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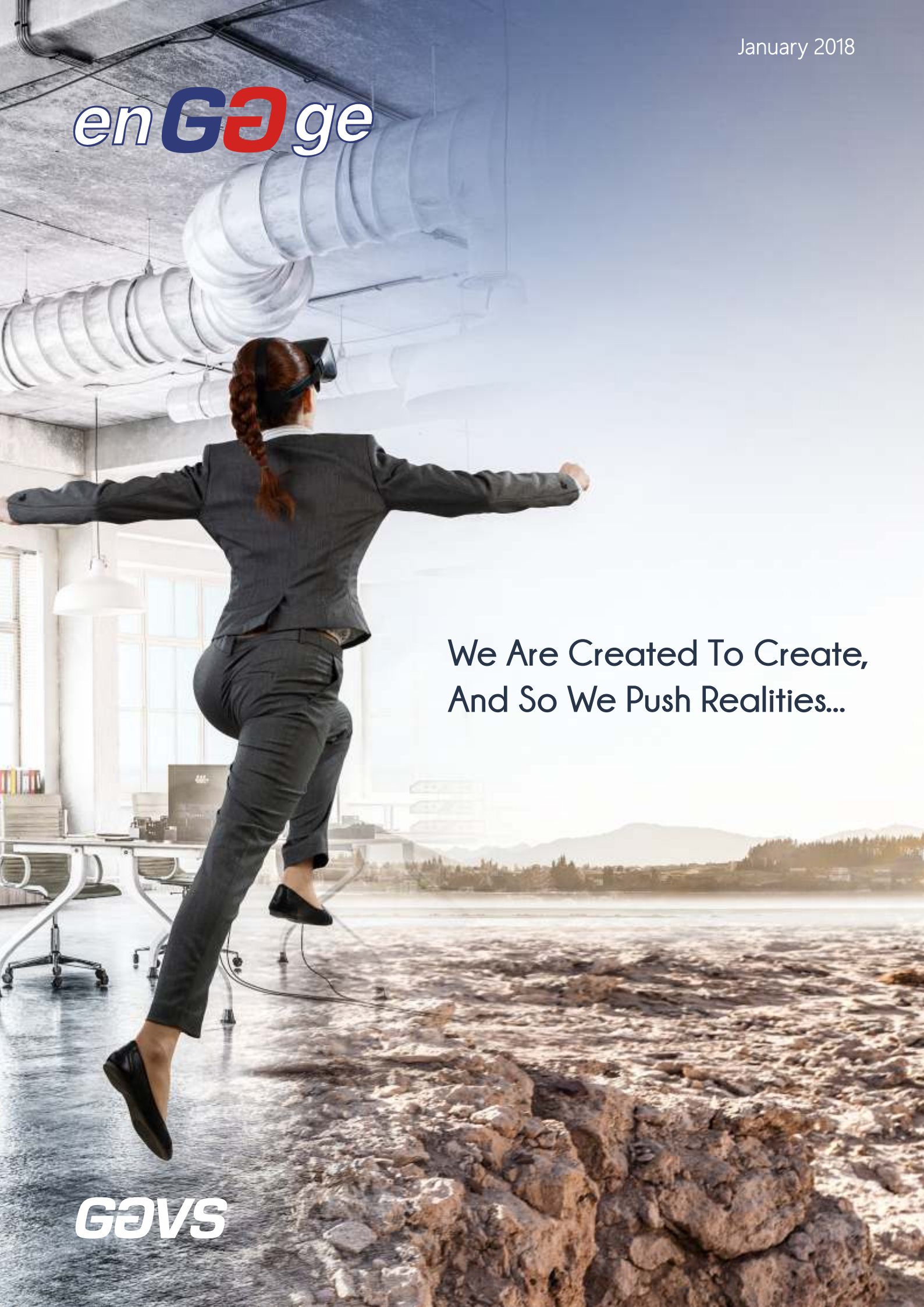

We Are Created To Create,
And So We Push Realities...

GAVS

Passive Digital to Experiential

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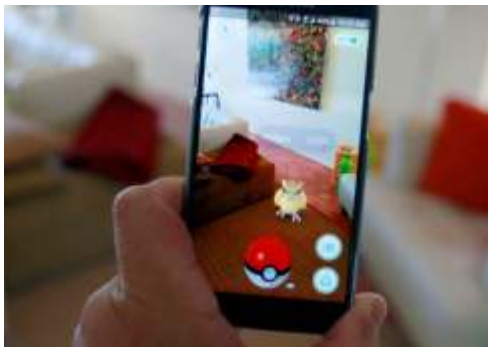
Anish Sreenivasan



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Author:
Rajalakshmi M

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Editor's Notes

Bindu Vijayan

I am in awe of technology as I witness how it gets increasingly interactive and user friendly. We decided to have this edition themed on Mixed Reality (MR), and I must say that the bunch of us in the editorial team had a lot of fun trying to understand how the technology works and how much of good it can be put to.

When I think of MR, I imagine a group of highly skilled coders and developers building fascinatingly synthetic realities and the first thing that comes to my mind is how truly open minded they are required to be; to be able to think up every rule of our world to create that precise, exact response in MR. Their creation should have objects responding realistically, moving to our will - have waterfalls like they are supposed to flow from the angle and position we are in - the spatial dimensions to consider depending on whether we are standing, sitting, lying down or flying!, graffiti drawing rooms, move furniture around, put in windows, pull out doors, break down walls, study anatomies, prevent fatal errors and accidents... that's a huge amount of responsibility on the creators, it moves outward from geometry and spaces to cognitive responses from a synthetic world. I learn of apps that talk back and respond lucidly to instructions that mean the same thing said in different ways, animations coming alive to respond on speech, synthetic overlays of objects that respond so real and human!

MR is constitutionally social and our experiences would get more and more immersive, read on to find out the magic of creating another reality. Its unfettered freedom for the creators with the responsibility to improve surgeries, military functions, buildings, prevent disasters and improve quality of work and life.

Happy Reading.

A Happy and Wonderful New Year to all of You from GAVS!

Mixed Reality: Why? Because Regular Reality Is For the Weak!

