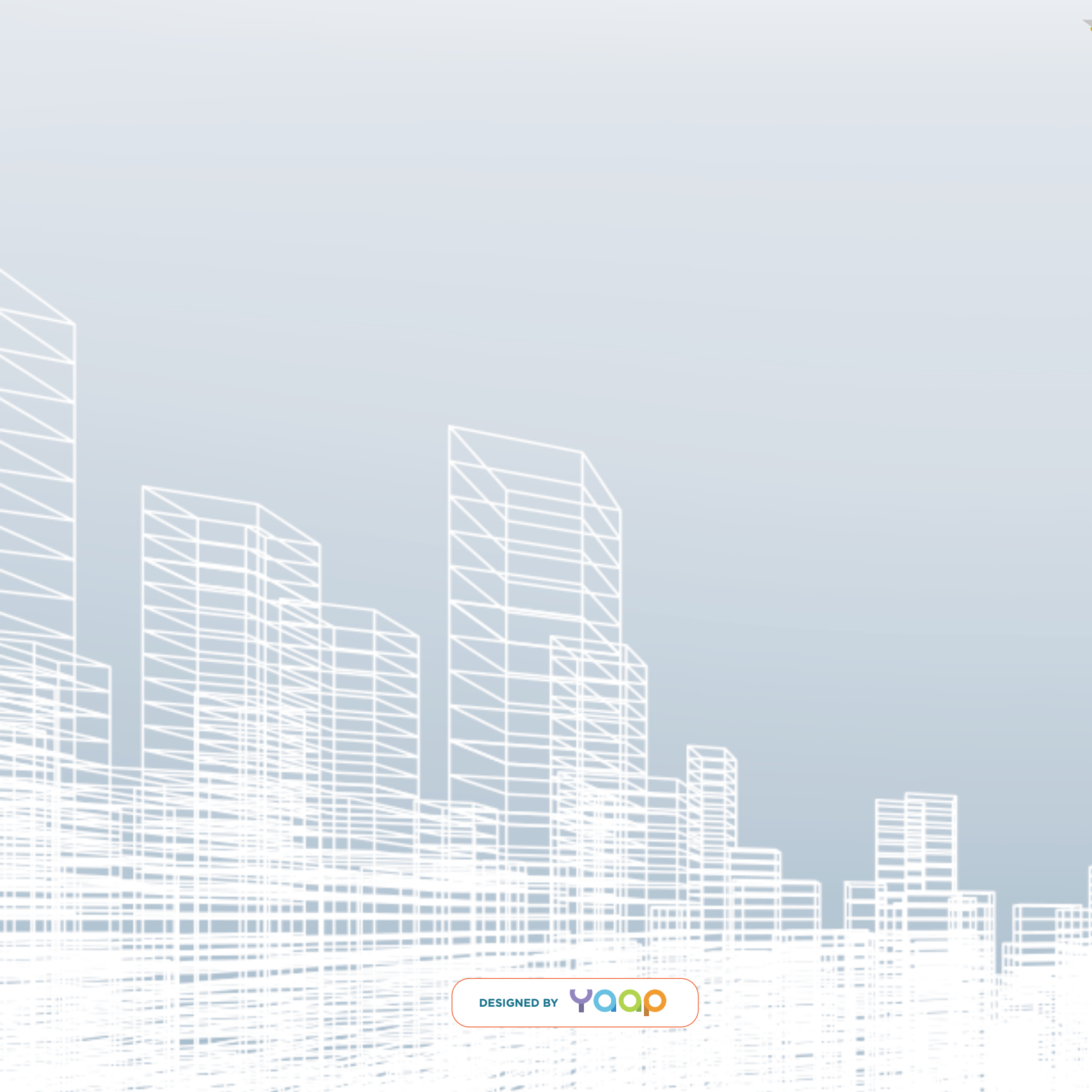
OUR AIM MAY BE AS HIGH AS THE ENDLESS SKY, BUT WE SHOULD HAVE A RESOLVE IN OUR MINDS TO WALK AHEAD, HAND-IN-HAND, FOR VICTORY WILL BE OURS.

— SHRI ATAL BIHARI VAJPAYEE
FORMER PRIME MINISTER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