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SMART MOBILE – (THE TRENDIEST EMBEDDED SYSTEM)

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Abstract
The core objective of presenting this paper is to create awareness about the basic electrical & electronic systems commonly used in our daily life and the embedded systems which form the basic fundamental block in any electronic gadget which we use. Today it is also one of the most challenging fields in computer applications. in this modern global world, we use an embedded system directly or indirectly for some or other purpose in our daily routines. hence fortunately Embedded systems are used in many areas right from vehicles and mobile phones to washing machines and printers. Nowadays it is impossible to imagine our life without them. The paper discusses about What does an actual Embedded system mean & how do we make use of it in almost all aspects of our present life. It also presents brief glimpse of the historical evolution right from telephone to a smart mobile with various versions like CDMA,2G,3G,4G& 5G smart technology. It also focuses on applications, advantages, health hazards in using a smart phone. It concludes about the overall impact of smart phone in social life through the research methodology conducted on mobile usage & the other features used by the consumer apart from making calls. The responses are well scrutinized and observed to present the conclusion.

Keywords- CDMA (Code Division Multiple Access), Microprocessor, Microcontroller, AGC (Apollo Guidance Computer), Sensor, Actuator, UPI (Unified Payments Interface), OTP (One Time Password).

Introduction
Embedded system is a simple computer with a stack of hardware & software programs hidden or embedded with the help of a microcontroller or a micro processor.it is basically designed to be dedicated for a particular application in any of the electronic or electrical systems. Almost in all embedded systems we find processors & controllers were Microprocessor is referred aa a heart of the computer. It's a basic building block of processors & controllers etc. The idea of designing an embedded system lead to both software & hardware developments which is mandatory to operate. Even though many attempts were made by the scientists & designers to development a full-fledged embedded system since 1960 but then The first embedded operating system was invented in 1987 by Wind River. later gradual development of technology has led to invent many embedded systems in the fields of Automobiles, Industrial Machines, Medical Equipment, mobile phones etc., which are further discussed in the content.

History of Embedded Systems
- In1960 first modern embedded system Apollo Guidance Computer was introduced by Charles Stark Draper which was a real time application used by pilots for flight guidance & information.
- In 1961-66 D17 Guidance Computer was developed for Minuteman Missile Guidance System & Intel introduced the first 4-bit Microprocessor 4004.
- Later in 1971-74 8 bit Microprocessors 8008,8080,8085 were introduced made vendors to rush the market & also Texas Instruments developed the first Microcontroller.
- IBM PC Era began from 1979 with introducing 16 ,32-bit CPU, RISC & SISC were developed.
- In 1987 the first Embedded Operating system (VxWorks) was released by WindRiver.
- By late 1990's Linux appeared & later Microsoft Windows embedded CE in 1996.
- The Embedded market reached $140 billion in 2013.