By Sourav Bhattacharya

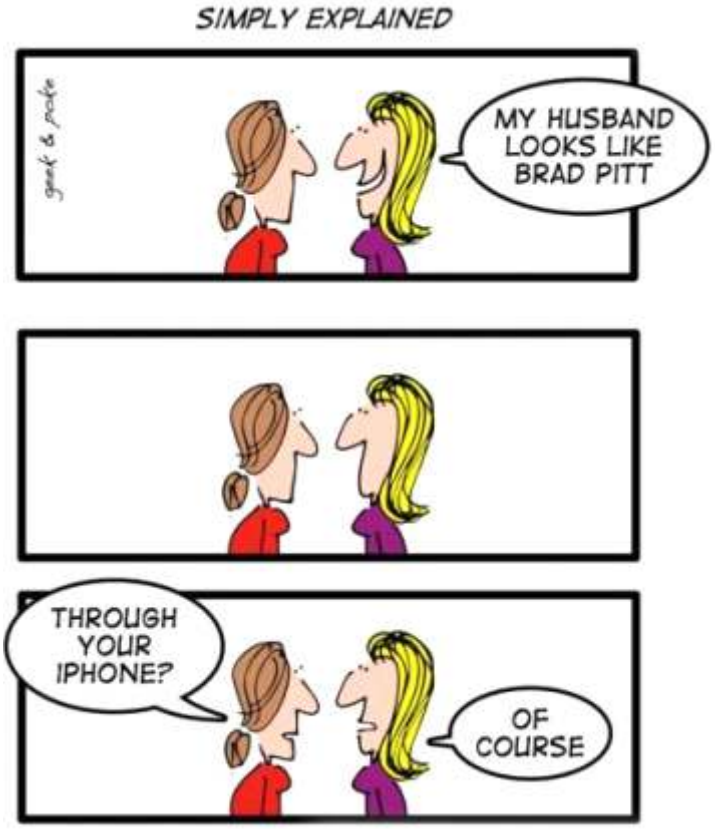
"Will you stop making stuff up! There's no such thing as Mixed Reality! I mean, how empty can someone's life be that they came up with something as corny as Mixed Reality? Did they get that bored with their own actual reality & real life that they decided the world needed another form of reality?! Seriously!"

Exasperated, my friend, who isn't from a purely technical background, threw her arms up in the air & shook her head like an angry toddler who was denied her chocolate as I tried in vain to explain to concept of Mixed Reality (MR) to her. I was having a hard time already, what with Virtual Reality (VR) & Augmented Reality (AR) concepts going straight past her noggin. I wasn't talking hardware. I was trying to make it funny and simple so she'd understand it more easily. I wanted to make her understand that MR, a term coined & propagated by Microsoft, was really a blend of real world with computer-generated imagery, and that it will someday seamlessly blend AR & VR all into one. But I could see that no matter how hard I tried to simplify & explain the concept to her, the words seemed to bounce off her eyes, quite literally, as she failed to get to grips with the concepts. That made me wonder: *Is the world really ready for the whole VR/AR/MR malarkey to go mainstream?*

So, here's me taking a stab at explaining MR to you in case you don't already know. Before time began, there was VR – Virtual Reality. It's a made-up environment where you stick a display to your face and deprive your other senses of feedback. So you can't see anything other than what's on the screen, and you can't hear anything other than the sound of what's on the screen. Basically, it's an attempt at fooling your brain into thinking that the images on the screen & the sounds in the ear are in fact what's happening in the real world. So if you were to be shown a VR scenario where you were being bored to death by participating in one of those daylong meeting, where management talks about synergy and being proactive and value adds to customers, your brain would in-fact think that the meeting was happening in real life and you'd probably be bored to death by the time the video ended. You see, reality is a funny thing.

It's actually nothing more or less than the sum of conclusions reached by a variety of unconscious inputs amalgamated by a bucket load of sensors. Whatever we see, hear, smell, touch & taste in the world, our brain intercepts these signals and turns them into a form of "reality". If you've seen The Matrix, then you'll know what I'm talking about. So VR is just trying to trick your brain into believing stuff that isn't real, is actually real. It's not real reality, but virtual. Get it?

Now comes Augmented Reality, or AR. Imagine if you wanted to see a dinosaur come alive, and walk around inside your office. Or, you just got fed up with another one of those day long meetings and wanted to see how your boss would look like with a Japanese Katana stuck in his/her head, bleeding profusely. Could you imagine it in your head? Sure! But wouldn't it be better if others could also see it? That's where AR steps in. AR, basically is a live & direct view of a physical real-world environment whose elements are augmented or supplemented by computer generated sensory input such as sound, video & graphical data. Heard of Google Glass? Yep, that was Google's first attempt at bringing AR to consumers. In case you're a millennial and you don't know what Google Glass is, because your world revolves around Snapchat & Facebook, no need to fret. Ever used a Snapchat filter? Or played Pokémon Go? If you have, you've experienced AR. In the simplest of terms, it puts virtual graphics into real-life environments. Think Pikachu popping up in your kitchen on screen.



So now you may be wondering, what the heck is this MR? Imagine if you could merge VR & AR into one single platform, so you could mix & merge real & virtual worlds to produce new environments and visualizations where physical and digital objects could co-exist and interact in real time. That, is precisely what MR is about. It would be an overlay of synthetic content on the real world that is anchored to and interacts with the real world. Imagine a surgeon overlaying an ultra sound image on their patient while performing an operation.

In mixed reality environments, users seamlessly navigate through both the real and virtual environments at the same time. Instead of residing in an entirely virtual world (VR), virtual objects are anchored into a user's real world space and augment their real world environment, making virtual interactions appear to be "real." These interactions mimic our natural behavior of interaction, such as objects getting bigger as you get closer and the changing of perspectives as you move around an object.

VR had actually hit the scene a few years ago when this company called Oculus VR unveiled an advanced prototype of its own Oculus Rift VR headset. This was back in January 2014 and 2 months later, Facebook bought Oculus VR for near $2 Billion! Soon after this, Microsoft announced their HoloLens project. It was different from Oculus VR's notion of an audio visual wrap around experience that enclosed wearers in immersive virtual worlds. Instead HoloLens' smart-glasses allowed the wearer to view the real world through its lenses, and then superimposed virtual images or objects on the scene. This was an approach to AR, but then Microsoft really hit one out of the park with MR when they used HoloLens to do a live demonstration of a NASA simulation of walking on the surface of Mars. Mixed reality demos shown on a big screen in front of a roomful of eager conference participants are amazing. For example, the Mars experience for the HoloLens makes it look like you are practically in the Star Trek Holodeck. However, there is a big problem with MR at the moment.

