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EVOLUTION OF FITNESS BAND OVER NETWORK and Fight against COVID-19

A Report for the Evaluation 3 of Project 2

Submitted by

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**Under the Supervision of
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THANK YOU.

DECLARATION:

I hereby declare that this submission is my very own work which, to the simplest of my knowledge and belief, it contains no material previously published or written by another person nor material which to a considerable extent has been accepted for the award of the other degree or diploma of the university or other institute of upper learning, except where due acknowledgment has been made within the text.

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ABSTRACT:

In ever changing world and growing technology we sometimes are unable to maintain the perfect balance between health and work. we keep on updating our self for better technology but in updating over technology we lose control over health. As nowadays our whole life depends on our mobile phones, here comes a new technology FITNESS BAND which keeps track of your daily basic health routine and notifies you on your phone. So, my idea is to provide another way of dealing with these fitness bands. In this paper I would try to connect these fit bands over clouds and all data gets stored over the server, So that another person (doctor) who has permission to use that data over the same private network can get the updates of your regular health and if something is wrong can give you an update. After this we will try to minimize the number of sensors used in fitness bands. Earlier there were 17 sensors used but I will try to minimize it to 9 sensors and try to make it cheap in cost. In this paper, there is complete information about what is a fitness band, their evolution i.e. its rise and fall, merits, demerits, how they work, uses, my proposed model with algorithm defined, conclusion and future works.

Also, in this project we will also discuss about the current ongoing pandemic CORONAVIRUS and how technology is helping. Mankind has faced various major pandemic situations in its history but this outburst of COVID-19 broke every record of history. It feels like humans are facing the war with such an invisible evil which

is very strong and yet uncontrollable. Most of the people with low immunity died due to this virus. The first case of coronavirus positive is found in Wuhan, China. Later, it spread like air in the atmosphere. The whole world is facing lots of problems like lockdown, economic fall, increase in death rate, and many more due to COVID-19. The world is in a great depression. But the government is taking many actions to save their country with such an epidemic situation. All IT firms have come together to work on it and use all their technological advancement to face this major outburst with all the power. Major IT trends are being a great help to fight this. This paper is about how major IT trends came together to fight this evil. In this paper, there are facts about COVID-19 and its effects on mankind and the whole world. There is also a survey about major IT trends like artificial intelligence, cloud computing, etc. and their contribution to fighting COVID-19. There are also some technologies like chatbots, supply chain, etc. which came as the savior in the fight against such a major pandemic.

TABLE OF CONTENTS:

TITLE	PAGE NO.
CERTIFICATE	ii
ACKNOWLEDGEMENT	iii
DECLARATION	iv
ABSTRACT	v, vi
LIST OF TABLES.	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
CHAPTER 1 INTRODUCTION	12
1.1 THE OVERALL DESCRIPTION	
1.2 PURPOSE	
1.3 MOTIVATION AND SCOPE	
1.4 TYPES AND CHARACTERISTICS	
CHAPTER 2 CORONAVIRUS INTRODUCTION	23
2.1 THE OVERALL DESCRIPTION	
2.2 SYMPTOMS	
2.3 PREVENTIONS	
2.4 TREATMENT	
2.5 IMPORTANCE OF DIGITAL READINESS	
CHAPTER 3 LITERATURE REVIEW	30
CHAPTER 4 MARKET ANALYSIS OF FITNESS BAND AND COVID-19	37
CHAPTER 5 EXISTING MODEL	41
5.1 FEATURES OF FITNESS BAND	
5.2 ADVANTAGES	
5.3 DISADVANTAGES	
5.4 EXISTING MODEL	

CHAPTER 6 PROPOSED MODEL AND IMPLEMENTATION

51

6.1 PROPOSED MODEL

6.2 IMPLEMENTATION FOR MINIMISATION OF SENSORS OF FITNESS BANDS

6.3 IMPLEMENTATION FOR CONNECTING RASPBERRY PI TO SERVER TO CREATE A PRIVATE NETWORK

6.4 IMPLEMENTATION FOR CONNECTING IT TO CLOUD

6.5 5 MAJOR IT TRENDS

6.6 9 MAJOR TECHNOLOGIES

CHAPTER-7 CONCLUSION AND FUTURE SCOPE

63

8.1 Conclusion

8.2 Future Scope

8.3 References

LIST OF TABLES:

TABLE TITLE	PAGE NO.
Types of FITBANDS	22

LISTS OF FIGURES:

FIGURE TITLE	PAGE NO.
1. Basics of Fitness band	13
2. Motivation of having fitness bands	20
3. Prevention steps	27
4. Cases overview of covid-19	28
5. IOMT	30
6. AI help to aid covid-19	33
7. Fitbit interaction with kids	36
8. consumers reaction towards buying fitbands	37
9. Worldwide users in 3 years	37
10. Brands and their services	38
11. OS compatibility now and future	38
12. Future sales	38
13. Sales channel now and future	39
14. NEW cases rate	39
15. Death rate worldwide	40
16. Features of fitness bands	43
17. Proposed model	52
18. Future of fitness bands	67

LISTS OF ABBREVIATION:

TITLE	ABBREVIATION
1. IOMT	INTERNET OF MEDICAL THINGS
2. API	APPLICATION PROGRAMMING INTERFACE
3. MO	MOTION OSSILATION
4. FDA	FOOD AND DRUG ADMINISTRATION
5. GPS	GLOBAL POSITIONING SYSTEM
6. IT	INFORMATION TECHNOLOGY
7. COVID-19	2019 NOVEL CORONAVIRUS
8. AR/VR	AUGMENTED REALITY VIRTUAL REALITY
9. 3D	THREE DIMENSIONS
10. UPI	UNIFIED PAYMENT INTERFACE
11. 5G	FIFTH GENERATION
12. DNA	DEOXYRIBONUCLEIC ACID
13. RNA	RIBONUCLEIC ACID
14. SARC-COV-2	SEVERE ACUTE RESPIRATORY SYNDROME
15. GRU- NN	GATED RECURRENT UNIT NEURAL NETWORKS
16. CT- SCAN	COMPUTERIZED TOMOGRAPHY SCAN
17. AI	ARTIFICIAL INTELLIGENCE
18. IOT	INTERNET OF THINGS
19. USB	UNIVERSAL SERIAL BUS
20. UART	UNIVERSAL ASYNCHRONOUS RESISTOR TRANSMITTER
21. WHO	WORLD HEALTH ORGANIZATION

CHAPTER 1 INTRODUCTION

Wearable technology, wearables, fashion technology, tech togs, or fashion electronics are smart electronic devices (electronic device with micro-controllers) that are worn close to and/or on the surface of the skin, where they detect, analyse, and transmit information concerning e.g. body signals such as vital signs, and/or ambient data and which allow in some cases immediate biofeedback to the wearer

Wearable devices such as activity trackers are an example of the Internet of Things, since "things" such as electronics, software, sensors, and connectivity are effectors that enable objects to exchange data (including data quality) through the internet with a manufacturer, operator, and/or other connected devices, without requiring human intervention.

Wearable technology has a variety of applications which grows as the field itself expands. It appears prominently in consumer electronics with the popularization of the smartwatch and activity tracker. Apart from commercial uses, wearable technology is being incorporated into navigation systems, advanced textiles,

and healthcare. An **activity tracker**, also known as a **fitness tracker**, is a device or application for monitoring and tracking fitness-related metrics such as distance walked or run, calorie consumption, and in some cases heartbeat. It is a type of wearable computer. The term is now primarily used for smartwatches that are synced, in many cases wirelessly, to a computer or smartphone for long-term data tracking. There are also independent mobile and Facebook apps. Some evidence has found that the use of these type of devices results in less weight loss rather than more. Sleep tracker devices have a tendency to under detect wakefulness



Fig 1: basics of fitness bands

1.1 THE OVERALL DESCRIPTION:

Fitness bands commonly known as activity tracker are nothing but a string in an umbrella of wearable sensors. Fitness bands are the type of wearable sensors which are used to keep track of your basic health metrics such as sleep, footsteps, calories, heartbeat, etc. In some cases, these bands are connected with ai features so that consumers can communicate to them as well there are known as Smart watches. Another type is fit bug which measures your aerobic steps and all, it keeps track of your diet plan especially keto diets. These bands are directly connected to your smart phones through it notifies you about your health condition. These wearable sensors are connected through Bluetooth with your smart phones. There are multiple types of sensors used in these fitness bands (which is explained in detail in the next section). Through these sensors it estimates and keeps track of various health metrics. Wearable sensors widely used in areas like medical, sports and security. In the medical department, this technology is evolved by continuously monitoring lots of patients with their body temperature, heart rate, brain activity, muscle motion and other critical data for keeping records and later comparison so that we can check whether the details observed with a tracker are accurate or not. In sports, this technology evolved among marathon runners and athletes mostly as they can keep track of their basic footsteps and calories with reliable and easy ways. They can detect change in our daily routine as well. There is also research going on in which they can detect measurement of sweat rate. In the security department, these sensors

