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FUTURE OF WEARABLE DEVICES USING IOT SYNERGY IN AI

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***Abstract*: AI and IoT are the two terms which are predicted to be the future of technology; however they are being emerged in their new forms day by day. Various sensors are placed in the devices, which are then made light and wearable for humans, these devices keep a track of various aspects of human life.Wearables have given a new face to the healthcare of humans.The proposed research has been done over the wearable devices concerning health since they track steps, provide GPS facilities, find out calories burnt etc. but the breach which should be worked upon to make them much more useful is to set a system which not only calculates the amount of burnt calories burnt but also gives the ways to set yourself at your best health by providing you the guidance of your food intake to regulate the amount of the needful components of your health.**

Keywords: AI, Internet,IoT,Sensors ,Wearable Devices

I INTRODUCTION

AI and IoT takes a step forward in every aspect of human life, the wearable devices are one of the insane creation of technologies which nowadays has become the need of each human, his associated health, safety, and almost every aspect of his life. Wearable devices took off their journey by being known as the step counters and amendments are still being performed to make it much more worthy.The features of wearable devices of present times,includes accurate working in modules, light weight and handy hardware, better user interactivity, and well-defined connectivity.

Fig 1: Wearable technology enabled by IoT and AI [11]

AI and IoT are the elements of wearable devices making its market to spread across in all directions, in all aspects of life and environment.[9]IoT and AI enables wearable devices for all, in all fields, some places which are on spotlights are:

I.I *AI and IOT in Wellness and Sports*

It can easily be observed that many of the wearable devices rely on the existing assistants like siri, cortana etc. however, these devices can be programmed with these assistants but the results will not be so productive or successful. An example can be Sensor based fitness tracker which has been a huge success nowadays, this has been a smart side of the wearable devices coming into play in the form of a sport accessory, IoT and AI together gathers the data and become a virtual coach and advisor for the routine analysis. It can be said that a virtual sensor, AI and IoT based coach provides guidance for actual, performable, oral and video based feedbacks and judgments that will enhance once health and wellness with an effort to lower down the rate of injury.

I.II *AI and IOT in Healthcare*

Devices based on IoT and AI are predicted to increase the life expectancy ratio in the coming future. Wearables are said to be of most use to this field, it is the easiest and a comfortable way to gather the data, observe their health and communicate to them in the meantime. IoT and AI enabled devices and tools are changing the face of medication via their functions and forms. For example, armbands, or ECG trackers, behind such devices relies the hand of IoT and AI platform, which are the essential components for data generation, gathering and management.

I.III *AI and IOT for Improving Safety*

Coming further in the field of healthcare, wellness and sports are one thing at a particular level but providing safety via means of AI and IoT are generating new standards. AI and IoT emerged in the field of bicycling, running, motorcycling etc. in an efficient manner ensuring safety for the riders. An event happened that fostered the growth of IoT and AI in the field of safety. This idea of IoT and AI in

the field of safety in the form of wearable devices was proposed by Jeremy Wall. He came with an idea to provide safety via using these two technologies in a handy manner [11].

After the innovations of such devices it can be observed that the accidental rate for the riders has been reduced by $1/3^{rd}$ ratio.

I.IV *IOT and AI Wearable for Everyone*

Not fixing the limits to humans AI and IoT empowered devices has given a fine edge to the four legged pets or animals too. Various wearable devices are used for the animals too, they are being used in farms or by the possessive owners of the pets, they place these devices over the animals and keep a track of their health, location, behavior etc. moreover, it provides complete package for the animals too.These systems generate a report for their mental or physical stress and prevent anxiety.

IoT and AI technology have generated, whistles, Fitbit, advanced cellular help services, activity tracking, etc. for animals.

All of the fields given above are enough to the saying that AI and IoT are setting new standards for technology and various other devices. [15].The proposed paper focuses on how the wearable devices will grow further in future by using the platform of IoT and AI.Since wearable devices are the new lead for the technology used and made available for all.