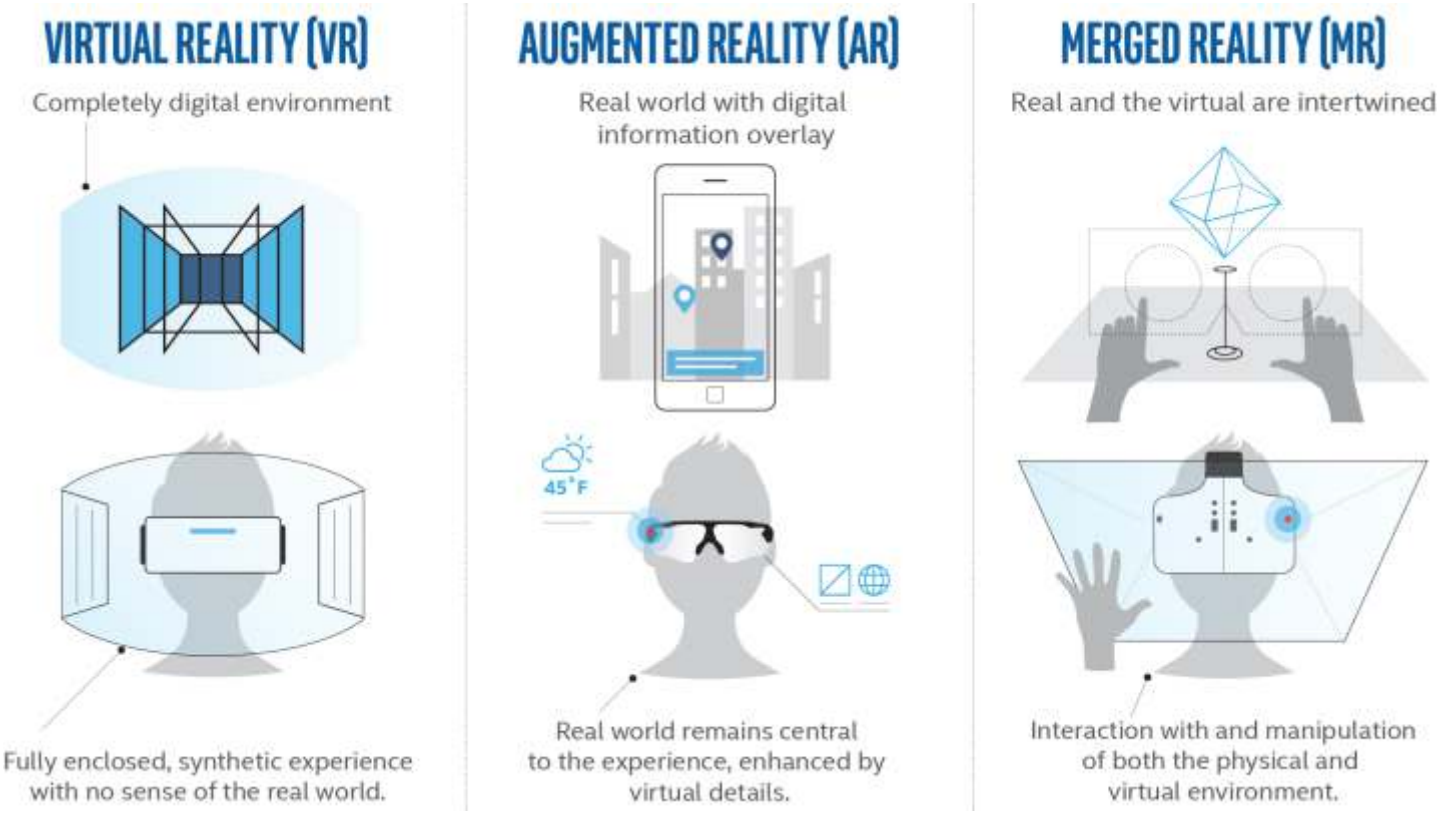
Using a MR headset isn't exactly the most wonderful experience. You'll see that the field of view is so tiny, it's like looking into the world through blacked out prescription glasses that have just one tiny hole in them. You have to constantly move your head around, like you're watching a fast paced tennis match, to be able to see most of the AR/VR effects. And it is most definitely a stretch to imagine that you've been transported elsewhere, like you normally would with a traditional VR headset. So while mixed reality enables people to interact directly with their ideas rather than screens or keyboards, yet in order to do all of that, mixed reality devices need to support virtual imagery that seems to be a plausible part of the real world and act in a cohesive way with it. However, in my opinion, most of the technology developed so far has yet to achieve that balance. MR is extremely difficult because there is no hiding the imperfections of the virtual, nor the awesomeness of the real.

Nevertheless, social media and tech geeks have been going gaga over mixed reality. Just like everything new these days. Once upon a time Facebook was all the rage. It was a happy place. Nowadays, it's just a platform for generating electronic and digital waste, filled with images of payday loan stores, political campaign signs, ugly billboards, personal branding, advertising, misinformation, utter narcissism, anger and negativity. The *faceputer* ads say that VR is already here and MR is the next big thing. And it's gonna work this time. But here's the real deal. There are so many ways that VR/AR/MR cannot fool the human brain. And it has little to do with the tech itself. In my opinion, it's more about neuroscience and our brain's perceptual limits. Call it motion sickness or "simulator sickness" or "cyber-sickness," but the nausea is real and has long bedeviled virtual reality.

The main reason is latency, or the tiny but perceptible delay between when you move your head in VR/MR and when the image in front of your eyes changes—creating a mismatch between the motion we feel (with our inner ears) and the image we see (with our eyes). In real life, there is zero lag. Information processing is instantaneous. However, no matter how good a VR/MR headset or *faceputer* gets, it will still be bound by the physics of data transmission. Even if it takes 20 milliseconds for the data to be displayed, it's still 20 milliseconds compared with the 0 milliseconds our brain takes to process information. Not just that, to be truly immersive virtual reality must show you what's in front of your eyes — but also what's to the side of them! The problem? The larger the field of view the more sensitive you are to motion.

Ever see something fly by at the edges of your vision? That's because your peripheral vision is especially sensitive to movement. Capturing movement in the periphery is key to an immersive experience, but that also means capturing it accurately is key to a non-nauseating immersive experience. Peripheral vision actually goes through its own pathways in your brain, separate from those used by your central vision. It appears to be closely integrated with your sense of spatial orientation. Because peripheral and central vision work so differently, it actually means that a wide field of view, which incorporates both, actually needs to solve two sets of problems. A flickering that is not noticeable right in front of your eye becomes distracting in your peripheral vision.