detect abnormal and unforeseen situations by detecting sudden change in your body routine. It also tracks physiological parameters and monitors various symptoms. Earlier there was lots of work done in this sector, the market is growing continuously in sectors and if we talk about the future then we can expect \$ 30 million market growth in 2020 which is almost double of the market in 2019. Main companies of fitness bands are apple, fit bug , amazon, Samsung, polar etc. First fitness band named pedometer was discovered in the 1700s and then the next pedometer was developed in 1965. Then continuous evolution is reported. There are many demerits of these bands which are repeatedly improving. There have been many more prototypes introduced in recent years such as biometric clothing which is strictly to be wearable. There are many more advancements in this sector such as smart yoga mats which seem to be valuable in the health department. My approach is to increase the availability of fitness bands by making it cost effective. There is also an approach to connect it to raspberry pi with a unique IP so that this band can be connected over private networks and our assigned doctors can also be connected regularly. This is to be done with keeping the thought in mind that if a consumer is stuck in a place where he/she can't get in touch with a doctor personally. As the doctor will receive the necessary information by the tracker server, the doctor can suggest the best way to heal without being present physically. Out of six studies, one review states that activity tracker improves health but there is little evidence of it. Out of five studies

that measured weight loss, found that one has weight loss, one has increased weight and other has no effects. 245 million devices have been sold in 2019 and the market is growing still. 20% of total revenue in 2015 is from wearable sensors. Out of 91% people who surveyed the band, 67% of people had positive states as there is no effect in general but according to the survey it increases encouragement among people for taking care of their health. But there were many problems they faced. Four major problems faced by these people were accuracy, price, battery issue, and not much handy. But there are many more advantages which say why we should use these bands. So, wearable sensors are of great use when it comes to self-encouragement. A device which can detect real-time track of your health and give notifications on your smart phones can be used in many ways but depends on your lifestyle and how you use it.

- Fitness bands commonly known as activity tracker are nothing but a string in an umbrella of wearable sensors.
- Fitness bands are the type of wearable sensors which are used to keep track of your basic health metrics such as sleep, footsteps, calories, heartbeat, etc.
- In some cases, these bands are connected with ai features so that consumers can communicate to them as well there are known as Smart watches.
- Another type is fit bug which measures your aerobic steps and all, it keeps track of your diet plan especially keto diets. These bands are directly

connected to your smart phones through it notifies you about your health condition.

- These wearable sensors are connected through Bluetooth with your smart phones.
- These are always in both states with display and without display.
- Wearable sensors widely used in areas like medical, sports and security.

1.2 PURPOSE:

Wearable sensors have been widely used in medical sciences, sports and security. Wearable sensors can detect abnormal and unforeseen situations, and monitor physiological parameters and symptoms through these trackers. This technology has transformed healthcare by allowing continuous monitoring of patients without hospitalization. Medical monitoring of patients' body temperature, heart rate, brain activity, muscle motion and other critical data can be delivered through these trackers. Moreover, in sports training there is an increasing demand for wearable sensors. For example, measurement of sweat rate was possible only in laboratory-based systems a few years ago, but is now possible using wearable sensors. Electronic activity trackers are fundamentally upgraded versions of pedometers; in addition to counting steps, they use accelerometers and altimeters to calculate mileage, graph overall physical activity, calculate calorie expenditure, and in some cases also monitor and graph heart rate and quality of sleep. Some also include a

silent alarm. Some newer models approach the US definition of a Class II medical monitor, and some manufacturers hope to eventually make them capable of alerting to a medical problem, although FDA approval would be required. Early versions such as the original Fitbit (2009), were worn clipped to the waist; formats have since diversified to include wristbands and armbands (**smart bands**) and smaller devices that can be clipped wherever preferred. Apple and Nike together developed the Nike iPod, a sensor-equipped shoe that worked with an iPod Nano.

In addition, logging apps exist for smartphones and Facebook; the Nike+ system now works without the shoe sensor, through the GPS unit in the phone. The Apple Watch and some other smart watches offer fitness tracker functions. In the US, Body Media has developed a disposable activity tracker to be worn for a week, which is aimed at medical and insurance providers and employers seeking to measure employees' fitness, and Jawbone's UP for Groups aggregates and anonymizes data from the company's wearable activity trackers and apps for employers. Other activity trackers are intended to monitor vital signs in the elderly, epileptics, and people with sleep disorders and alert a caregiver to a problem.

Earbuds and headphones are a better location for measuring some data, including core body temperature; Valence has developed sensor technology for new activity trackers that take their readings at the ear rather than the wrist, arm, or waist.

Numerous companies have also released devices in the form of a ring that leverage the capillaries in the finger.

There are collar-mounted activity trackers for dogs.

Much of the appeal of activity trackers that makes them effective tools in increasing personal fitness comes from their making it into a game, and from the social dimension of sharing via social media and resulting rivalry. The device can serve as a means of identification with a community, which extends to broader participation.

The standard activity-tracking smartphone or web apps present data in statistical form meant to be viewed after the activity has ended. However, research suggests that if we want a richer understanding of the data, we need intelligent computing to be included in the systems that run the apps.

Some users and reviewers remain ambivalent towards the technology, making the point that in such a "mirror" displaying one's identity, misrepresentations are problematic. There is also research problematizing tracking devices in relation to how we inhabit, experience and imagine our bodies and lives. All forms of lifelogging also carry privacy implications. Social networks associated with activity trackers have led to breaches of privacy such as involuntary publication of sexual activity, and the potential for advertisers and health insurers to access private health data through the devices is a concern. In 2016, there were several advances

made in regard to fitness tracking geared toward kids with a variety of options from organizations such as UNICEF and Garmin.

1.3 MOTIVATION AND SCOPE:

In those who are overweight or obese some evidence has found that the use of these type of devices results in less weight loss rather than more after 18 months of use. However, it has been noted that the activity tracker used in this study is a now-discontinued model that is worn on the upper arm, which might be uncomfortable, and wear times of the tracker were low. One review of six studies found that there was little evidence that activity trackers improve health outcomes. Of five studies



that looked at weight loss, one found benefit, one found harm, and three found no effect.

Fig 2: motivation of having fitness band

Another study comparing 8-week interventions and four-month follow-up of physical activity monitors, a guided weight loss program, and both together found

that activity monitoring and the weight loss program were associated with similar improvements and both combined together were associated with more improvements than either alone.

It is unclear whether activity changes occur in children and adolescents.

Activity trackers are available both with and without display.

Certain movements of the user, such as working in the household, cycling, swimming, dancing or rowing can distort the results obtained from activity trackers.

In a test conducted by Stiftung Warentest, for example, no product determined the distance of a bike ride, even approximately. Furthermore, the determined values for the human energy transformation were erroneous. With the heart rate large deviations have been observed at wristlet trackers, and it is recommended for this purpose to use appropriate chest straps.

Wristbands can be uncomfortable to wear and inadvertently be lost. For some products genotoxic substances were detected.

The connection of activity trackers with social networks can lead to violation of privacy, such as involuntary publication of sexual activity. The apps of some activity trackers not only transmit personal data, but also private address lists to servers on the Internet without notifying or asking the user. Even when anonymized, the mere presence of geolocation data may be a national security risk. However, the

results of a study among semi-professional (half-) marathon participants suggests that these users are open towards sharing tracked activity data on a voluntary basis with: friends (51.7%), family members (43.4%), or a physician (32.3%).

1.4 TYPES AND CHARACTERISTICS:

Are you in search of a top notch fitness tracker to take with you when you go running, biking, or hiking? If so, you will want to do your research first. Consider the following types of trackers, broken down into categories based on your unique interests and needs. Get ready to be inspired, get in gear, and have your best year ever when it comes to your fitness goals.



Feature	Zip	One	Flex	Charge	Alta	Charge HR	Blaze	Surge
Steps, Calories, Distance	✓	✓	✓	✓	✓	✓	✓	✓
Clock	✓	✓	—	✓	✓	✓	✓	✓
Sleep Tracking	—	✓	✓	✓	✓	✓	✓	✓
Auto Sleep Detection	—	—	✓	✓	✓	✓	✓	✓
Silent Wake Alarm	—	✓	✓	✓	✓	✓	✓	✓
Floors Climbed	—	✓	—	✓	—	✓	✓	✓
Active Minutes	✓	✓	✓	✓	✓	✓	✓	✓
Auto Exercise Recognition	—	—	✓	✓	✓	✓	✓	✓
Multi-Sport	—	—	—	—	—	—	✓	✓
Continuous Heart Rate	—	—	—	—	—	✓	✓	✓
Caller ID	—	—	—	✓	✓	✓	✓	✓
Text Notifications	—	—	—	—	✓	—	✓	✓
Music Control	—	—	—	—	—	—	✓	✓
GPS Tracking	—	—	—	—	—	—	—	✓
Hourly Activity & Stationary Time	—	—	✓	✓	✓	✓	✓	✓

table 1: types of fitness bands

CHAPTER 2 CORONA VIRUS INTRODUCTION

2.1 THE OVERALL DESCRIPTION:

Coronavirus aka COVID-19 aka Wuhan virus, there are many names of this virus.

Coronavirus or COVID-19 is an infectious disease. It has been first seen in the

Wuhan country of China and now all across the globe. It is spreading at a very fast

rate; social distancing is the only method to control it. One can be sick for 1-15 days before showing any symptoms and this is the main reason why it is spreading so rapidly. It shows symptoms like fever, cough, tiredness, and respiratory illness (in severe cases). Those with weak immune systems can develop more serious symptoms like pneumonia and bronchitis. Coronavirus can spread through body fluids like cough and also through human contacts like touching something an infected person has touched and so touching your eyes, nose, or mouth. To avoid getting infected one should wash hands in every 20 seconds with soap, alternatively use an alcohol-based hand rub/sanitizer. There is currently no vaccine or treatment for COVID-19. The FDA is currently advising people to take care of internet sites and stores selling products that claim to forestall, treat, or cure COVID-19. Additionally, don't take any kind of chloroquine unless it's been prescribed for you by your GP and purchased from a legitimate source. Like a chilly or the flu, people are advised to drink fluids and acquire lots of rest and if having trouble breathing, seek immediate treatment.