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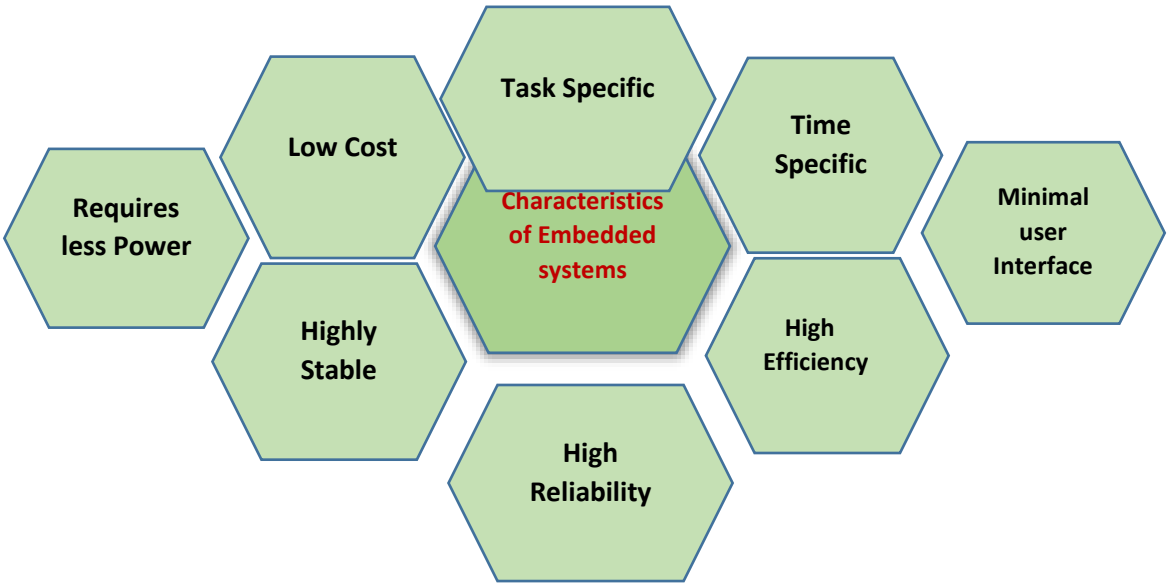
Vol-13, Issue-02, No.03, February 2023

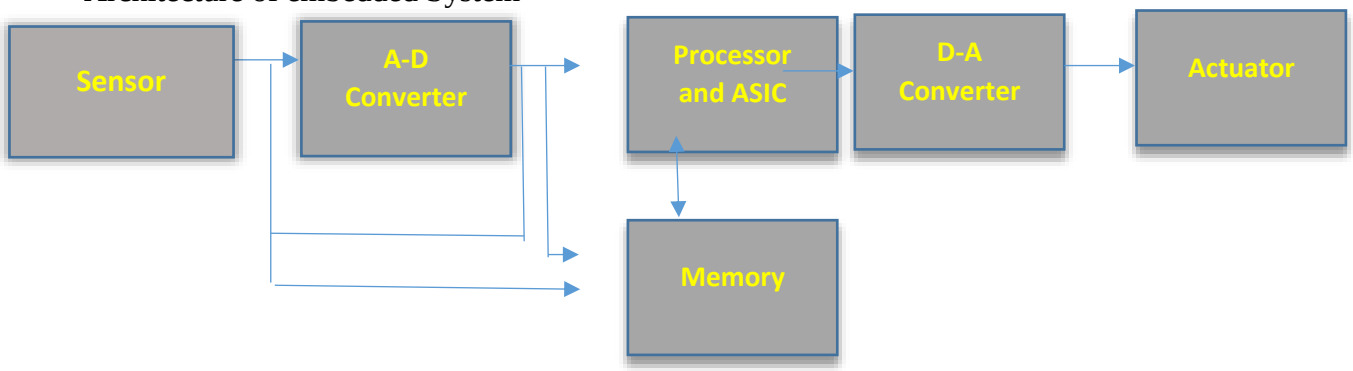
- Later many inventions were made and included add-ons.
- Analysts are currently expecting Embedded market larger than $160 billion by 2030.

Characteristics of embedded system



- Developed around a real-time operating system
- Can be either micro-processor or micro-controller based were both are integrated circuits that give computer power to the system.
- Designed for one specific task
- It must be interfaced with peripherals to connect input and output devices.
- Limited memory, low cost, fewer power consumptions.
- It does not need any secondary memory in computer.
- Often used for real-time computing in IoT devices.

