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Survey on Smart Ring

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ABSTRACT: Today in this fast growing world, we are facing many challenges. This system we designed is basically a combination of multiple ideas to implement single idea (to make a ring smart and versatile). There are many existing devices like smart watch and bands for quick accessibility, health monitoring system and camera but when we talk about technology, it comes to small size as well as portability. Basically, every device or technology that can make our life easy can save time or money or effort is smart. Any device that is connected to the internet and also uses sensors data is a part of internet of things. So we are coming up with a highly portable device, a ring, which does not require any external charging source and package of many features like call pick / drop, inbuilt MIC, spy cam, phone security system, GPS, SIRI/Google assistant, health monitoring system, SOS and most importantly body heat charging.

KEYWORDS: SOS: Save Our Souls, Smart Ring, Wearable, Self Charging, and New Technology.

I. INTRODUCTION

The main idea behind the ring is to ease the daily task and avoid the concept of charging through external charging points. This ring would be very much useful in the daily routine. The features would include:

1.1 Call pick/drop: These days talking on phone for long hours is a very common thing. Also during business where picking a lot of calls is important makes very difficult for a person to pick approximately a 113g of object again and again. Now think of avoiding the phone and picking up the calls with an approximately 20g device, a ring. This ring will allow you to pick and drop or end a call. Calls will be picked or dropped with a single tap and cancelled with a double tap.

1.2 SIRI/Google assistant: Voice command is very important aspect in the life if used efficiently. Many times the phone is quite distant from our reach, voice command is really useful at that time, now think of accessing SIRI / Google assistant with your ring which would help you fulfil many requirements like sending text, making calls, setting alarms, making reminder, etc. This feature will be accessed by a long tap on the ring. So this ring will have an inbuilt MIC which gets activated while on a call or using SIRI/ Google assistant.

1.3 Spy cam: In today's era, harassment, kidnapping, snatching, road rage and various other crimes are increased day by day and in almost every case we don't have any proof against the criminal to prove his crime therefore this ring will also help you to collect proof with an inbuilt spy cam which has activated on triple tap on the ring.

1.4 SOS: With the spy cam we also offer a feature of SOS, which is used in case of emergency. The ring will activate SOS feature on the phone which will send your location to the registered contacts during emergency. A separate button will be provided to activate SOS feature. This feature will be activated by the long press of that separate button.

1.5 Phone distance alert: With this hectic schedule and everyday tension faced by almost every individual, many times we forget our phone to carry and may misplace it. Now to overcome such situation it has an inbuilt alert system which will make an alert after reaching a specific distance.

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1.6 Body heat charging: This ring will be ON only when we wear it in our finger. It does not require any charging rather it will charge itself with our body heat. This technology works on harvesting energy using thermally regenerative electrochemical cycle.

1.7 Health monitoring system: It will track steps, calories, BP, pulse rate as well as monitor heart rate. Also when the BP or pulse rate gets disturbed, it will also show a health alert.[4][7]

1.8 Gesture Control: The ring also provide the feature of gesture control, which allows us to control music (play, pause, play next or previous song).