There are around 210 countries and territories that are suffering from this pandemic situation. Around 3.1 million affected from this virus and 22 lakhs people are dead till now while 95 lakhs people are recovered. China where it all started faced lots of hatred due to this but now they controlled this pandemic and not in the list of top 10 suffering countries. Major effects are shown in the United States, Italy, Spain, the

United Kingdom, etc. In India current cases are 33k and 1k are dead. Majorly older age people or people with low immunity are at higher risks. All the places are on lockdown and at major restrictions. This infection directly attacked human essential need i.e. communication. Major measures are taken to stop this. Largescale quarantines, travel restrictions, and social-distancing measures have led to a huge fall in consumer and business spending. Consumers stay home, businesses lose revenue and lay off workers, and unemployment levels have risen. The aviation sector is the most affected sector due to the shutdown of flights in many countries, parking costs and cancellation charges are very high. Other sectors will see delayed demand. All the trains and public transports are stopped. Complete social distancing is attempted in this major lockdown. Indian railways are also giving their contribution in the fight against COVID19. Trains have now become isolation wards so that people in remote areas without medical facilities can be reached, each Bogie has 10 coaches, there are plastic curtains outside every coach, each bogie has two toilets and two shower rooms, a nurse cabin, and a doctor's cabin. The prototype of the isolation coach is ready and now approved. Major IT firms are contributing as well with millions of money to fight against coronavirus and to support their country. China used its technological advancement and took major advantage of being technically forward to fight against coronavirus. There are many technologies such as artificial intelligence, cloud computing, 3D printing, 5G is becoming majorly

helpful. In this paper, we are going to talk about such technologies and IT trends which are contributing to curing this illness. How they are coming together for giving their crucial efforts to fight this pandemic. All the IT partnerships are essentials to fight it. There is also a discussion about 5 major digital technologies helping humans to COVID19. In this dark time, it's good to see how all the organizations are coming together to save as many as they can. It's very inspiring to see how mankind is growing together. But it's more important to stay together and united to pull it off.

1.2 SYMPTOMS:

- Most common symptoms:

- 1 fever
- 2 dry cough
- 3 tiredness

- Less common symptoms:

- 1 aches and pains
- 2 sore throat
- 3 diarrhoea
- 4 conjunctivitis
- 5 headache
- 6 loss of taste or smell

7 a rash on skin, or discolouration of fingers or toes

- Serious symptoms:

1 difficulty breathing or shortness of breath

2 chest pain or pressure

3 loss of speech or movement

4 Seek immediate medical attention if you have serious symptoms. Always call before visiting your doctor or health facility.

5 People with mild symptoms who are otherwise healthy should manage their symptoms at home.

6 On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days.

1.3 PREVENTION:

Protect yourself and others around you by knowing the facts and taking appropriate precautions. Follow advice provided by your local public health agency.

- To prevent the spread of COVID-19:
 - Clean your hands often. Use soap and water, or an alcohol-based hand rub.
 - Maintain a safe distance from anyone who is coughing or sneezing.
 - Don't touch your eyes, nose or mouth.
 - Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.
 - Stay home if you feel unwell.

- If you have a fever, cough and difficulty breathing, seek medical attention. Call in advance.
- Follow the directions of your local health authority.
- Avoiding unneeded visits to medical facilities allows healthcare systems to operate more effectively, therefore protecting you and others.



Fig 3: prevention steps

1.4 TREATMENT:

To date, there are no specific vaccines or medicines for COVID-19. Treatments are under investigation, and will be tested through clinical trials.

Self-care: If you feel sick you should rest, drink plenty of fluid, and eat nutritious food. Stay in a separate room from other family members, and use a dedicated bathroom if possible. Clean and disinfect frequently touched surfaces. Everyone should keep a healthy lifestyle at home. Maintain a healthy diet, sleep, stay active, and make social contact with loved ones through the phone or internet. Children

need extra love and attention from adults during difficult times. Keep to regular routines and schedules as much as possible. It is normal to feel sad, stressed, or confused during a crisis. Talking to people you trust, such as friends and family, can help. If you feel overwhelmed, talk to a health worker or counsellor.

Medical treatments: If you have mild symptoms and are otherwise healthy, self-isolate and contact your medical provider or a COVID-19 information line for advice. Seek medical care if you have a fever, a cough, and difficulty breathing.



Fig 4: cases overview of covid-19

1.5 IMPORTANCE OF DIGITAL READINESS:

As technology has always been a blessing to society if used in a good way. In these dark times also, technology is playing a vital yet necessary role to support every sector of our life. Digital readiness helps our business and life to be going as per normal norms. Daily new technology is introduced to make you engaged in these

lockdown situations as well. Their major goal is to continue our lives as much as possible. Also, they try to maintain a less workforce yet effective to solve these issues. Digital readiness is very important to stay in competition in a post-COVID-19 world. The only way to be on the list post-covid-19 is to make yourself strong so that this economic crisis does not fall so badly on our countries. As many countries are falling apart due to this crisis, there are many countries as well who are supporting others to reduce their effects due to their technological advancement.

Chapter-3

LITERATURE SURVEY

3.1 “The Internet of Medical Things?” A Whitepaper by Intersog 03-2018 It talks about changing the working of the healthcare facilities to make it more familiar to the patients. The security and privacy are a major concern and the main challenge which has to be faced is to convince the patient to trust the device and make use of it. It aims to make the products more scalable and easily monitored. The disruption

was caused due to the network issue and the challenges one has to face. Awareness about smart technology and gadgets which are trends of the markets.



Fig 5: IOMT

3.2 “SMART-XRAY (+CT) -SCAN_BASEDCOVID19_VIRUS_DETECTOR” by Jordan Micah Bennett, software engineer/creator of "RobotizeJa". In this paper, the researcher has tried to explain the cause of COVID-19 from the beginning. He tried suggesting various ways of implementing the smart X-RAY system to detect the COVID-19 virus. Referred from many ongoing works the author has suggested the study of a Similar type of chest CT to detect the virus-positive or negative. The author has suggested various methods and easy ways so that a person with a non-medical background can also do the tests and find out the results. The main aim of this research was to contribute to the current ongoing work of vaccine making. AI

systems can be used to study the gene formation in RNA and can be used to train the model to make the decisions. Jordan suggested a better way of detection of the virus. He has given a brief comparison of the medical strategies such as DNA testing etc. which takes much longer than using an AI+Scan image which will give the result in minutes. This research has been made because this thing is spreading rapidly as compared to common flu. The doctors are facing a hard time doing tests and finding results until then 10 new cases appear. Hopefully, this new combination of AI will somehow make the work easier. Faster detection will lead to earlier treatment and fewer chances of death. The laboratory methods have many cons because there are some cases that are positive and they still become undetected due to faulty DNA or maybe some clinical mishappenings. This AI-driven solution has no cons and its learning rate is faster as compared to the lab results.

3.3 “Modes of Transmission of virus causing COVID-19: implications for IPC precautions recommendation” written on March 29, 2020. The paper briefly describes the transmission of the COVID-19. The respiratory transmission of this disease can be in two different forms. One of the transmissions occurs due to respiratory droplets. The size of the droplets lies between $>5-10 \mu\text{m}$. This droplet can infect a person by getting in through the medium of mouth, nose, or ears. Again, the second type of transmission could be through the air droplet nuclei. These are the droplets which are $<5\mu\text{m}$. This droplet can happen to be in the air for a longer

time period and can infect the person within 1m of distance. It has been found that no air transmission of this disease happened to date. It can spread in the community by direct contact with infected people and also by indirect contact. The direct contact could be seen when exposed to the infected while he coughs or sneezes. The indirect contact is made when the infected person leaves the virus in some non-living structure and the perfectly healthy person comes in contact with it. They have also discussed a theory given by The New England Journal of Medicine which has conducted some laboratory tests on this virus and somehow stated that there is a possible chance of airborne infection caused due to this virus. Hence, the WHO has not published any relevant news regarding this. So, it is required to read very carefully about this topic. Based on this the conclusion is brief and very well summarized. They suggested that we take care of the airborne infection and be well prepared for any scenario. Masks are suggested in this condition and also strict maintenance of hygiene is recommended. Sanitizing the hand every minute to avoid the contact with indirect virus and mask to avoid the direct contact. This work can be found in CC BY-NC-SA 3.0 IGO license. Scientific brief- Reference noWHO/2019nCoV/Sci_Brief/Transmission_modes/20 20.2



Fig 6: AI help to aid covid-19

3.4 “REVIEW OF VARIOUS USERS” As discussed, there exists a significant market for vendors of various fitness wearables. The success of the market inherently depends on the interest of consumers in the products they offer. Reasons for interest and investment therefore depend on consumer notions of perceived usefulness – physical functionality and motivational purpose, while similarly tapping into aspects of “fashionability” and attitude towards the adoptive use of technology. The methodology of this Research Paper has established the theoretical framework through literature reviews discussing managing health and fitness through activity and exercise; devices and technologies as a tool for understanding the body; their use and integration in daily life as an extension of the body. The

research analysis follows by examining the factors behind the take up and effectiveness of fitness trackers. For the purpose of this research piece a ‘fitness tracker’ is defined as any wearable device to be worn on the wrist that is specifically designed to track and monitor a person’s movement, daily activities, and vital statistics in relation to health and fitness. The aim of this Research Paper is to gauge whether the intentions in the uptake of fitness trackers are truly in line with the purpose of objective tracking they are made for. Themes described in the previous chapters will guide the discussion and provide the framework for evaluation. While the outputs given by fitness trackers are of measurable quantities in relation to aspects of health and fitness, this research paper also intends to evaluate how people use their devices, interpret information tracked for them and find motivation as a result – the outcome expects to illustrate what motivates people to use such devices and how. This paper intends to prove that fitness trackers are more than simply just objective tracking devices but powerful motivational tools in promoting physical activity

3.5 “*The rise of the Fitbit kids: a good move or a step too far?*” The concept of tracking your fitness with wearable technology is not new but the rate at which activity trackers are being worn by school children, is. And it’s causing quite a range of reactions.