Architecture of embedded System

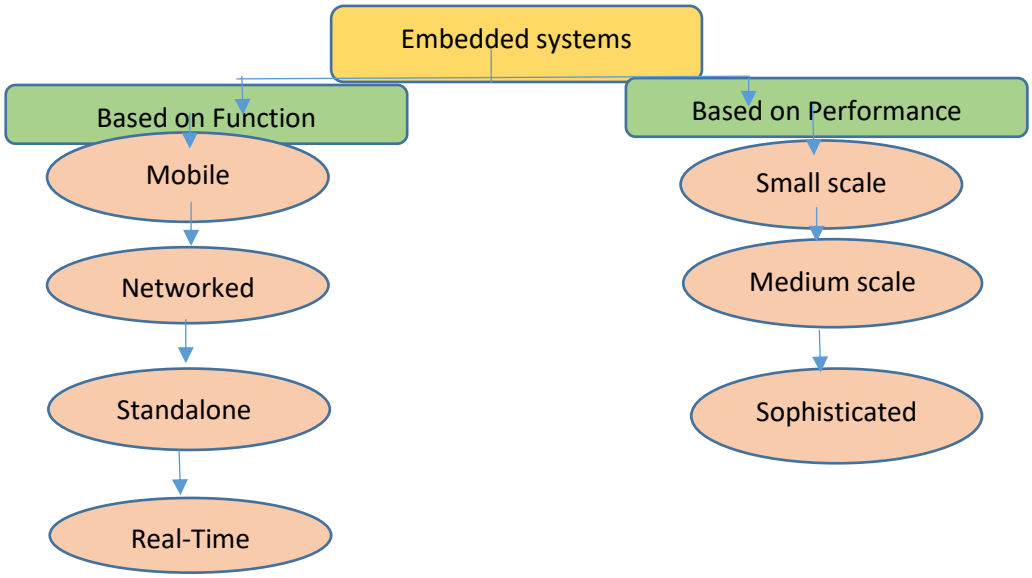


Sensor: Sensor converts physical quantity to an electrical signal & stores it in the memory.
A-D Converter: A-D converter (analog-to-digital converter) converts the analog signal from the user into digital which can be easily understood by the microprocessor or microcontroller
Memory: Major part of the digital data is stored in memory cells which can be of two types 1) Volatile memory 2) Non-volatile memory.
Processor & ASICs: This block of embedded system Processes the data to measure the output and store it to the memory.
D-A Converter: D-A converter (A digital-to-analog converter) the processed data from the embedded system into analog so that it can be easily understood by the user

ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

Actuator: An actuator allows you to compare the output given by the D-A converter to the actual output stored in it and stores the approved output in the memory.

Types of Embedded Systems



There are several common embedded system software architectures, which become necessary as they grow and become more complex in scale. There are many applications of embedded systems which majorly include Automobile industry, Medical Sciences, Networking, home devices, smartphones etc. In spite of all the above mentioned aspects one of the trendiest application of embedded systems at present is “Smart phone” which has turned out as most important gadget to be carried always when we step out of our homes.

To be more specific smartphone is simply a pathway in between embedded system & general purpose computer. Growing technology has forced us to use wide range of mobiles starting from telephone, walky-talky, wireless connectivity, CDMA technology to 2G/3G & has reached 5G era within no time. In simple words smart phone is a half way representation of a computer. Designing a smart mobile is a very difficult challenge as it requires many peripherals required for multitasking activities & it should be specifically designed according to the consumer’s choice for example look wise it must be tiny & slim, with high performance, cost effective, reliable, should last a long battery time even with poor power sources while sensing & influencing their surroundings. Ultimately mobile is the most widely required tool in almost all the fields say in education for presentations, video classes, online gathering and also to save data in soft forms, in case of Medical sciences it has become more effective because these days most of the appointments & consultations are made virtually until & unless physical check-up is mandatory. Especially when minute abnormalities are concerned doctors are preferring to prescribe emergency medications online which saves time. Fortunately, some of the major internal diagnosis are done using smart machines which operate on artificial intelligence. What not everything can be controlled if we have a smart phone in your hand. Everything is just a click away, right from groceries to medicines anything is made available online & they are delivered within an hour at your doorsteps reducing the risk of other aspects. But very fortunately there can be disadvantages also on the other side. The only thing required to perform any activity is a smart phone with Wi-Fi/data connectivity & the concerned application to make work more simple & easy. On the other hand, there are many more requirements beyond like network operator, features of the mobile, Resolution of lens camera, battery backup, display, operating system, primary memory expandable memory, USB slots hence one should be more dedicated to design a smart phone embedded with various peripherals required within a single chip. There are uncountable number of brands which are manufacturing smart phones with latest technology as required by the customers. Based on the selling price scales every manufacturer is trying to produce a new by-product from the existing versions simply by adding a

ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

more & more options available to customers. Hence mesmerising customers to buy the product irrespective of the price. An IPhone can serve as a best example in this scenario, Apple provides the safest security to the smart phone with all possible options similar to other brands but the only point of more sales is just the security they provide for the device which the other brands are failing to produce. Similarly, the cheaper smart phones are even developed using low quality material usually manufactured in Korea & Japan which do not provide a longer wear & tear for any product.

Research methodology

A Survey was conducted on "Smart phone usage by the consumers" by considering the primary data using google forms questionnaire. Some data has Graphical analysis used for comparing the data & respective graphs are attested below for reference. According to the survey conducted on consumer's mobile usage the following aspects were observed (Most of the responses are from men & women aged from 21-30).

- Every citizen owns a brand new latest model 4G/5G technology supportive smart phones (often in the range of 18000/- to 20000/- & above) according to the popularity owned by individual brands (40% of population uses Samsung,5.8% of population use IPhone & other brands depending on their financial status)
- Consumers keep on changing smart phones based on the add on applications & other factors like power of the camera lens, battery backup, expandable memory, internal chip quality & waterproof technology etc.,
- Almost 50% of the population prefer 4G/5G Technology according to the tariff plans provided by various service providers & fortunately more than 60% of the people prefer Airtel Service Provider because of the best deals available on the data plans.
- Every person almost uses a smart phone for more than 8 hours per day may have a serious impact on health conditions which may even lead to long/short sightedness. Focus on the high frequency radiations uninterruptedly may affect the eyesight leading to abnormalities in vision & may also have impact on nerves and hence on the lower part of the brain. If the same continues for few more years we can expect a person to be mentally disordered & Gradually as days pass on we may not expect people to survive without a smart phone.
- Making online transactions through UPI apps are beneficial as far as customers service is concerned but they may lead to cyber-crime which steal your personal information & credentials on the web sources turning situations worst resulting in loss of money & identity
- Clicking unknown links, sharing OTP's & other bank details may harm you by stealing personal data
- In contrast technology has improved to such a great extent that even a person can sit anywhere near by the locality & operate house hold gadgets on their fingertips. (heart beat sensor, sensor controlled remote systems & AI)
- Entertainment zone may sometimes make you dependent on the system hence there will not be a balance between mind & heart as such.
- Continuous exposure to music & other aspects through headsets, ear dopes & other Bluetooth devices may damage our ear drums and even lead to deafness in worst cases.
- Access to blue film content may spoil a person's identity which leads to blackmailing line were a person can be sexually assaulted by means of illegal photography etc.,
- Using the touch key panel continuously will affect the sensitive nerves connected to the tips of the fingers.
- Unknowingly many people are spending much of their time in smart phones using it for various activities like browsing, gaming & entertainment etc.,
- There is a proven theory that gaming & entertainment like PUB-G, Temple run & other similar applications has lead people (specifically children) to mental disorders which made them feel sense of suicidal tendencies to end their lives in worst cases.

ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

Conclusion

Based on the above discussed points one can expect various complications which may affect a person's health in various ways depending upon the usage of a smart phone. Hence every individual should take utmost care towards their physical & mental health. In this regards as a responsible citizen every person should reduce the time spent in smart mobiles & use it for only required purposes like for attending calls, for communicating important & necessary information which will be helpful in some or the other way, to deliver the content through online basis, browsing to know the unknown information & to share useful data etc. To communicate with friends & relatives who stay abroad so far & so forth. Strictly Sticking on to the above precautions will make u a better citizen who can make use of the technology in the modest way.

Ultimately the family, younger generations, locality, city, state & country will be safe from the above hazards which may pave a healthy path for future generations to be fruitful.