II LITERATURE REVIEW

IoT is developing a huge market for itself at a very fast rate it is predicted that it will gather a market in trillions before in the end of its transformation decade era. From a scientific point of view, the focus shifts over the amount of data held by IoT has become the largest type of data over the internet from past few years[1] and AI can affect the basis of designing and development of IoT at the highest level[2]. IoT and AI will remove the distance between the manufacturers and users. The scenario shows a picture where artificial intelligence based on big data gathered by IoT will bring the user's need through the internet based on their requirement parameters[12]. In the field of IoT,embedding and transmitting data to the manufacturers using internet leads to a direct connection between power device manufacturers and users. In the field of AI, the manufacturers will be able to provide the satisfaction to the users respectively, proportionally leading to a significant increase in business opportunities[3]. IoT when reference with AI provides the methods to transform the solution of complexity into the solution of the organizations market providing them high performance characteristics. AI provides algorithms that optimize the needs of IoT design to be concentrated on the customer's need. AI provide IoT an ability to access and handle big data and identify customer's need accelerating IoT based developments[2].

The wave of AI and IoT has every person's interest in their fields moreover; these two are the words which are expected to set new trends for technology. The power in the hands of AI and IoT arises a way towards a communication away from the boundaries, a society with human and robots and of course a safe and secure networking environment[10]. AI and Robotics by collecting data to analyze and predict issues far beyond a human reach, and will build a sustainable social foundation[4].IoT no doubt brings profits to almost each area of work consider it retailing or transport, it ranges from healthcare to public security and safety. This newly emerging trend is promising a future with expanded opportunities [5]. The fields related to human health, human tracking, virtual assistant, virtual coaches etc.al are a face of technology in future. An author Ray Strong says that "In the new trend of IoT number of technological devices have come into play to find out and measure various health parameters. With the increasing in amount of options in the wearable devices consumers tend to be confused among which one they should choose." This process of choosing the most favorable device goes on a process of finding out that what risk is possessed by the individual by looking at the medical history of the patient. This data in last is treated by various devices optimized and IoT solutions.[16] [6].The new era of augmented and refined medical care will give demographic instructions and information to manage the main issues, along with both less time consuming and more time consuming lives into quality life[13]. AI and IoT techniques will take the level of healthcare to another level and will reduce the amount of training to be given on the learning model which will further reduce the stress and provide background knowledge own its own by converting big data into smart data using AI and IoT.[8]The authors Paul Rad et.al. had said that the wearable devices based on the platform of IoT and AI are even doing wonders in diseases like Alzheimer. They say "Diseases like Alzheimer aren't treated or detected at an early stage via any machine or so, the patient tend loose his or her memory at a high pace and in the end die with pain, an idea has been made to detect diseases of this sort at an early age from taking an idea over the Cancer detection. An attempt has been made at a high level to generate the devices which are based on IoT and AI platforms which can detect the disease at ease, the patients cam themselves detect that they are at the verge of facing this disease and they should be ready to get its treatment."[14] these are the results and observation of a few researches that prove that IoT and AI has done a lot in this field and have a lot to do in all fields [7].

III PROPOSED WORK

Wearable are everywhere surrounding us, serving almost every field that exist. One side it enables health and safety, on other side it becomes a wearable computer in the form of smart watches, many more examples exist in the real world. AI and IoThave made them standing at a level that is taking these devices on the highest peak.Wearable devices produce results in relation to tracking, healthcare, step counts, securing and safety etc. but what if all the devices available with you transform itself into a one single device so that you can do all the things at one place and at any time, this is the work proposed in this paper. The idea relies on the fact that wearable devices are available on a common platform for everyone. These devices when enabled via features of AI and IoT can lead to wonders. The proposed idea is that this technology of AI and IoT with its nature of brining transformations and its use in working of wearables can make it easily possible to generate new level wearable devices.The devices which will track, count your step, assist you in whatever you do guide you while traveling, helps you ensure your safety, becomes your phone, PC, laptop, all at your wrist in the form of a band or watch, not only that, it will become a health advisor for you at every place that is entering your health profile at once and then getting notified or voice instructions what to intake or not, whether to sit or walk, etc. all at you hand. The devices of this sort will be tracked in a short period of time. Using IoT the devices will be connected to each other and AI has always been a player of data and its analysis.

This proposed idea displays the future of forthcoming wearable devices, where a single device will enable its user to do whatever he wish to do at any place and any time. The technology of IoT and AI will bring this device in existence that will enhance not only healthcare or tracking but empower the human kind via means of technology.