In the UK, a mother withdrew her child from primary school because it stopped him from wearing his electronic fitness bracelet, although following protests the school later allowed pupils to wear Fitbits (except during physical education class).

In New Zealand, high school counsellors said they were concerned the Fitbit devices could become a fixation, particularly with girls trying to lose weight and keep fit.

In Australia, students in some schools are wearing these devices (for example, nine of the 24 in my daughter's grade 4 class) despite terms-of-service such as Fitbit's saying users should be aged over 13 to use its service.

As for older students, Oral Roberts University in Oklahoma said earlier this year it was giving new students the option of wearing of a Fitbit as part of its ongoing fitness program. However, this caused some concern and sparked an online petition over fears it could promote eating disorders.

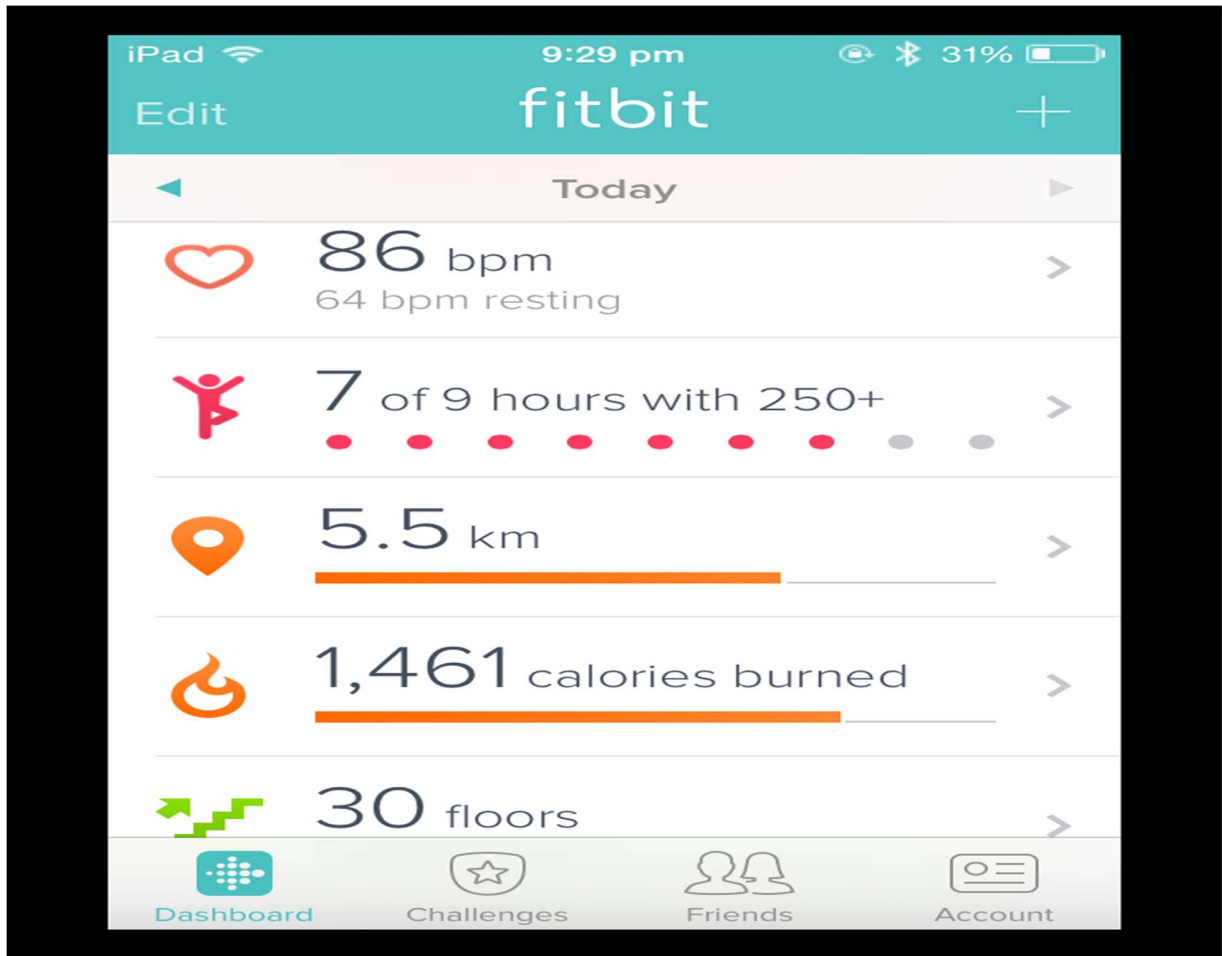


Fig 7: Fit Bit interaction with kids

CHAPTER 4

MARKET ANALYSIS OF FITBANDS AND COVID-19

How likely are you to purchase a wearable fitness tracker / activity band (Nike Fuel Band, FitBit, etc.) in the next year?

> All respondents in segment Country | US in my account
 > Weighted according to U.S. Census figures for gender and age: 18 and older



Margin +/- 2% | 5,515 responses from 06/10/2015 to 08/02/2015
 Note: the reported percentages do not sum to 100 due to rounding

Generated by CivisScience © on Aug 18, 2015 at 12:23:34 EDT

Fig 8: consumer reaction towards buying fit bands

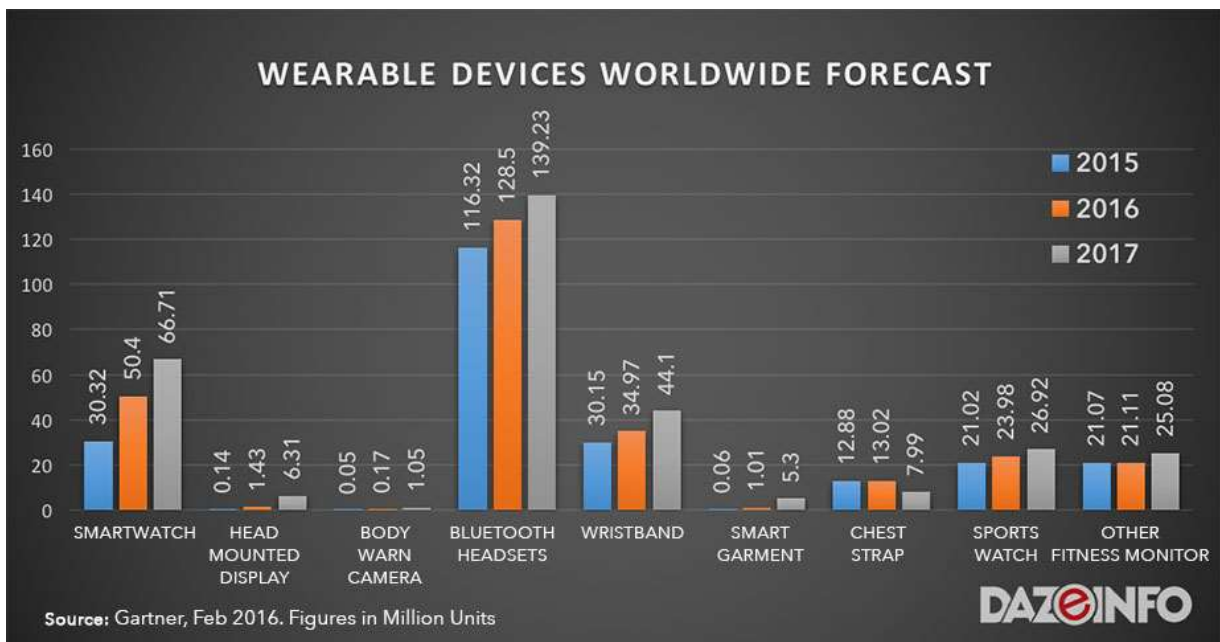


Fig 9: worldwide users in three years.