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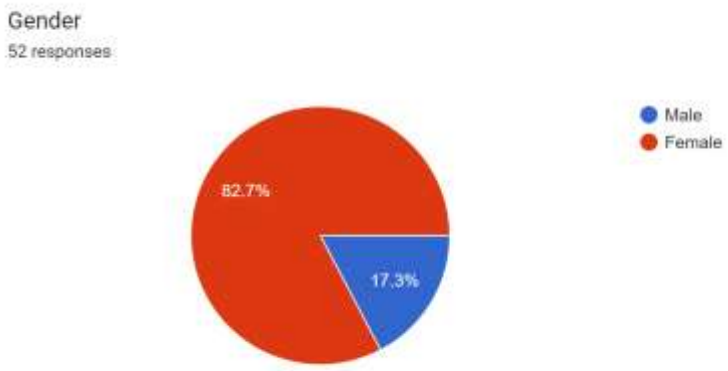
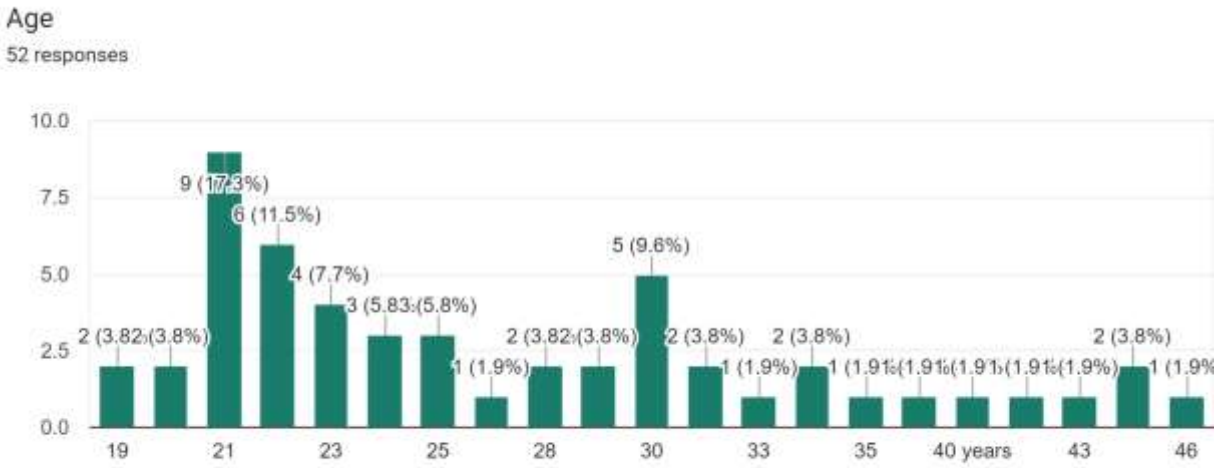
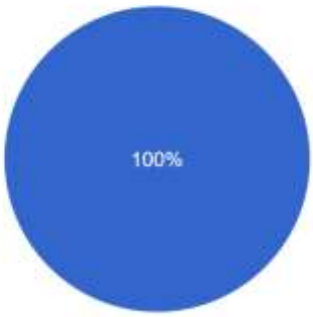




ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

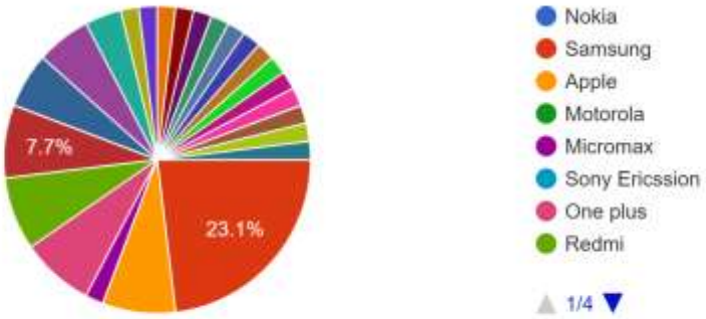
Do you own a mobile?