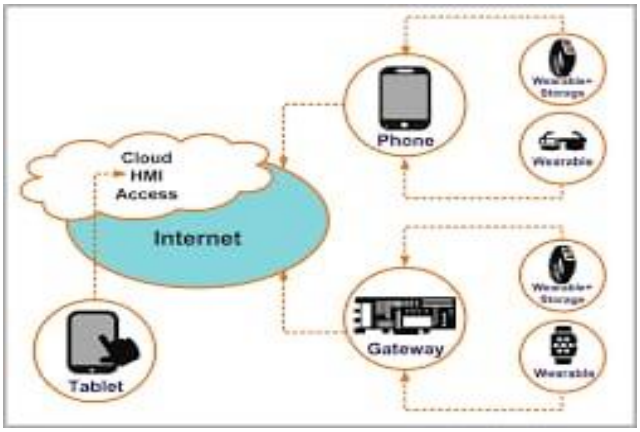

Fig 2: Wearable devices connected through IoT [3]

IV WORKING PRINCIPLE

Wearable devices are all around us and have become an essential part of our lives. In all fields where these devices are into play the experts of these fields doubt the excellence or working of these devices. Looking on the time and all the valuable resources available the usage of data, analyzing that data, processing of that data, associating knowledge, finding patterns and then letting the information to be generated, makes the working of wearable devices fluent and reliable.

Various IoT and AI based devices like virtual coaches, fitness devices, etc in the form of wearables work via sensors, trackers, fibers, AI and IoT based assistants. Performance analysis and data analysis allows to generate the result, then gives their own predictions to their users.

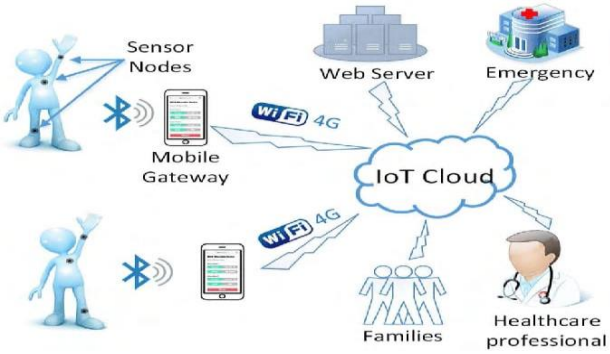

Fig 3: Wearables enabling services via IoT and AI [12]

This has expanded itself in a vast manner in the field of healthcare specially and then helps to maintain body by providing personalized care, give audio and video guidelines to maintain themselves in various type of environment and surroundings. The algorithms and data sets used by the wearable devices are dealt via IoT and AI platform and solutions. The sensors identify the environmental conditions, trackers track the user, assistants guide in their respective fields, allows user to get his laptop on his hand, user can operate their phone via the band on his wrist etc. wearable devices are on the track to generate the trend of wearable devices vanishing the hand holding devices. In the field of healthcare the applying AI, machine learning and IoT, patients medical data is collected and then treated, various organizations are bringing wearable in the real world and providing us personalized experience over such devices in one or the other way or to say in the field of their specialization.

Wearable devices and data had become a vast way to go on for a deep learning process by dealing with large amount of data sets. The predictive idea of the technology of wearable devices is an observed result from the past and present days of innovation in the field of IoT and AI based wearable devices. These devices are no doubt set to change the face of technology in the coming future.

V LIMITATIONS

Although small screens which are easy to carry and user interactiveare a fascination among all in today's and forthcoming world, limitations always rely for further changes to be made for covering up the present point of breach. Similarly the limitation here relies is that it is not always convenient to speak out what you wish to search and small screens always create an issue for typing making wearables stand behind the traditional devices. Moreover wearable devices are interactive but not as much as of mobile phones, which can somewhere raise a level of difficulty in understanding the content on the screen.[15] However, a large amount of traffic comes from various devices using internet, it is predicted that the coming search engines will foster the next generation strategy of using the mobile apps for speech recognition and predictive keyboards and moving all these apps in the wearable device memory will be the most challenging task. It can only be resolved in the wearable devices by using extraordinary learning tools for generating keyboards or providing simpler search engine that work in a personalized manner according to user interest anddoes allow the user to go out for something new to be searched.