Brand	
• SDK support	• Device count
• API support	• Article count
• Apple Health support	• Validation study count
• Google Fit support	• ClinicalTrials.org count

Device	
• Sensors	• Battery life
• Validation	• Robustness
• Previous usage	• Water resistance
• Price	• Connectivity
• Availability	• Usability
• Phone environment	• Easy of data access
• Affiliated app features	• Privacy
• Look and feel	• Security

Fig10: brands and their services



Fig 11: OS compatibility now and future



Fig12: future market



Fig: 13 sales channel comparison now and future

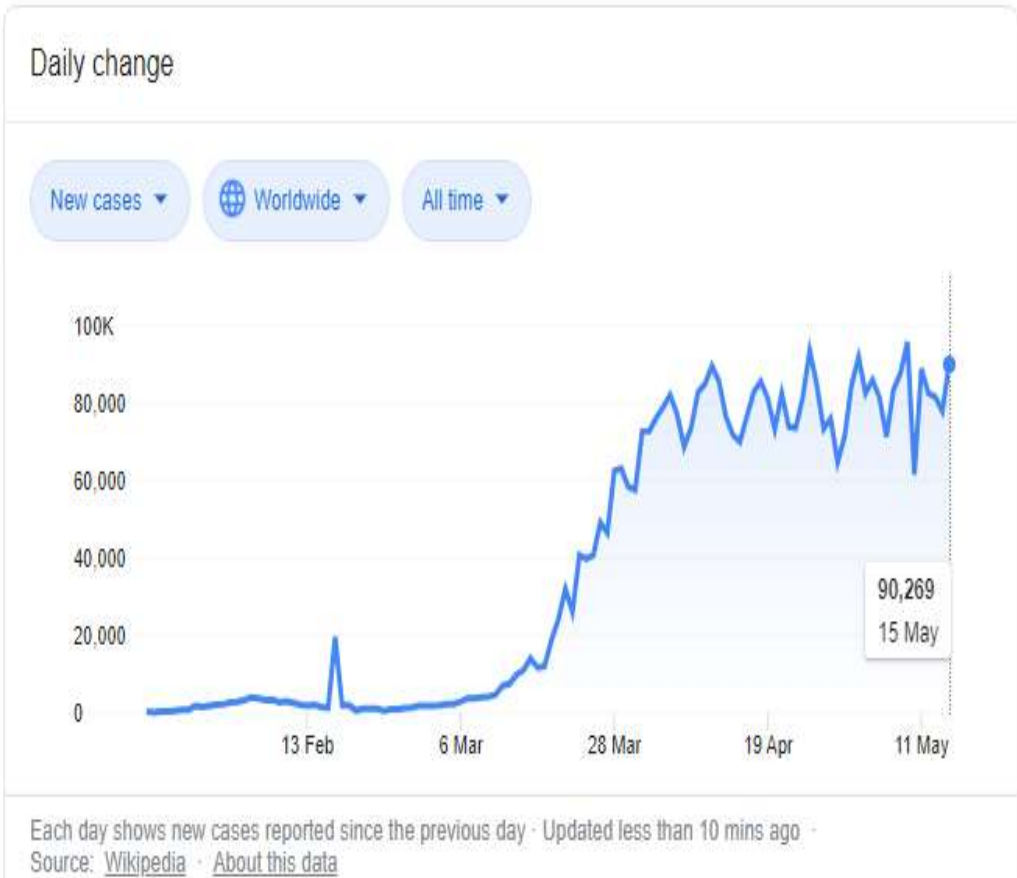


Fig 14: daily new cases of covid-19 worldwide

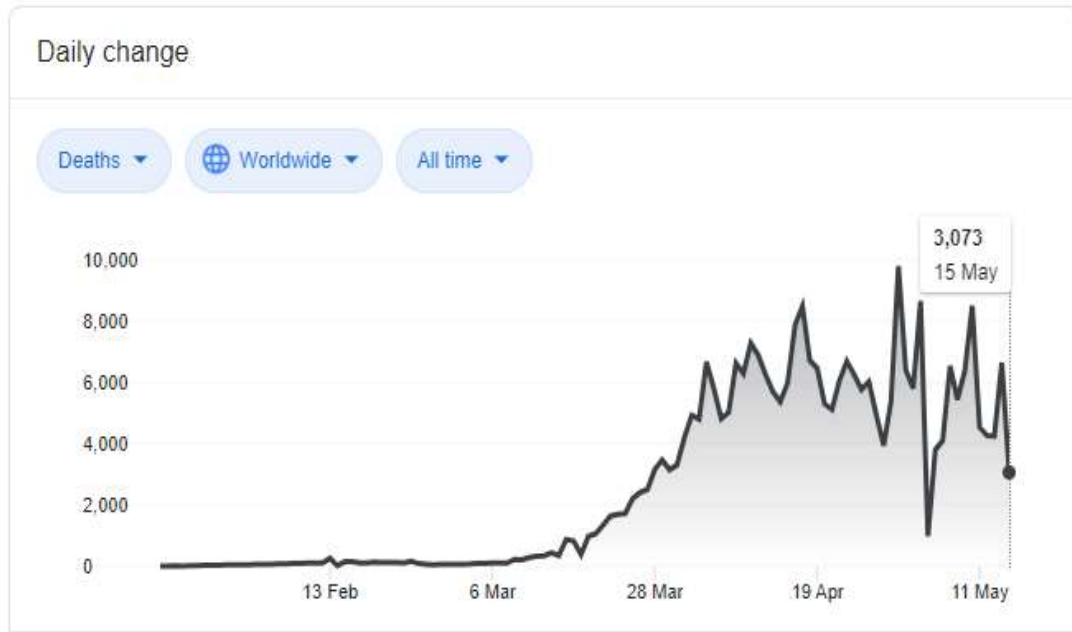


Fig 15: Death rate worldwide

CHAPTER 5

EXISTING MODEL

5.1 FEATURES OF FITNESS BAND:

Every one of us sets fitness goals, and to achieve them, we make changes in our daily routines. It can be including greens in our diet, going for a walk or jogging. There are a bunch of fitness tracking devices that help track your daily activities. The most commonly used devices are fitness trackers and fitness bands. Some people like using them as smartphone accessories, while others look for the most advanced to keep track of their health.

Monitoring heart rate: The heart rate monitoring feature is found in almost every fitness band these days. It gives you clear insights on your daily routine and workouts. Some of the latest fitness bands such as the Fitbit Alta HR provide accurate details on every single activity you perform.

Monitoring breathing: Some fitness bands help you stay calm, healthy and more focused at what you do. Every session of breathing in and out allows your body to function effectively. We tend to ignore good, deep breathing and bands such as the Garmin Vivo Smart 3 and the Fitbit Charge 2 measure beat-to-beat variations from your recorded heart rate, helping determine a comfortable breathing rate.

Tracking calories burnt: Depending on how hard you workout through the day, you get a measure of calories burned. The more calories you burn, it is beneficial in

maintaining vital body functions. This is also a quicker and easier way to maintain your weight. The Amzer FitZer Ka and the Fitbit Charge 2 are good examples of fitness bands that help track efforts you put to burn calories.

Watching cardio fitness levels: The Hug Fit ID115HR and the Fitbit Charge 2 have the Cardio Fitness feature. It calculates the amount of oxygen used by your body when you perform different activities. This tells you how well your lungs, heart and other organs use oxygen to function. Higher the score, better your cardiovascular performance.

Sleep tracking: Sleep quality has direct effects on your mood and health. There are several fitness trackers such as the Misfit Ray S501BM0BZ monitors your sleep duration and the quality. Some of the new offerings have a sleep tracking feature, which records how much you sleep and it even lets you review sleep stages. This lets you schedule your sleep timings and get you back on track.

Silent alarm: None of us like spoiling our sleep with loud and noisy alarm tones. The Thrum Fit 2 TF2FBB01 and the Xiaomi band 3 HRX Edition MGW4027IN are just two examples of fitness bands with the buzzing alarm feature. With the help of this feature, your tracker will wake you with a quiet vibration instead of buzzy tones.

Smart like your phone: An increasing number of fitness trackers can do a lot more. Besides just tracking walking and running, there are several other activities like

hiking, biking, yoga that a fitness band can track. All these activities are added to your daily activities. That's not all, the fitness bands can be synced with phones. With the help of this feature, you will be notified when you get calls, text messages or even social media notifications. They also remind you of any important calendar alerts, even if your phone is not with you. This is a feature on some of the fitness bands that offers features found on smartphones. Most of these activities will definitely push you to stay active and keep you engaged the entire day. The only thing you need is to start finding time from your busy schedule and start exercising.



Fig16: Features of fitness band

5.2 ADVANTAGES:

1. ADOPTABILITY:

As we know fit band technology is increasing day by day, the usage of fit bands are increasing regularly. The consumers are happily using new healthcare technology.

2. DAILY MOTIVATION:

The consumer uses this not because it helps in exercising, there is no use if this in exercise but it tracks the amount calories we burnt in running or in any type of exercise. So this track keeps you motivated to stay healthy and fit.

3. TRACK YOUR SLEEP:

The best thing why adults use this is that it keeps track of their sleep which helps them maintain a proper sleep routine. Not only this, it also tracks how much time you were in deep sleep, this helps them to update their sleep pattern.

4. SET YOUR OWN GOALS:

As this keeps track of most of your basic health factors, it helps you to keep updating your lifestyle. This also motivates to set some health goals in our busy schedule so that you can take care of yourself as well.

5. MONITOR HEART RATE:

These fit bands keep track of our heart rate as well which is very useful for people who suffer from bp related issues. This helps them in keeping track of their heart rate and if they face any sudden change they can take safety measures.

6. STAY CONNECTED:

This band stays always with 24/7. These wearable sensors work only when you wear them always and should always be connected with your smart phones so that you get notification from time to time.

7. AWARENESS FACTOR:

It keeps you notifying about every small update about your health which increases your awareness about many facts of healthcare to you.

8. DESIGN OR STYLE FACTOR:

If we talk about its style , it's very handy and stylish. It never goes out of trend and works with whatever style you carry.