The way I see it, admitting that there are unsolved neuroscience problems with the whole VR/AR/MR malarkey doesn't mean the technology is doomed to fail. Instead, it means something far more fascinating: Understanding why virtual reality fails to fool us could lead to a better understanding of the exquisite complexity of the human brain! But the way I see it, the world isn't ready for mainstream MR. It may work exceedingly well as a concept, and some devices may be able to give us a near-real feel of the virtual world, but I guess there are many more years to go before we are able to fool non-techie friends like mine that the reality in front of them and the reality that computers can create, can be one and the same thing. So if you really want to trick your brain into believing something like mixed reality, try some wine. The *faceputer* isn't gonna cut it at the moment.



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All images copied from Google Search

Knock Knock.. Are You Real?

By Anish Sreenivasan

Imagine you are heading to an aquarium which is well hidden in the streets and you have a bunch of penguins on your phone walk you to your destination in the busy Tokyo traffic. Yes, that's a very simple and practical application of augmented reality. Mixed reality which is also referred as hybrid reality is a next generation technology in which virtual and augmented reality are merged to produce new environment and visualization where physical and digital objects co-exist and interact in real time. Mixed reality takes place not only in the physical world or the virtual world, but also is a mix of reality and virtual reality, encompassing both augmented reality and augmented virtuality via technology. In other terms, Mixed reality is a mix of augmented reality and virtual reality. It seamlessly blends the real world with the digital medium and creates a new environment where real objects can interact with virtual ones.

Mixed reality is such a rapidly emerging technology that there are products lining up for consumer use purposes. Microsoft had just built a completely functioning product, 'HoloLens' a head-mounted wearable device. Microsoft has already integrated this technology with their Xbox consoles. Another tech giant nVIDIA have made their GPUs to be VR ready for the new Microsoft mixed reality headsets.

So how is MR actually implemented?

Mixed reality is implemented through a concept called 'Spatial mapping'. This provides a detailed representation of the real world surfaces in the environment allowing the developers to create a convincing mixed reality experience. By merging the real world with the virtual world, an application can make holograms seem real. Applications can also more naturally align with user expectations by providing familiar real-world behaviors and interactions.

There are two types of spatial mapping implemented which are the 'Spatial Surface Observer' and the 'Spatial Surface'.

Practical usage:
Just like augumented reality, mixed reality will be a big deal in the entertainment industry in its earlier development stage. Later on it is expected to solve practical real world problems, especially in the fields of architecture, education and designing.

Virtual assistance: Apparently, a Skype version which is compatible with HoloLens already exists. So using this technology, a person or a technician can remotely give assistance to a customer just like he assists while being in the customer's home. The technician can draw 3-dimensional instructions which spring to life on the HoloLens, allowing the customer to know precisely how to approach and solve the problem.

Education: As per researchers, the more sensory input people connect to a piece of information, the more effectively and efficiently they learn it. With mixed reality in the scene, it is believed that more senses are stimulated in deeper ways. In simple terms, there is visual, audio and spatial stimulation all at once.

Medicine: It is noted that Virtual reality is already being used during the training of surgeons. Even though considering that it is not a replacement of the real surgery itself.

Out of the typical learning environment, surgeons-to-be can use VR and haptic devices to stimulate the human body and the tools used to fix it. Just like how a wannabe pilot has to clear a simulation course before getting into a real flight training.

Surgeons say, *"These haptic devices are so clever that they can tell the difference between cutting through bone and skin in the virtual world, and provide accurate sensory feedback in the real one."*

The haptic devices are used as a list of medical tools which include needles, scalpels and the feedback received by the user will be adapted accordingly. Mixed reality is supposed to enhance the above experience even more while dealing with real life surgeries. I know that sounds scary, but yeah it could happen.

Some future predictions:
Probably in the next 2–4 years you're going to see a variety of mixed reality glasses come out. The industry is spending many, many billions of dollars on it. It's going to be a pretty big wave of technology.

Mixed reality is going to be the user interface for self-driving cars, for smart cities, for the Internet of Things—for everything. Your robots, your drones and all the fun stuff that comes along—you're going to control them with mixed reality glasses.

Can You Have Your Cake and Eat it Too?

By Rajalakshmi M

The name "Pokemon GO" is sure to take you back to last July. The game which has a record number of downloads across both Android and iOS, made Niantic Inc a household name in a short span of time. The game went on to break many records and took Augmented reality to the next level. Its explosion paved the way for something that would blend the virtual world into everyday lives to help develop the concept of Mixed Reality.

The success of such games, and further the muted response to Virtual Reality throws a fundamental question at the digital world? Has the world come to a state of coexistence with what we know to be "virtual"? The answer to this is Mixed Reality.

Source: www.deccanchronicle.com

In a modified Augmented Reality, though you can see your Pikachu, it would look different from different angles. That means not only is the digital world superimposed in the real world, there is an actual interaction between the two. But where are we technologically in achieving this dream - the Mixed Reality?

The first to come was VR- Virtual Reality-The 3D world created by the programmer which can be explored and interacted with by a person by immersing herself/himself to achieve it. Now it seems cool and all, but where is the fun if real world and virtual world are disjoint sets. Then comes the idea of AR - Augmented Reality- Yes, A 3D programmer's world but it supplements the real world, but the user remains in the real world. And then comes the mother of all realities MR- Mixed reality- There is not just the 3D Programmer's world, but also the real world and they could superimpose on each other and interact with each other. And it could be immersive or non-immersive. Thus, Mixed Reality is a superset of all realities and it could be any point between the extremes of the reality-virtuality continuum.

The market research firm MarketsandMarkets has published a report that goes onto say that the combined markets of VR and AR alone would be worth a whopping $160 bn by the end of 2022.

They also go on to say that the size of the Mixed Reality market will also be around the $453.4 mn by the end of 2020. The current enterprise use of Augmented Reality includes the areas of visualization, training and interaction. Consider the use of AR by AccuVein. They use the technology to convert the heat signature of patient's veins into an image that is superimposed on the skin, for easy location of veins by the clinicians. The likelihood of a successful needle stick on first try has improved by around 3 times and the need for further assistance has reduced by 45%. The field of training has had a sort of revolution. Real-time, on-site, step-by-step visual guidance on tasks such as product assembly, machine operation and warehouse picking has helped the manufacturing employee walkthrough the processes in a 3D way instead of the usual 2D schematics or videos. Boeing reports that trainees completed the work in 35% less time when AR was used to guide them through 50 steps for assembly of 30 parts in aircraft wing. GE has made its factory workers test the interactive voice commands of AR and has reported a productivity increase by 34% in its tests.