52 responses



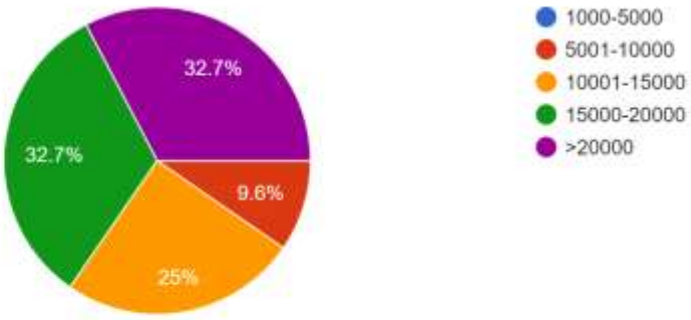
Currently you own a:

52 responses



How much did you pay for it (in rupees)?

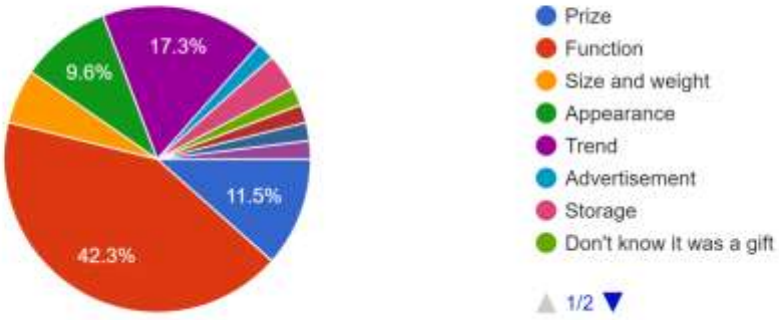
52 responses



ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

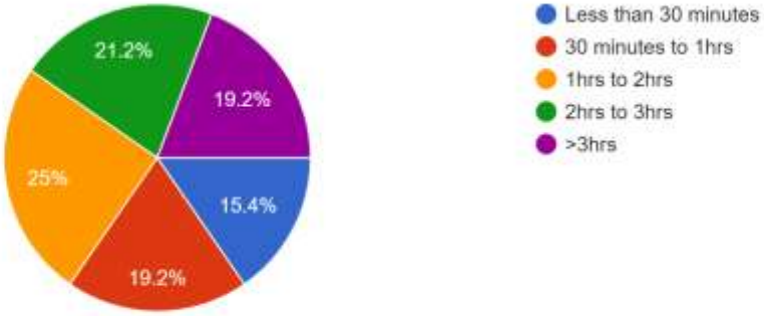
Why did you choose this model?

52 responses

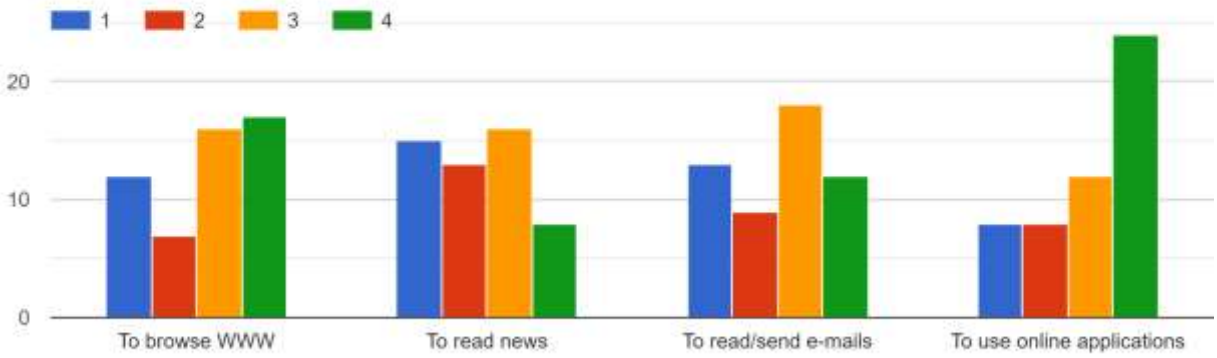


How much time do you spend on your mobile phone on average in a day (calls only)?