9. MONITOR MANY CHRONIC HEALTH FACTORS:

This band montor many chronic health factors so that you can keep track of your health real-time and if you face any issue you can take necessary steps without wasting time.

5.3 DISADVANTAGES:

1. BATTERY LIFE ISSUES:

Consumers usually face battery issues with time. Common complaint for this band is that we need to charge it regularly to use it.

2. ACCURACY ISSUES:

As we know that these bands are not that accurate. Most famous fit band named fitbit is 52% accurate and other than that are less than this. So this is an area which needs to be improved super soon.

3. NOT AFFORDABLE:

Everyone faces this issue that these bands are very costly and everyone can't afford them so. But it's improving with time. My idea is also to resolve the same issue.

4. NEED CONNECTIVITY WITH SMART PHONES:

As we know these fitness bands should always be connected with your smart phones, this increases the problem for those who don't have smartphones .

5. FIT/FORM FACTOR:

When we talk about style quotients it is perfect but wearing it 24/7 is a bit difficult and uncomfortable as sweating problems arise and many more.

6. SCALABILITY LIMITED:

As there are limitations for every track it keeps which makes it not comparatively useful as it should be. Utility wise its reliability decreases.

5.4 EXISTING MODEL:

Earlier there were 17 types of sensors used in fit bands which are mentioned below:

1. 3-axis accelerometer: These sensors are common and can be found in almost all the activity trackers these days. This is an electromechanical device that senses gravity as well as linear accelerations i.e., it tracks movements in which direction you're moving and also take inertial measurements of your body's position and velocity.
2. Altimeter: This sensor uses atmospheric pressure to sense any changes in the altitude. A very beneficial sensor to accurately track your steps, especially while climbing the stairs.
3. Ambient light sensor: How does your fitness band knew that it is night or you're going into the sunlight? Well, that is where the ambient light sensor comes into place. It detects the time of the day by converting the light into a digital signal and then broadcasting it to the inside unit. This sensor is also used in mobile devices to increase or decrease the screen brightness, thus saving your battery life.
4. Barometer: These measures and also shows the atmospheric pressure, thus you can know whether it is going to be sunny or rainy day.
5. Bioimpedance sensor: These sensors are most commonly used in Smart weighing scales to measure your body composition such as the total body fat

w.r.t your lean body mass. These days some fitness trackers are also using these sensors to track heart rate, sleep patterns, hydration, respiration rate and even skin galvanization.

6. Capacitive sensor: Do you know how some smart bands wake up from sleep when you just move your wrist? Well, the capacity proximity sensor is responsible for that feature. It helps in lowering the power consumption by putting the device to sleep (and wake up) when not used for a long/set amount of time.
7. Compass: This sensor is mostly found in Sports Watches. It shows the direction of magnetic north and bearings from it.
8. ECG sensor: Also known as Electrocardiogram sensor, it records the electrical impulses that are sent by your heart with each beat, through the heart muscle. These tiny signals can only be picked up by ECG.
9. GPS: Global Positioning System (GPS) is one great feature in the fitness tracker that ensures your calorie burn stats are accurate. It works by tracking your exact location while you are walking or running by calculating the distance between series of GPS satellites.
10. Gyroscope: Gyro sensor aka angular rate sensors aka angular velocity sensors help in tracking your movements more accurately while you're on the go.

11. LTE: This is mostly seen in Smartwatches and some fitness trackers as well.

A LTE enabled device, simply means that it has built-in mobile connection i.e., you can make/receive calls directly from the device itself.

12. Magnetometer: This is another useful sensor to track your coordinates exactly. The sensor measures the magnetic field of the earth and can also be used as a compass.

13. Optical heart rate sensor: This is now the most popular as well as the most common feature among the fitness bands and smartwatches starting from budget variants to premium devices. The heart rate sensor sits comfortably within the fitness tracker or smart watch, preferably under the device with a small light against your skin. When your heart pumps the blood, it moves through your veins at a faster pace, thereby causing less light to be reflected backwards. The device with optical HR sensor then calculates your heart beat using a special algorithm. However, the results are not that perfect, for you to consider them as an alternative to the heart rate monitors that are close to your chest.

14. Pulse oximeter: Pulse oximeter sensors are in the market since 1980's but became affordable only recently, all thanks to the advancements in healthcare technology. It uses LEDs as a light source to emit light into the tissue and a

photo detector is used to collect the light back from the skin. They measure how well the oxygen is supplied to each part of your body from your heart.

15. UV sensor: This is by far the most useful sensor in the list as far as I know.

The UV sensor monitors the sunlight and alerts when you're absorbing dangerous UV radiation

16. Temperature sensor: This sensor provides your body's temperature reading or external temperature when needed.

17. Gesture technology: This is some future tech that controls the functionality of your devices through your body movements such as rising your hand, moving your fingers etc.

So we will work on sensors and will try to minimize this sensor to 9 sensors. Those sensors and the complete process will be explained in the next section.

CHAPTER 6

PROPOSED MODEL and IMPLEMENTATION

6.1 Proposed Model:

My idea is to connect this wearable sensor to the server so that the data is going to save there and the doctor also can connect through the same server and can get a real time update of your health condition. After this we will try to minimize the number of sensors used in fitness bands earlier. Earlier there were 17 sensors used but I will try to minimize it to 7 sensors and try to make it cheap in cost. Types of sensors we are using:

- ARDUINO BOARD
- ACCELEROMETER
- BLUETOOTH MODULE
- POLYMER LITHIUM BATTERY
- RASPBERRY PI
- GYRO SENSOR
- USB TO UART CONVERTOR



Fig 17: proposed model

6.2 IMPLEMENTATION FOR MINIMISING SENSOR:

Step1: Understand mechanism of every sensor

Step2: Collect all your hardware together

Step3: Start assembling

Step4: Upload code of arduino card

Step5: Install and run the app

Step6: Start packing your hardware in band form.

Step7: Epilog.

6.3 IMPLEMENTATION FOR CONNECTING RASPBERRY PI TO CREATE A PRIVATE NETWORK:

Particle Cloud is another solution which allows you to connect a Raspberry Pi (or any device built on the Raspberry Pi platform) to their cloud service. As far as I understand, the cloud is free for up to 25 devices. So, it's absolutely affordable for prototypes

6.4 IMPLEMENTATION FOR SYNCING TO CLOUD:

1. A person accumulates steps by walking or any other activity
2. The fitness tracker's sensor records this data in real-time, but the data stays local on the device
3. The fitness tracker will background sync the activity data to the device app on your phone (i.e. the Fitbit app) at various intervals. Background syncing usually happens between 1–20 times per day.
4. The fitness tracker app (i.e. Fitbit app) will immediately send that data to its cloud/API
5. The cloud/API will notify authorized 3rd party apps, like MoveSpring, of new user activity data

6. The 3rd party app (i.e. MoveSpring) will receive the notification and immediately retrieve the data from the cloud/API (i.e. Fitbit API). MoveSpring will then run through scoring and update the challenge rankings.

6.5 5 MAJOR IT TRENDS:

As information technology is growing day by day, and there is new advancement every minute they are supporting the fight against coronavirus. This outburst is not easy for any sector whether its business or IT or banks. Every sector is becoming economically weak as no social gatherings lead to no workforce which leads to fall in their income. Still every firm is trying their best from work from home to give all the efforts to pull it off in such disastrous situations. There are major IT trends mentioned below which show how they contribute to fight back this situation.

1. IOT and COVID-19

COVID-19 as soon as it was declared as the major epidemic, industry 4.0 started focusing on its solution. It has played an important role in tackling this major outbreak. There are many AI solutions which are helping the ease of the life of patients. They are providing a 24hrs surveillance system which is monitored by the machines to avoid the human contact. In this major outbreak the core fundamental which should be followed is social distancing. Use of machines can minimize that risk of being exposed. The doctor sitting in the other room can take

care of the patient without going near him using video conferencing. There are many technologies which are being used by the police and government. Drones are being used to see if the people walking on the streets are following the mentioned guidelines or not, if not then accordingly punishments and fines are charged. These are the smart sinks which provide an exact amount of handwash using the IOT sensor whenever the hand is detected and allows to clean and sanitize. Also, it provides an exact amount of water with medium temperature to stop waste of water and maintain hygiene.

2. A.I. in COVID-19

The primary goal of AI research is to extend our understanding of perceptual, reasoning, learning, linguistic and inventive processes. AI is doing a lot for the treatment of the patients of COVID pneumonia. CT scan images for testing purpose: Many images from the different patients have been collected to feed the data to the neural network system. It has been found that there are some radiological rays which can be studied in the CT scan of the chest to find out if the patient is a positive or a negative case. Reading these rays is also not a very easy task for the doctors or radiologists. Studying respiratory patterns: COVID-19 has a different type of respiratory formation from common flu and hence there can be change observed in the respiratory pattern. These patterns are studied by using GRU neural networks. Wellness prediction of the patient: A prediction

model based on XGBoost Algorithm is used to measure the mortality rate of the patients. In this the patients are categorized in 3 groups for reading: lactic, lymphocyte, highly sensitive and according to which the number of days the patient is going to be treated at the hospital is estimated. Defining the structure of Proteins: AlphaFold uses amino acid sequences to measure the presence of the proteins related to the SARS. DNA testing: Improved DNA testing is the requirement for the detection of SARS-CoV-2. It changes the sequence of the RNA genes and can cause the flu.