II. METHODOLOGY AND MODULES

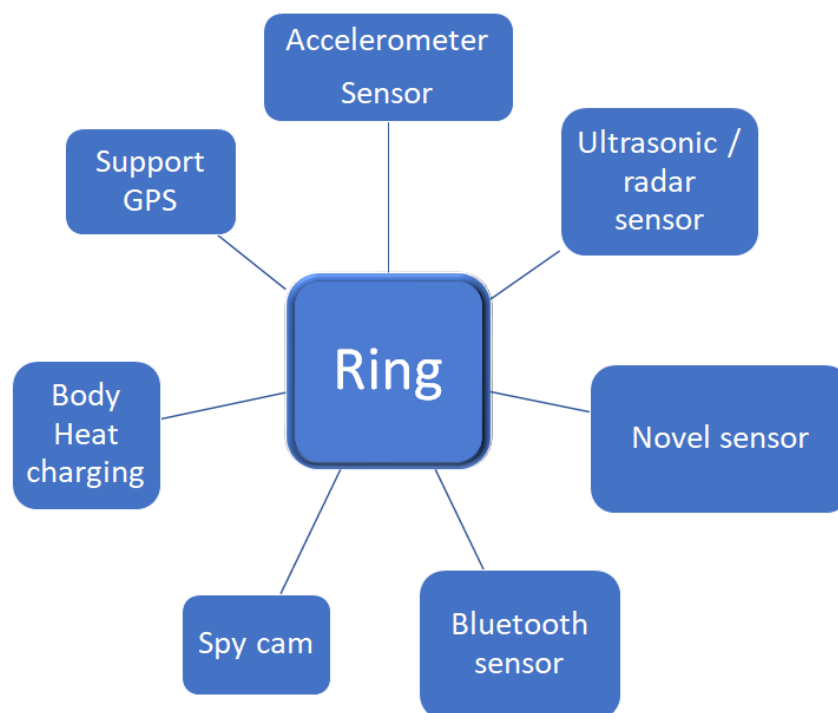


Figure 1: Features provided by the Ring.

With respect to such a small size which the ring has, it will be able to easily accommodate all the sensors Mentioned above such as novel sensor, accelerometer sensor , ultrasonic/radar sensor , Bluetooth sensor for Connectivity, spy cam, GPS and body heat charging system.

2.1 Accelerometer: This sensor will be used for blood pressure monitor, heart pacemaker and other integrated health monitoring equipment.

Accelerometer as the name suggest measures the acceleration. Acceleration is basically speed or velocity divided by time. It is very useful for sensing motion and vibration.

Accelerometers are highly sensitive so, only they can measure every minute shift in acceleration. Tri-axial accelerometer is used to detect step counts.[4][7]

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2.2 Ultrasonic / radar sensor: They will help in measuring the distance from the phone, i.e. phone distant alert feature will be working using this sensor.

2.3 Novel sensor: This sensor will act as a power button. The ring will only get switched ON when it is put in the finger. Human presence can be detected using this sensor.

2.4 Bluetooth sensor: It will help us to connect the ring with put phone. This gets activated automatically when the ring is in the finger and new pairing device mode will be activated by single tap on SOS button.

2.5 Body Heat charging: Charging is basic problem we people face in our daily routine and so many times while doing an important or call our device get discharged. So here we are using the technology, which is introduced by researchers of Massachusetts Institute of Technology. So through this, ring doesn't require any external charging, it can be charged by our body heat, it requires temperature between 20 deg. C and 60 deg. C. This technology works on harvesting energy using thermally regenerative electrochemical cycle. It produces more electricity at lower temperature it is charged because energy absorbed by the body or external sources.[1]

III. COMPARISON OF SMART WATCH, SMART BANDS WITH OUR SMART RING

	Smart Ring	iWatch
1.	Charging not required, works with body heat.	Limited Battery Life
2.	Support every brand of smart phone.	Didn't support any other brand of phone support only iOS devices.
3.	Ring is of metal, so it will keep its appearance or quality for longer time comparable to bands.	The bands of iwatch get blemished via constant water interaction.
4.	This ring can be connected with any phone or tablet included iOS devices.	It can connect only with iPhone 5s or later versions of iPhone, and it also doesn't support iPad connectivity.
5	Ring is tough, cannot break easily	Since it has glass screen, therefore easily breakable.
6	Light in weight	Heavy weight
7	It will be cheaper.	It is expensive.

IV. RELATED WORK

4.1 Comparison of Smart Watch:

Name	Features
Samsung gear sport sw[14]	<ul style="list-style-type: none"> • Water resistant • Workout • Health track • Timely suggestion for stretching

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	<ul style="list-style-type: none"> • Control with touch • Activity tracking- sleep , step , workout , heart rate • GPS • Notification and call alert • Customizable watch face • Dedicated application store for utilities
Apple Watch Series 4 [13]	<ul style="list-style-type: none"> • GPS + Cellular • Optical heart sensor • Waterproof • Aluminium case • Proactive Health monitor • Automatic workout detection. • Activity sharing with friends. • Phone call, apple music, messages, podcasts. • siri