52 responses



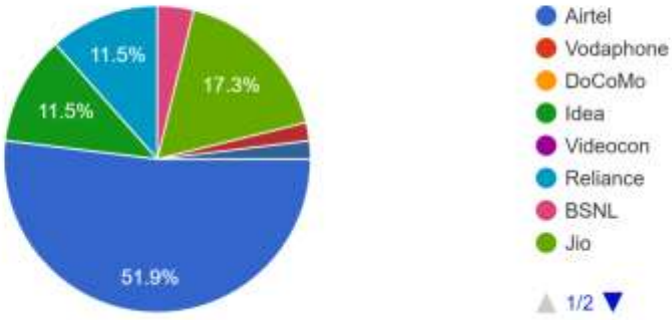
What is your primary purpose for using internet on your mobile phone? Please rank your answers from 1 to 4: 1 is the most frequent purpose and 4 is the least frequent



ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023

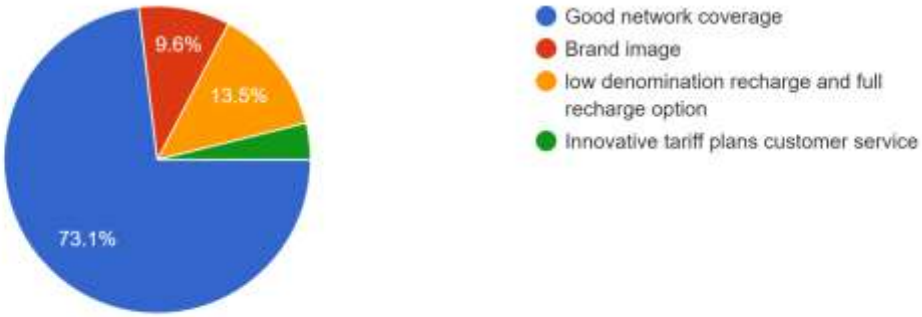
Which mobile operator do you use?

52 responses



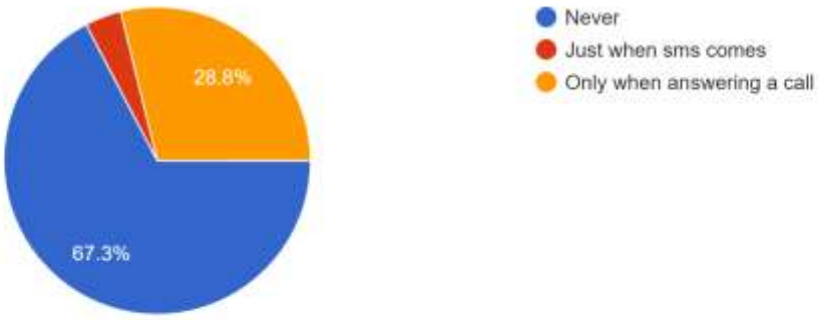
Why did you choose this provider?