3. BLOCKCHAIN and COVID-19

Sharing of confidential data has always been a problem of digitization. Revealing the identity of customer and supplier can lead to important data leaks. There is a lot of competition in the market and nobody is willing to lose their customer's trust. For ensuring the trust of the customer and safeguarding their data block-chain may play an important role. The supply chain created by the block-chain does not require the information of the supplier but only the customer Id and the sending address. Blockchain is helping through providing transparency over user's database so that consumers can detect whether the person in which they are in contact with affected through covid-19 or not. There are many new applications that blockchain provided such as MIPASA app which is introduced by IBM which is used to fight covid-19.

4. BIG DATA in COVID-19

Big data plays a major role in taking actions against this pandemic. There are many technologies that are assured to pull out of the world from this crisis. The major technology introduced by big data after this outbreak was the migration map. This migration map helps people to understand where this outburst is coming and at what extent it is harming. This also tells the red alert areas or areas which are infected from this infection. This also helps us to know whether areas near us are infected or not. This migration map helped China a lot in fighting this pandemic. Predictive analysis helping people to predict whether this infection is going. Its data driven technology is helping to understand this pandemic nicely. Their data platforms track no. of patients and help them track more. Their early warning analysis helps people to know information about what is coming next.

5. DATA ANALYSIS in COVID-19 Data analysis plays a major role in fighting this outburst of coronavirus. To keep track of patients and all their information is analyzed by a data analysis model. The no. of patients who are dead or active cases or recovered are estimated through data driven models. All the analysis regarding covid-19 and all the updates are analyzed by analysis techniques. Data visualization is also done from these techniques.

6.6 9 MAJOR TECHNOLOGIES BEING SUGGESTED in FIGHTING COVID19: Below mentioned is some digital technology that is becoming boon

in this depressive situation. These technologies are making our lives a little normal and letting us make use of this quarantine time as well. They are trying their best to help us so that we can continue our duties while working remotely.

1. Video conferencing:

As 191 countries announced complete lockdowns, it leads to closure of all the educational institutions and all firms. In this closure, all the firms and institutes started remote work and distant learning as their basic need to not fall apart in crisis due to which no greater can be harmed to anyone yet social distancing can also be applicable. All they started online classes through videoconferencing apps, cloud meetings, work collaboration tools, team viewer apps, virtual private networks, etc. as their base to maintain a work-life balance. Online submission of tasks has to be done. There are many different types of apps that are receiving big hikes due to the increase in no. of users and heavy traffic. Even institutes are planning to take online exams so that students pass this year as exam holding seems impossible at offline centers.

2. Social media and digital gaming software:

As everybody is quarantined, social media platforms are being the blessing for mankind whether it's for being a source of information or source of entertainment, in both the ways social media is playing a vital role. Engagement over social media has been increased as this has become the only source of communication

among people. This helps them to keep themselves busy so they panic less about the crisis. If we talk about digital gaming software, it has always been a keen source of entertainment among youngsters. But nowadays, to keep themselves busy everyone has started playing these digital games. There are many types of games played on video conferencing as well so that people don't miss being physically there.

3. Tracking and tracing of coronavirus contacts

As the effects of COVID-19 are increasing day by day, a rare collaboration is seen to fight against it. This collaboration is announced by Apple collaborating with Google to create a tracking device that can tell you where the person near ever been in contact with any patient suffering from this infection. They took Bluetooth as their base technology. This software is called Tracetogether in which short distance Bluetooth which will exchange signals with the person in front of you and all the data is saved on a server that is directly accessed by the ministry of health. There is another app used in India named AROGYA SETU which works on the same fundamentals on a different level. This also proves as another boon to society given by technology. This makes it easy for the government to find or trace the people who came in contact with the infected person.

4. Robotics, drones, and chatbots

Drones are of great help in providing test kits and necessary supplies to emergency areas as it reduces delivery time and improvises the response time. It can also be of great help for maintaining and tracing people who are not following any type of guidelines. This can be used as surveillance for maintaining peace. As the workforce is decreasing day by day, robots can be of great help for providing medicines to the infected people so that contacts with them can be minimized. This also can be used as great help for supplying goods to red alerts areas. Chatbots are used for making interactions with patients remotely. Such chatbots are trained as professionals according to guidelines of the ministry of health.

5. 5G communication and networking

As everything is shifted to online platforms everybody's need is a good network. Due to its huge bandwidth, and latency rate all the hospitals and command centers are using 5G networks for communication. It works seamlessly in any type of weather. 5G is playing a vital role in creating accurate networks for communication. Its high-speed compatibility will help all the firms to keep track of their employees' work and data sharing become easy. Although implementation 5G is not globally due to its major disadvantages of being highly expensive. But soon this will come to an end.

6. 3D printing

3D printing is playing major roles in maintaining stocks of supplies which are needful for fighting this pandemic. 3D printers can be used to create lots of masks and other supplies using different design files and raw materials. The supply of goods that are banned due to no border export guidelines can be created using these 3D printers. Many countries are using this technology to keep their stocks full of necessities. Masks, sanitizers, and other equipment can be used to maintain supply chains among ourselves.

7. Digital and Contactless payments

As cash can carry viruses in it, it is advised by the world bank to minimize the use of cash notes. Although they are taking all the important measures to prevent cash from this virus. Still, they suggest digital payment and promote the payment through ecards or other payment apps. This leads them to online purchases and keeps them inside their houses. Online payment or net banking helps them to maintain social distancing.

8. Supply chain 4.0

As everything is going online and all the people are suggested to maintain social distancing, their basic necessity is that everything that they want can be supplied properly, so that they will not face any problem. 4 major industries are working together to maintain the supply chain properly. Those industries are blockchain, big data, IoT and communication. They all are working so that everyone can get

what they want in specific so that it doesn't get over. Exact amounts of supply are made for everyone so that no wastage can occur. This maintains the accuracy of data and takes steps for data sharing properly.

9. AR/VR

Augment reality or virtual reality is always a part of entertainment for humans. This technology always helped people to promote remote work. As in this lockdown everyone is stuck in lockdown this helps people to communicate without even being presented there. There are many companies using virtual reality for organizing the meetings and presentations. Many builders from different countries provide their customers the VR tour of property to increase their production sale.

CHAPTER-7

CONCLUSION AND FUTURE SCOPE

We hope our trained cascade can be used in some applications such as intelligent searching, which searches for eyes and mouth through horizontal and vertical overlapping blocks of the edge image. In the future it will be very affected.

7.1 CONCLUSION

In this we explained all the facts about the fitness band, what is a fitness band, its rise and falls, its evolution. After that we explained how a fitness band becomes useful when you don't have a doctor nearby for chronic disease. Then we further explained the idea of using a raspberry pi inside a fitness band so that a private network can be created so that various other doctors can also monitor your health conditions. This is an experimental approach towards the new idea of a fitness band. All these days, wearable sensors, activity tracker and fitness bands are well known for their new thoughts but most of them don't have the accuracy to fulfill consumer's needs. Its most important issue with this product is its cost. So, I tried to minimize its cost by minimizing the number of sensors used. This was my proposed model for the paper to minimize the cost and increase connectivity. So further it also explains the future needs of the consumer from the product. All these things are included in my project.

Covid-19, the reason for major depression and many more problems is no more a reason to worry until we are united and being positive to get through this situation. This paper concludes every possible fact about COVID-19. From what it is to How it affects us. It also shows how badly it's spreading like oxygen in the air. There are also mentioned how we are pulling it back to reduce its effects. This also tells us about how technology helps us to fight against this coronavirus. There is mention of major technology which is making our lives easy in this disaster. There is also mentioned how major IT trends fighting it with different use cases and different effects. Summarily it's inspiring to see how every sector is giving their best efforts to save mankind from this invisible enemy. In bad times, real well-wishers are those who help you to come out from a bad situation, and IT trends are being well-wisher in this disaster.

7.2 FUTURE SCOPE

Dedicated activity trackers or fitness trackers can help you move more, sleep better, and improve your overall health. However, fitness trackers are slowly fading away and smartwatches are taking their place. Users now want more features from their fitness bands like internal sensors, bigger, better screens and more. But, are we witnessing the death of the fitness tracker or is the market just experiencing a lull before it surges back in line with smartwatch? Well, looks like it's in the balance for now, but there are signs that indicate fitness trackers could soon be back on top. In

this article, we'll take a closer look at the companies we believe will continue to lead the fitness tracker market and explore potential next-generation features that they could introduce to make sure these trackers still lead the fitness tracker charge. Till now we know what type of work has been done in this field, but there is still scope of improvement. These are the future improvements which can be done in this fields:

- Sweat rate measurement is one of the most important growth which is expected in the near future because it's very crucial for athletes to get in measure in handy ways.
- Blood sugar level is needed for patients so it would be great if their fitness band can detect that as well.
- Features to increase in make it easy for the help of people with disabilities so they can also feel it is handy.
- Smaller trackers so that it can be more handy and more stylish as well.
- Waterproofing is a feature which many companies have tried and many are still working. So this can be a greater change if fitbands can be waterproofed.
- Battery life issues are most common in this technology so it will be great if battery life can be improved.
- Accuracy can't be compromised when it comes to health and as we know accurate tracker is fitbit which is only 52% accurate. So the most important improvement is to increase accuracy so that it can be more reliable.