These are the small successes with just superimposition of images. Now imagine if there was context. Imagine if a person is training to become a clinician had access to the virtual vein of the actual vein being targeted by the clinician at AccuVein and could see in real time what was happening? And if the trainee could stick the needle and then see how it all went? What if the Boeing trainees could train initially just with the virtual parts and see how the virtual aircraft flew in actual reality? And maybe to the miner who was standing 100s of feet down needed some help with the mining equipment. If an expert could get a remote access to the real time virtual mining equipment and then recommend the action? And what if the floor supervisor wanted real time visualisation of performance of equipment on the floor? Maybe all he needs to it touch a few buttons on the equipment panel and 3D representation of its performance? And what about cadaver less medical schools? And what if Sherlock Holmes could recreate his mind palace in his room? This is application of enterprise mixed reality.

The technology for mixed reality is still at a nascent stage. It means immense progress in the fields of Image recognition and Simultaneous Localization and Mapping(SLAM). Mixed reality calls for the need of advanced image recognition for object recognition to identify the environment of a user so that he/she can interact with.

It also needs to function in all known or unknown environments by continuously creating their maps. Thus, a real-time understanding of the real-world environment surrounding the user without any lag is needed to create the perfect co-existence of the needed digital and physical world. Above all this needs to be complemented by the hardware and processing power. Today Microsoft HoloLens and Meta's Neta Pro have taken some baby steps in realizing the potential of Mixed Reality with its take on virtual overlay, sensors tracking physical world, inertial measurement units and processors.
The world has a long way to go before realizing the complete potential of mixed reality. Mixed reality lets the world have the best of both virtual world and real world and thus helps the world realize its digital 3D potential. For the world to embrace the technology completely more research and development in the above enablers can help in faster commercialization and thus leading to bring economies of scale. The poet in me says it will be the fulfilment of the dream of having my imagination in actual reality.

As we march ahead in this journey of embracing a vision within the reality, questions arise about the mere meaning of existence. We exist in an environment with its own problems and questions. Not only can we live in a world given to us by the red pill but we can further bring that world into Stark Tower. But let us not need the totem, for reality must be embraced in the journey called life. But if you are the one whose totem never needed to be taken out, you my friend have had your cake and eaten it too!!

The Talent Mix!

By Shalini Milcah

Imagine little Tim, in a very dark tunnel and there's a tiny little light at the end of it, which appears like a single dot. Although Tim moves closer towards it, it doesn't change. Then he moves further away from it, but it still appears the same. It's just the small white light; always. Suddenly 'brilliant' Tim decides to unusually move right and perpendicular to the dot, instead of moving forward and backward as he did earlier. Now Tim realizes that this dot is actually a line, and he begins to see the real length of it. He walks around the dot 90 degrees and ends up staring straight at this bright, white line now. Eventually, Tim has moved from the one-dimensional view (as a dot) to a two-dimensional view (a line with length) by simply moving around. Now, our super-exited hero doesn't stop there, he gets another brilliant idea! Instead of moving forward or backward, left or right, Tim decides to move up and down. As he ventures up an imaginary ladder, he realizes that this is no line at all, but a square with extended width. Astounded, he realizes that this little dot in one-dimension appears to be a dot, then moving on to a second-dimension, it becomes a line and then the third dimension being a square with two sides. Isn't there a fourth dimension now? Tim thinks just as you. Yes, now it's perfectly possible for a cube to exist but which direction could little Tim take to view such an object? He should travel along a new direction, may be, in or out (depth-wise) but he sure thinks that it's practically un-achievable.

Tim, in his story tells us that we are trapped viewing the cube in our three-dimensions although an object of four-dimensions indeed exists. In addition, if Tim can imagine a point, a line, a square, and a cube, and the only reason he couldn't imagine a fourth dimensional object is because he has never seen one. We can't call it Tim's fault, for he hasn't heard of 'Mixed Reality' yet.

Wiki says, "Mixed reality is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects coexist and interact in real time." Isn't that mind-boggling? In 1989, Jaron Lanier coined the phrase 'Virtual Reality' that could simulate a user's physical presence in an imaginary environment, and he created the first commercial business around virtual worlds. Later on, in 1990, a former Boeing researcher, Tom Caudell came up with the term 'Augmented Reality' that augments various sound, video, graphics and other sensor based inputs on real world objects. All these reality technologies lie within the broader ***mixed reality*** spectrum, between the real and virtual world. Thus, the independent concept of mixed reality (or hybrid reality) combines the best of both virtual and augmented reality, covering all possible variations and compositions of the real and virtual objects.

Therefore, it can be understood that, in a mixed reality environment, users can navigate through both the real and virtual environments at the same time. When both the real and virtual worlds are merged together, new environments and visualizations become possible where physical and digital objects coexist and interact in real time. Such interactions could possibly mimic our natural behavior of interaction, such as objects getting bigger as we get closer and the changing of perspectives as we move around the object.

Mixed reality takes place not only in the physical world or the virtual world, but also is a mix of reality and virtual reality, encompassing both augmented reality and augmented virtuality via technology.

In healthcare training, medical mannequins are used to generate unlimited training scenarios and teach empathy to healthcare professionals. Additionally, the surgical and ultrasound simulations are used for their training exercises. Today, if a brain surgeon used Microsoft's HoloLens, ever wondered what all he could possibly do with it? He could send out some MRI images to his colleagues indicating the problematic areas for discussion before the surgery and also he can view the holographic image of the patient's brain in the room, vibrating in the size of an elephant to clearly see where an intervention needs to be made thus he could easily figure out the details of the operation before-hand. So, surgeons could actually use these holograms to prepare for complex surgeries or even support the operations themselves.

Coalescence, a wearable mixed reality defense training for air, land and sea domains, can literally merge the trainee's real world view with a synthetic environment providing a seamlessly enhanced, mixed reality. This mixed reality provides trainees with immersive and engaging training scenarios for faster learning transfer and more effective training

“Can you see me now?” one of the first location based games played online along with the bot-fighters won the Prix Arts Electronica in Interactive Arts. This chasing game for Android and iOS works with up to 100 people playing online at a time, with players who can exchange tactics and send messages to Blast Theory, its developer. It’s one good example of a mixed reality game, where performers on the streets of a city use handheld computers, GPS or other devices to chase online players who move their avatars through a virtual model within the same city.