4.2 Comparison of Smart Bands:

Band Name	Features
Fit bit[10]	<ul style="list-style-type: none"> • 15+ exercise modes. • Store and play songs. • 4day battery life. • Heart rate monitoring system. • Female health. • Connected GPS. • Works on iphone and android.
Mi band 3[11]	<ul style="list-style-type: none"> • Large OLED touch screen • Instant notifications • Water resistant upto 50 m • Upto 20 days battery life • Stepcount & heart rate • Monitor sleep quality • Real time activity tracking • Secure design • Weather forecast • Events and alarms • Goal reminders • Idle alert • Convenient password free unlock • All new mi fit application • Soft skin friendly strap • 20 days of battery life • OLED touch screen • Call & notification alert-read messages and receive call

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	notifications and alert from applications such as uber , whatsapp etc
Honor band[12]	<ul style="list-style-type: none"> • AMOLED display - full colour. • Sleep monitoring. • Real time heart rate monitoring. • 50 m water resistant. • Multiple workout types. • Smart features- online number identification , incoming and reject calls , notifications, locate your phone, can take selfie , long battery life 17 days , stop watch , alarm time.

V. COMPARISON OF SMART RINGS

Ring Name	Features
Ocamo Multifunctional Intelligent Waterproof Smart Digital Ring with NFC	<ul style="list-style-type: none"> • Smart Digital Ring • Its Intelligent and Waterproof • It is Multifunctional
Generic JAKCOM NFC Magic Smart Wearable Finger Rings for Smartphone.	<ul style="list-style-type: none"> • Smart NFC Ring for Android Windows • Keyless entry to keyless doors. • It Replaces Payment Card or other IC/ID card. • Improve human health and prevent disease • Used in phone unlocking, quick start phone's applications, Share information. • No need to charge and waterproof • Full U. S. sizes optional
Leoie NFC Multifunctional Waterproof Intelligent Ring Smart Digital Ring Gift	<ul style="list-style-type: none"> • The main function is store and exchange personal information, as well as mobile content and personal privacy encryption unlock. • Charging not required and it is water resistant, programmable read-only lock function, 7-byte serial number clone protection function. • Short distance connectivity, put ring close to the NFC area for good connectivity. • Support all Android and Windows NFC.
LYCOS Life NFC Smart Ring	<ul style="list-style-type: none"> • Quality Stainless Steel Ring with Silicone Overlay • Personal Security Manager and have advanced features for mobile device security • Wireless Tap to Transfer Function (T2T) with two NFC 888 bytes of storage each • Unlocks phone with no password, just a Tap of the ring • Water resistant & Works with NFC phones, mostly

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	Android phones.
Fashionwu Multifunctional Smart Digital Ring Fashion Intelligent Ring NFC Ring	<ul style="list-style-type: none"> • Made of high quality material, healthy, comfortable to wear. • The main function is store and exchange personal information, as well as mobile content and personal privacy encryption unlock. • Short distance connectivity, put ring close to the NFC area for good connectivity. • Support Apple, Samsung, Huawei, millet and other NFC-enabled mobile phone.
MChoice Waterproof Wear Finger Digital Ring (C) NFC Intelligent Ring Multifunctional Smart Ring	<ul style="list-style-type: none"> • MChoice NFC Multifunctional Waterproof Intelligent Ring Smart Wear Finger Digital Ring (C) • BRAND : MChoice
Xenso ring	<ul style="list-style-type: none"> • Gesture control- control vole , change music • Bluetooth call • Data storage 4 GB • NFC payment • Separation alert • Silent alarm • SOS alert • Voice assistant-siri • Keyless entry to keyless doors • Fitness tracking

VI. CONCLUSION

This paper describes the features and specifications of the smart watches, bands and rings. It includes almost every important feature provided by the products of different companies.

Currently watches and bands are mostly used in smart and small sized technology. This platform is furthermore taken one step forward with smart ring. Most of the rings are NFC oriented.

The NFC is applicable for a very short distance and also has low connectivity. Our target audience is the youth, business persons etc., who are really stressed out picking up a heavy gadget (smart phones) in the hand.

We believe that our system is one step forward as the present implementation tells us that there is no such ring which works on the principle of self-charging. Since in this fast growing world and fast life, nobody wants to waste time for charging or carry a heavy power bank. But here we propose this idea for future implantation in context to the current scenario.

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