52 responses

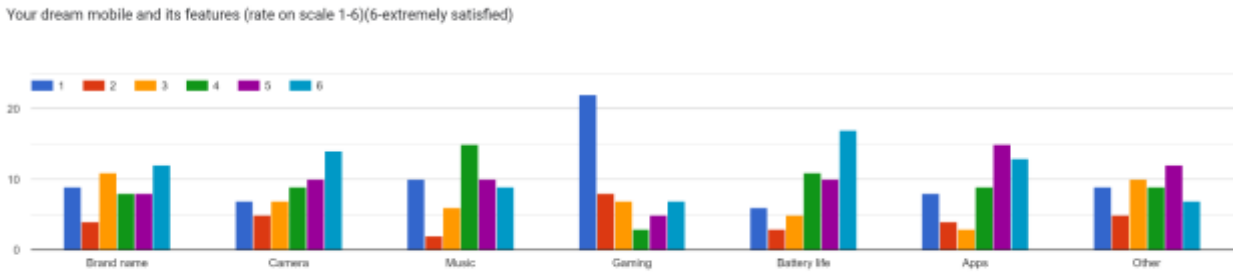


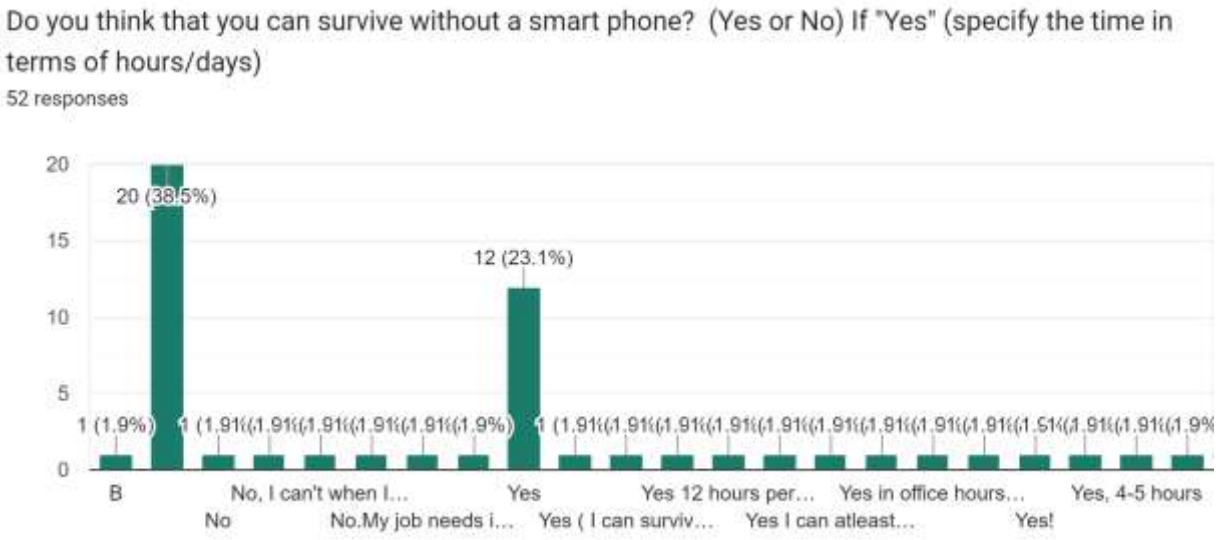
Do you use your mobile phone while driving?

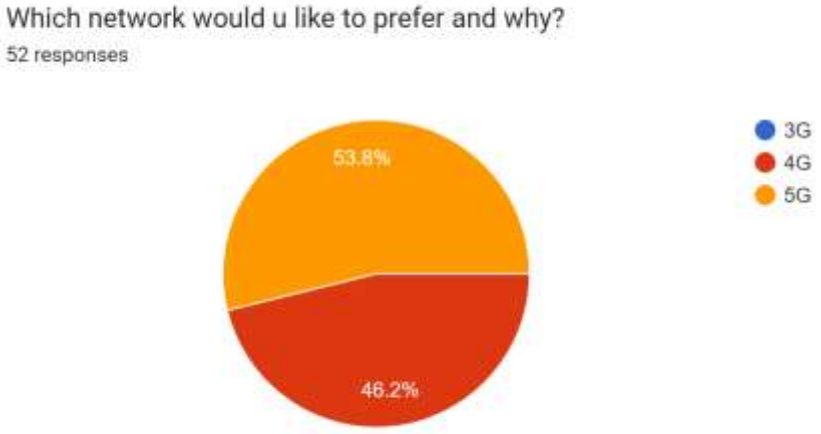
52 responses



ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023







ISSN: 2278-4632
Vol-13, Issue-02, No.03, February 2023