Let's imagine the future! Think we have a device that could virtualize all of the technologies we use now, and also bring down the cost of ownership to literally zero on all our day-to-day life's devices. That's what mixed reality is going to offer. The ability to take all our day-to-day devices, virtualize them and summon them.

Synthesizing Our Reality

Bindu Vijayan

I was fascinated seeing a video on product unveiling thru MS Hololens, the digital mapping of the room and how the room fills with holograms, the next gen hand tracking and I went 'wow'! The lady in the video moved the holograms across the room in real time and space, the boxes she moved reacted using physical space simulation just exactly how they would in our real physical world.

How much of the synthetic world are we allowing into our lives – there is another superb youtube video 'envisioning the future with windows mixed reality' where an assistant comes up and talks to Penny asking her if she is fed up of trying to set things up, and wonders, 'should we start a panic?'. The same assistant then goes up to Sameer, her colleague who is in another location and says 'Penny needs your help' which has Sameer appearing in front of Penny as a 3D hologram helping her with what needs to be done. The collaboration is uber cool, they are doing a design together in mixed reality.

Their collaboration is so neat and visually fascinating – Penny picks up an eyedrop from the physical ceiling to graffiti the wall, Sameer mulls thru the possibility of adding a cool bamboo fountain in the room. Windows bring spatial sound, articulate hand tracking, bots help with businesses, with 3D assets, and I quickly read up how MR can enhance our real lives.

Mixed Reality offers one that freedom to move, interact and explore beyond our real-time space, with a fascinating and whole immersive experience. Our body motions are called 'translations' which offers an entirely different dimension to our experience – one gets a different view when seated, a different view when you are standing... I saw an anatomy lesson in MR; it had the student taking the lungs out of a body, probe a lobe, see its minute details, choose a skull by touching the air, split it into several fragments – the temporal bone, zygomatic bone, occipital bone, parietal bone.. what a fascinating way to learn and memorize! Especially for people who are oriented to visual learning. The images are so clear and precise in depths and other dimensions

All of us have in this magazine have tried to explain MR the way we understand, and its interesting to see how each one of us have interpreted the fascinating technology. Its intriguing to see how a pair of lens understand the surfaces of the room - allows 3D hologram images to be placed on those surfaces to give us the immersive mixed reality, the point where polar ends (the digital and physical world) of a spectrum meet, and the more we work on the technology the more immersive it is going to get.

Research has developed a method for translating two dimensional medical images into 3D augmented reality models so that surgeries can be planned with greater ease and precision, and the technology helps with navigating around organs.

With the technology becoming more and more affordable, most businesses would be aided with some type of immersive technology, and as the technology builds, lending virtual overlays on almost any business from a buyer's perspective, it can also help businesses by being able to detect faults and errors and save dollars; in other words, prevent disasters and losses.

Who would have thought we would achieve such huge paradigm shifts in our realities? As digitization grows and strengthens, synthesizing realities aid us perform better as physicians, teachers, in the military, construction, mining and what not.

With 5Gnetworks, compute functions on the cloud and so on the technology should be able to get a lot cheaper, and that means reach almost everyone soon enough.

A firm called Scopis has built the first mixed reality interface for surgeons to make spinal surgeries minimally invasive. They claim that they help improve accuracy and speed of surgeons because the HoloLens shows them precise angles and positions of the equipment.

Just imagine a doctor being able to see a holographic image of her patient's brain, much larger than the actual size which helps the surgeon to determine the exact spot that needs intervention.

I would never have conceived of a reality that projects synthetic things into your reality, to make life easy. It is amazing to think of the huge amount of work that goes into designing the 3D object, including reactions and behaviors to make it real and behave as how reality in the physical plane would be.

With this new reality making the perfect overlay on our physical reality, we can achieve several things inexpensively, for eg. network teams across different geos, work together, build designs together. The interaction seems so perfectly natural that people don't feel they are interacting with a digital environment. With gestures and voice commands, teams existing several thousands of miles apart are able to work together on the same building project, expert physicians can consult on complicated surgeries across miles, it is a world so immersed with connectivity.

That's huge responsibility for those who are building the technology, isn't it? They are actually designing how people will experience in future, and what does something like that entail? It also means huge freedom to their creativity with a huge array of possibilities and chances to see their visions made into realities. They are building on human senses and it can't get more complicated than that; the spectrum is so very vast with human tastes and preferences, and creating experiences for everyone across the spectrum is a very demanding ask. To have to translate positive reactions into the synthesis, deepen it further in coding, wow!

Where is all this taking us, I sometimes wonder, we synthesize reality, synthesize our understanding, how true when they say that our minds will always fit what we want it to fit, the key to infinite creativity....

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All images are from google

Mixed Reality? Nahhh… "BANG BANG"? Yeah!...

You Read That Right! Bang Bang, it is.

By Dibin

Nonpareil stunt sequences, dancing on the streets with *Miss. Harleen*, and murdering dozens in a blink of an eye. Didn't do well in the Box Office, but that was one *Bang Bang* treat on 2014 Diwali, for all Hrithik Roshan fans around the globe. Crazy as it may sound, I remember watching that movie for 2 continuous shows at Jazz cinemas on its first day of release. Yeah, I get it - I'm a fan since a kid and will always be.

Oh wait! I totally forgot. It's not 2014 anymore and I'm writing for enGAge now.

But I want to talk about blasts and bang bangs. Isn't that all entertaining? Especially if you are a fan of Michael Bay? I know I know. You would be like Hell Yeah!!

I agree with you too, like when there is a blast in a movie or when its Diwali/New Year, we would love to hear all that, but I doubt it would be the same if we were "in" a blast!

With the new year coming up, I would like to talk about some blasts and bursts which may happen in our lives and can be avoided, if precautions are taken.

Now you may be thinking, "What kind of Blast or Burst is he talking about? I do not live in a War zone nor do I have any plans to do so. So how will I possibly get into a blast scene?"

The answer to that, is sadly Yes!. You may get into it, if you don't take the right precautions.
Let me start with something basic which we do in our everyday lives. "Driving".

You, me and everybody we know, drive vehicles to commute. And with vehicles, accidents happen. And accidents happen due to several reasons.

Allow me to narrate something that happened in October 2016. I'm sure the people close to me know this already, but anyway...