VI CONCLUSION

The platforms and various interfaces are present for the working of wearable devices and more, but there is much more which is expected and required from the emerging technology. AI and IoT are the basis of really powerful wearable devices and a prediction is made that they will be above the levels of generally available systems for use. Using the technologies of machine learning, AI and IoT on present wearables will be there to be observed in near future. No doubt by using AI the complex task of today's time will become a cup of tea and will satisfy the demands of user.However, researchers and developers are still on the way to find out the solutions for this IoT and AI based platforms. But the cost of developing the wearables of such a high level will generate some gap due to use of some highly sensitive sensors, chips, trackers etc. between the user and the product. On the positive side there will be a rapid decrease in the cost of hardware that will cover up this gap very soon after developing such devices, this observation can be made out on the basis of Moore's law. IoT and AI will together boost up the level of technologies in the development of wearables, providing a vast connectivity and AI speech capability. In short, wearable devices will took over the traditional devices most probably in the near future, however, work has to be done for overcoming the limitations. Wearables will be the one for all technology via use of AI and IoT.

VII FUTURE SCOPE

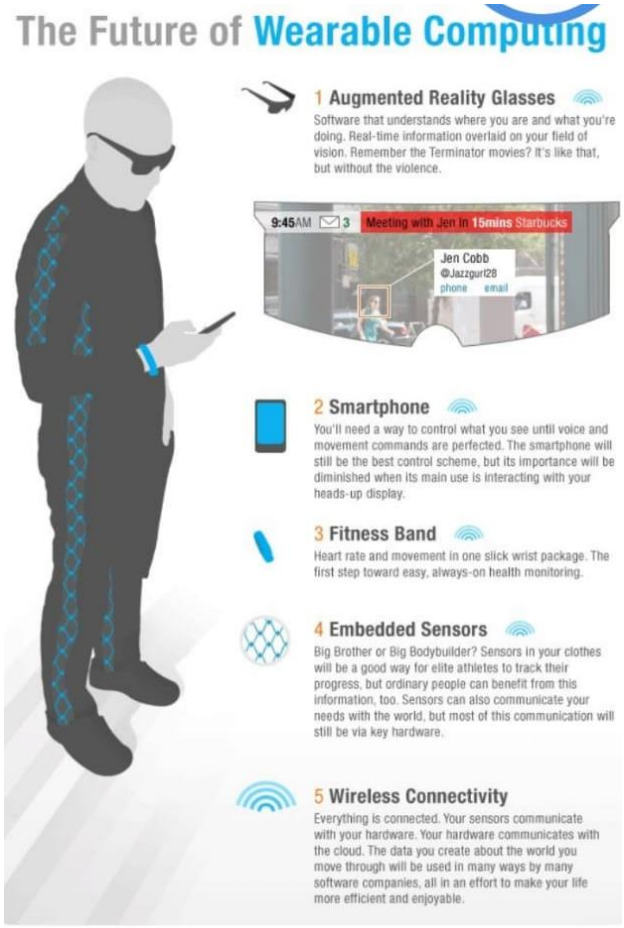

Fig 4: Future of wearable devices [16]

Wearable devices will create various opportunities for everyone and at any time. Sooner the wearables are in the hands of consumers the interaction of these devices increases. The features that will foster wearable technology in future will be its light weight and much more portable than those of today's mobiles and laptops, much more readily personalized than mobile phones since they will be everywhere with the user tracking his or her data more precisely, anywhere and anytime access via using wireless networking, and giving a holistic performance of each technology in just a single device. Such opportunities wait for the wearable devices in future. However, the AI and IoT will definitely speed up the process of achieving this stage and of course; the accuracy will be the most favorable part of these devices. The present days themselves show that wearable devices has proven themselves in various fields like fitness, healthcare, trackers etc. and this raises the believe in the future of wearables based onIoT and AI. Consider it as a business scope, healthcare scope or a way of user enhancement and data gathering, wearables will prove themselves as the face of emerging technology for future advancements. Despite occasional disappointments, this market continues growing and surprising us, and IoT

synergy in AI appears to be the means to streamline this move.

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