- Security issues are also a major problem as it has gps so it's easy to hack the band. So security must be improved.
- Flexible technology could be one of the biggest changes in fitness trackers. This would mean that the modules would be thinner, bendable and could fit more snugly around the wrist. Samsung has long showed an interest in flexible technology and has a plenty of wearable prototypes exploring these kinds of developments.
- Since blood pressure monitoring feature aims to offer medical-grade tracking, adding it to a mass-market device requires FDA approval and, perhaps because of this, it isn't necessarily a priority for companies like Fitbit and Garmin just yet. Since it's a strong indicator of overall health, rumors indicate the big names are all exploring the possibility of the feature, reports Wearable.
- There's plenty of dispute whether it is possible to monitor glucose through non-invasive methods on the wrist. While it's unlikely we'll see fitness trackers offering glucose monitoring anytime soon, Fitbit is preparing a coin-sized glucose monitoring patch that's minimally invasive, and transmits the data to its wearables.
- Fitbit is expected to start on this feature sooner rather than later, and that should mean an overlap onto its fitness trackers.

- Consumers have been crying out for hydration monitoring in high-tier wearables for some time now. But, it's hard to monitor hydration precisely. Fitbit has shown itself to be the most forward-thinking in this area, though this is a feature that fits Garmin's M.O. better than any other wearable giant.

There are many areas which need improvement and can be invented in future as well.



Fig 18: future of fitness band

7.3 REFERENCES:

1. Man lai C.; Ka Yin C.; Gary T.; Michael L.; Ka Yan H.; Stuart F.; David B.; Ejoo K.; Ka Yiu L. (2019); "Examining Consumers' Adoption of Wearable

- Healthcare Technology: The Role of Health Attributes” In: *International journal of environment research and public health*. Vol. 16 , 2257.
2. Mischk J. (2018) , “ Wearable technology: The Latest Trend in Professional Sport” Available online : <https://www.wearable-technologies.com/2018/05/wearable-technology-the-latest-trend-in-professional-sports/>
 3. Robin W.; Latrina K.(2014); “ Wearable Technology: If The Tech Fits , Wear It” In: *journal of electronic resources in medical libraries* , vol. 11 , pages 204-216.
 4. Kayla R.; Penny A.; Jos P.:(2018); “ RELIABILITY OF FITNESS TRACKERS AT DIFFERENT PRICES FOR MEASURING STEPS AND HEART RATE: A PILOT STUDY”. In: *Central European Journal of Sport Sciences and Medicine* | Vol. 24, No. 4/2018: 57–64 DOI: 10.18276/cej.2018.4-06.
 5. “ Types of Sensors in Fitness Trackers & Smartwatches” available on 24 oct 2019 ; available online : <https://bestfitnessbands.in/activity-tracker-sensors/>
 6. “Make Your Own Activity Tracker” by GodsTales ; Available online : <https://www.instructables.com/id/Make-your-own-activity-tracker/>
 7. “A brief history of fitness technology” by Brad Millington on 15 january 2018 ; Available online: <https://phys.org/news/2018-01-history-technology.html>

8. “Advantages and Disadvantages of Using a Fitness Tracker” by dumb little man tips for life on 3 january 2019 ; Available online : <https://www.dumblittleman.com/do-fitness-trackers-work/>
9. Shin J.; Mohammad K.; Amir G.; Nicci B.; Ahjung L.; Xiaopeng; (2018); “Wearable Activity Trackers, Accuracy, Adoption, Acceptance and Health Impact: A Systematic Literature Review.” In : 10.13140/RG.2.2.22188.10888.
- 10.Coorevits; Lynn C.; Tanguy;(2016); “ The Rise and Fall of Wearable Fitness Trackers”. Available online : https://www.researchgate.net/publication/310686726_The_Rise_and_Fall_of_Wearable_Fitness_Trackers
- 11.“ The Evolution Of Fitness Trackers For Athletes And Consumers” by sporttechie ; Available online: <https://www.sporttechie.com/the-evolution-of-fitness-trackers-for-athletes-and-consumers/>
- 12.“how can set raspberry pi home server” by toptal ; Available online : <https://www.toptal.com/raspberry-pi/how-to-turn-your-raspberry-pi-into-a-development-server>
- 13.Tech pitches in to fight COVID-19 pandemic by Ken Mingis on April 2020. Available at: <https://www.computerworld.com/article/3534478/tech-pitches-in-to-fightcovid-19-pandemic.html>

14. How next generation information technologies tackled COVID-19 in China
By QI Xiaoxia in April 2020. Available at:
<https://www.weforum.org/agenda/2020/04/how-next-generation-information-technologies-tackled-covid-19-in-china/>
15. Ten Digital Technologies Helping Humans in the Fight Against COVID19 by
Kiran Kumar and Hiten Shah on March 2020. Available at:
<https://ww2.frost.com/frostperspectives/ten-digital-technologies-helping-humans-in-the-fight-against-covid-19/>
16. 10 technological trends to watch in COVID-19 pandemic by Yen Xiao and
Ziyang Fan on April 2020. Available at:
<https://www.weforum.org/agenda/2020/04/10-technology-trends-coronavirus-covid19-pandemic-robotics-telehealth/>
17. How private-sector tech companies are stepping up to the COVID-19 fight by
Amiee Percy on April 2020. Available at:
<https://www.atlassian.com/blog/technology/private-sector-tech-companies-covid-19-fight>
18. COVID-19 and Conflict: Seven Trends to Watch by Crisis Group Special
Briefing N°4 New York/Brussels, 24 March 2020. Available at:
<https://www.crisisgroup.org/global/sb4-covid-19-and-conflict-seven-trends-watch>

19. Binti Hamzah FA, Lau C, Nazri H, Ligot DV, Lee G, Tan CL, et al. CoronaTracker: Worldwide COVID19 Outbreak Data Analysis and Prediction. [Submitted]. Bull World Health Organ. E-pub: 19 March 2020. doi: <http://dx.doi.org/10.2471/BLT.20.255695>
20. Hiroshi Nishiura, Sung-mok Jung, Natalie M. Linton 1, Ryo Kinoshita 1, Yichi Yang 1, Katsuma Hayashi 1, Tetsuro Kobayashi 1, Baoyin Yuan 1 and Andrei R. Akhmetzhanov 1; (2020); “The Extent of Transmission of Novel Coronavirus in Wuhan, China, 2020”; In: © 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).
21. Can Coronavirus like outbreaks be controlled with IOT? by DQIndia on February 2020. Available at: <https://www.dqindia.com/cancoronavirus-like-outbreakscontrolled-iot/>
22. Coronavirus is exploding the remote workforce – here’s how IT should prepare by Kurt Marko on march 2020. Available at: <https://www.dqindia.com/cancoronavirus-like-outbreakscontrolled-iot/>
23. Covid-19 boosts remote work, security concerns by Chandu Gopalakrishnan on march 2020. Available at: <https://www.scmagazineuk.com/covid-19-boosts-remote-work-securityconcerns/article/1675908>

24. Falcinelli, Shane D; Chertow, Daniel S; Kindrachuk, Jason (2016). "Integration of global analyses of host molecular responses with clinical data to evaluate pathogenesis and advance therapies for emerging and re-emerging viral infections", ACS infectious diseases
25. "mapping-the-landscape-of-artificialintelligence-applications-against-covid-19"; By: Felicia Vacarelu, Communications Specialist, UN Global Pulse on March 2020. Available at: <https://www.unglobalpulse.org/2020/03/mapping-the-landscape-of-artificial-intelligence-applicationsagainst-covid-19/>
26. Becky McCall; "COVID-19 and artificial intelligence: protecting health-care workers and curbing the spread"; in: [https://doi.org/10.1016/S25897500\(20\)30054-6](https://doi.org/10.1016/S25897500(20)30054-6), VOLUME 2, ISSUE 4, PE166-E167, APRIL 01, 2020
27. Bennett, Jordan. (2020). "Smart Ai ct scan based Coronavirus2019/Covid19 detector." In: Researchgate
28. K. C. Santosh(17 March 2020); "AIDriven Tools for Coronavirus Outbreak: Need of Active Learning and Cross-Population Train/Test Models on Multitudinal/Multimodal Data"; In: Springer Science+Business Media, LLC, part of Springer Nature 2020

29. Mihalis Kritikos (2020); “What if we could fight coronavirus with artificial intelligence?”; In: EPRS | European Parliamentary Research Service Author: Mihalis Kritikos, Scientific Foresight Unit (STOA) PE 641.538 – March 2020
30. “Covid-19 and IOT” by Aradh group on march 2020. Available at: <https://arad.co.il/blog/covid-19-andiot/>
31. Phones Could Track the Spread of Covid-19. Is It A Good Idea? by Will Knight on march 2020. Available online at: <https://www.wired.com/story/phonetrack-spread-covid19-good-idea/>
32. The New Transparency: smartphones, data tracking, and COVID-19 by Mark Andrejevic on march 2020. Available at: <https://lens.monash.edu/2020/03/09/1379796/the-new-transparency-smartphones-data-tracking-andcovid-1>
33. This startup wants to fight Coronavirus with soap and water by Adi Pick on march 2020. Available at: <https://www.calcalistech.com/ctech/articles/0,7340,L-3799860,00.html>
34. Covid-19 Tracker by Bing live. Available at: <https://www.bing.com/covid>
35. Ting, D.S.W., Carin, L., Dzau, V., et al. “Digital technology and COVID19”. In: Nat Med (2020). <https://doi.org/10.1038/s41591-0200824-5>