It happened right after, when our HR dept., finally decided to make me a permanent employee of GAVS from being a retainer for 6 months. And with all that joy I went and gifted myself a brand new super sport motorcycle from Yamaha called R3. Though getting a Ninja ZX-10R has always been my goal, for now, all I could get was an R3. Well R3 is not a bad motorcycle you know. The 320cc twin cylinder mill in that is something. But I would have to admit that the rest of the bike was not that impressive. Being a 'track guy', I hated the diamond frame, the not-so-rear set foot pegs, the mediocre MRF tires and what not. Other than that, the bike would go well as a city rider and tourer. Again, no ABS though. Ughhh.

Well, keeping that aside. The only motive of me buying that bike is to take it to a track every weekend and do what I always love to do the most. Which is... Cornering.... cornering... and cornering... did I just say that three times? Never mind.

So, as planned, I took my bike to the only track available in Chennai, MMSC at Irukattukottai, which is close to Sriperumbudur for doing my weekend track practice. It was a few days before Diwali and I could hear the fireworks all around every now and then.

Everything went well till my 11th lap when I had to meet with an unfortunate accident at 9th corner(C9) which was totally unexpected. And trust me, with almost 15 years of riding, I had managed to not have a single serious accident, at least not one in the last decade. All I remember was that I lost total control over my rear in a corner at 3-digit speeds. But fortunately, the only thing which saved me that day was the tactics of safely ejecting myself from a bike which is about to crash. Minutes after, when I finally got over the shock, i realized nothing majorly bad happened to me, but I could see from a distance that my bike had crushed into the barricade and the oil was leaking all over the tarmac. In no time I was taken to a hospital and didn't have much time to think about what really went wrong with my bike. I had few scratches and a ligament tear in my left leg.

After a day, I was informed that my bike was taken to a Yamaha Service center in Sriperumbudur for repairs. I took a cab and rushed to the service station to see what happened. Like every other enthusiast, my bike was everything to me. And I was more worried about its condition than mine. When I reached the service station I went straight to the workshop, where I could see the bike via a glass wall.

That scene there... almost broke my heart and got my brain fried for a moment. With my hands on the glass, all I could do was, stare at the gruesome scene.

I couldn't find the bike's front and the engine was clearly broken. The feeling is equal to seeing your loved one in a critical state at ICU. Even worse than that, I thought, in my case. All those images of me touching the bike for the first time flashed at blistering speeds and I became all woozy. It's still almost impossible to erase that memory from my head.

[Actual pics of the bike at service station that day!]

The service engineers stated that this was one of the biggest crashes they have seen, where a sport bike was crushed to this extent, just in a week of purchase. They were surprised to know that I was the one who drove it and I'm all fine and walking.

Then I asked the service engineer the million-dollar question, *"So, what really made the accident happen? I'm sure there was something wrong with the bike"*

He replied, *"Sir, Burst."* I was little confused, because it's a brand-new bike and I asked him again *"What burst?"* He replied, *"Your tire, sir"*.

And then he took me close to the bike and showed it to me for the second time, I could see that my rear tire had burst and that was the reason for my crash. I didn't say anything after. I went and sat in the reception sofa and was thinking of everything I was taught about riding precautions.

"You knew it could happen, you knew it could happen to anybody, anytime. Yet you chose not to do anything about it.

You knew your tire pressure was way too low than it should be, you knew your tires were not meant for track in your 1st lap itself, yet you didn't take it to the pit.

You knew the bike was not ready, yet you forced it, to its limits.

You talk a lot about safety, but you were not wearing your full riding suit that day.

You knew half way that you forgot the riding boots at home. You could have gone back and taken it. But you didn't.

You were lazy. And now you have to pay for everything "

And trust me a lot of these thoughts were racing in my head and I couldn't focus on anything for a month. Luckily, I was on medical leave for 3 weeks, so it didn't affect my job. Following that, my parents technically gave a red card to my motorcycle riding passion, by forcing me into believing that motorcycles and India doesn't go well together. Can't blame them, they have seen a few accidents within the family. Then instead of repairing the bike further, I had to sell it through the dealer which was even more painful to do. I tired my best to not remember about that incident again and by April 2017 I bought a new car and officially put an end to my motorcycling career, as per my parents wished.

Months passed and on a fine Sunday, I was resting and watching Malaysian GP. That's when I got a mail from our VP – Products, Mr. Chandra Mouleswaran, with a title "Need an IoT solution for Tire Burst." At first it got me thinking *"Nice. I wonder which client needs a IoT solution for Tire Burst"*. I was convinced that this should be a solution requirement for some RFP. I then replied with some links to TPMS devices and gave a small write up about how these devices can save us from Tire Burst. He replied telling that he wanted to meet me on Monday and discuss more about it.

Next day I met him first thing in the morning, and asked about it. Only then I came to know that this was not for some RFP, but he was genuinely concerned about the deaths caused because of tire bursts. I was also shocked to know that there were recent accidents due to tire burst amongst our colleagues; this was the main cause of 33% of deaths every year all over the world. Little I could do, in that room that day, as I'm no tire expert, I said, *"Chandra, give me some time, I will get back to you on this with a solution"*.

I went back to my seat and started to think about Tire bursts once again. One part of it was little depressing that reminded me of my bike, on the other side I really wanted to give this a try and collect every solution for it.

I went home and spent the whole night reading articles about tire burst from the internet and took good notes of everything mentioned. But I still had some doubts, so decided to visit a tire showroom before concluding.

Slept for some 2 hours that night and went to Yokohama tire showroom in Thoraipakkam next morning. That showroom is owned by a friend's relative from whom I purchased tires for my dad's car recently. As he already knew me, he greeted and asked what he could do. I explained that I'm there to take some precautionary notes against tire burst, for creating awareness. Though he was a busy guy he agreed to help, and I didn't want to eat too much of his time. I jotted down all the points he mentioned, thanked him and left for work from there.

Upon reaching work, I quickly consolidated a cheat sheet listing all the right precautions to be taken and sent that as a mail to Chandra. He was really happy about it and asked if this can be made as an article which can be shared with whole of GAVS.

I was thinking to myself, *"We are making our customers a Zero Incident Enterprise, why can't we make our self a Zero Accident Enterprise?"* and wanted to do it right away. I approached Bindu (editor of enGAge) with my article and asked if this could be published in some way, and after the *"Censor Board approval"* here it is. :)

I would like to convey my special thanks to Chandra Mouleswaran for being my inspiration behind this article and Bindu for making all necessary efforts to get it published (though it's not on Mixed reality).
Attached the Tire Burst - Cheat sheet with this, do have a readout. Would be happy if it helps someone, after all that was the whole intent.

Tire Burst Cheat Sheet

Tire bursts can happen due to combination of several factors. Below are the top causes and its solution:

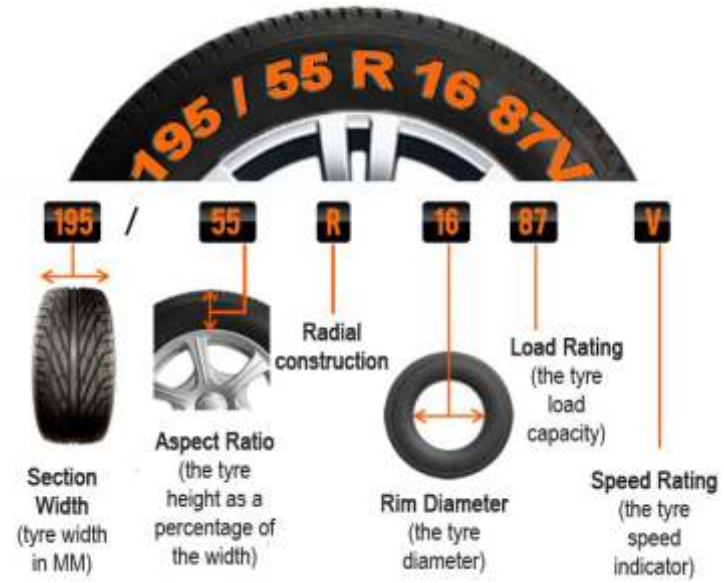
- Over Speeding
  This has always been the top cause of tire bursts, and a reason for several other causes here like High temperature, Tire Collision leading to structural damage, etc.,

  We are all aware about staying safe by driving within city/highway limits, but there is one another crucial thing which most of us fail to notice is the Speed rating of our tires. Every tire comes with a speed rating ranging from N till Y molded to it and it's recommended not to go any closer to its limits, no matter how new the tires are.

  The next question in your mind would be, "How do I know my tire's speed rating?". It's simple.

  For e.g.: Tires come printed with specification like this: "Apollo Alnac 4G 195/60 R15 88H".

  Apollo – Tire Company; Alnac 4G - Tire Variant; 195/60 – Width and Aspect ratio; R15 – 15inch Radial Tire; 88 – Load index (which means that the tire can individually can take load of 560 Kgs); H – Speed rating (which is 210km/h).



- Dying Tires
  Wear and tear are something we can't avoid, no matter how good we maintain our tires. Checking the thread level of tires are crucial, not just to avoid Tire bursts but for everything to do with traction. Under normal driving conditions, tires start to wear out in an alarming fashion after 3years of its fitment, so it's recommended to go for a tire change or to have the thread levels checked every time you hit the highway. Thumb rule here is, your thread level should never go below the thread wear indicator level.

- Low pressure and high temperature
  Driving at high speeds, in one of those summer days, with a worn-out tire and low tire pressure? That's a deadly combination for a tire burst to occur and one of the major reasons. It's always recommended to have a check of your tire pressure every week and the temperature during long drives in highways. Every car comes with a recommended Tire pressure rating, which is usually pasted as a sticker in the chassis near to the driver's seat. It will have the details related to your tire, its size and the cold pressure it should hold, in respect to the load. Always stick to that.

  If you are thinking, "How do I check my tire pressure every week and the temperature during my long highway drives?". There are solutions for it. It's called TPMS (Tire Pressure Monitoring System). The acronym may sound like an expensive setup. But it's not. There are aftermarket Bluetooth TPM systems available in ecommerce sites like Amazon, Flipkart etc., for a little 3k to 30k it will give you accurate Pressure and Temperature of your tires in real-time.

  Note: Almost every high-end car manufactures like Mercedes, BMW, Audi, Porsche etc., have this feature by default.

- Over loading
  Just because your car has space to hold 7 passengers in the place of 5, it doesn't mean you should. Because the weight of your car and the passengers are eventually distributed to your car's tires. And like we already discussed, every tire comes with a load limit it can take, anything above that with under inflated tires and a couple of pot holes, becomes a mortal mashup for your tires to blow up. It's always suggested to drive your vehicle with the recommended load capacity and tire pressure. As discussed before, it's always mandatory to fill the tires with appropriate tire pressure as respect to the load (No. of passengers/luggage) and maintain that thumb rule every time you take your vehicle for a drive.

- Faulty suspensions
  A faulty suspension can lead to uneven tire wear which in turn can result in provoking other causes of tire bursts like Dying tires. When our car becomes old, we start to get troubles from different parts of the vehicle. Some of those issues are visible, some are audible(rattling), some hinder performance and some don't give any warning at all. Luckily an uneven suspension can be visually identified. If your car is sitting low in one side, or if you spot any difference in ride height in one side, its most likely that the suspension is uneven and need to be calibrated immediately.

- Manufacturing defects
  Tire manufacturing defect is not something usual. Tires manufactures go through stringent norms in maintaining the quality of tire made and all those tests are government compliance. But there are also some slight chances of getting faulty tires from the vendor, so always have a thorough check before buying your new tires.

  If all the above conditions are checked, we can be sure that we don't experience a tire burst. But what if you took your car in a hurry on a hot summer day and forgot do the inspection, what if you had to drive your friend's car which u have no idea of its condition and a tire burst happens during the drive?

  Tire bursts are scary, and you should know how to handle the situation if it happens to you.

  Do's and don'ts which you must follow when you go through a Tire burst:
  Do: Take your leg off the accelerator pedal and let the car slow down on its own.
  Don't: Applying hard brakes
  Do: Keeping the steering wheel firm and try to maintain a straight line
  Don't: Losing control on the steering
  Do: Pullover to the side gradually, when the car is at safe speeds (<20km/h)
  Don't: Trying to pull it to a corner immediately

  And once you are safely parked, turn on your hazard lights and put out the reflective triangles (if you have them) to warn the other drivers on the road about your break down. Grab your car's user manual and call the road assistance number listed, to fix your tires. Remember, even if it was just one tire for which you already have a spare, its suggested to not try the DIY and wait till the road assistance arrives to your location. Because you will never know about the rim damage which may have occurred during the incident.

Happy New year to all GAVSians!
Have a prosperous year ahead and ride safe.

Reference:
All images are from Google

Technology is best when
it brings people together

- Matt Mullenweg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