Evolution of Mobile Phones

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Abstract : The topic contains the steps and turning points of how Mobile Phones turned into Smart Phones. It not only contains the past journey of mobile phones but also the future prediction of smart phones, it will contain the projection of how smart phones will evolve after a decade. The projection will show the new resources that will be integrated in the smartphone and also how the existing system will be modified and updated. The current smart phone contains an average of 4 sensors, which will be appended in the future. This journey of adding various new sensors will be projected in the topic. The topic will also involve the evolution of the Smart Phone's operating system, it will exhibit the ways in which the current operating system can be improved. It will also contain the circumstances or the turning points in the development of operating system in the future. In the evolution of Mobile Phones the major component is the Hardware, the topic will contain how the hardware components were evolved. Also the topic will showcase some of the sensors and other hardware components that will be developed in the future.

IndexTerms - - **Processing Speed, Safety Rules , Solid State Battery.**

I. INTRODUCTION

The topic contains evolution of mobile phones is a journey where in the topic contains the 20 year journey of how mobile phones for transformed into smartphones. In this 20 year journey a lot of things have occurred some have succeeded and some have failed miserably. In this topic we will see all the events those had occurred in 20 years, the good things along with the bad things that had occurred during this lifespan. In this topic a lot of case studies are being rectified and looked upon, There are a number of case studies in this topic in which some of them were really turning point for the technology and some failed very badly. The topic not only covers the past events in the telephone industry but also predicts the future of the new technologies which are yet to be launched. Although most of the predictions is been proved with the proves, also some of the Technologies which are a recently been bombing in the industry is explained and shown in this topic. Though the predictions may not be accurate completely but there are some events that will occur for sure. As technology is been invented at a very high rate and nobody can predict when it takes that turns, Although most of the predictions are more likely to be happen in this topic.

II. LITERATURE SURVEY

The evolutionary 20 year journey of the mobile phones is been shown in this topic. In previous days the cell phones were used only for calling purpose, the basic reason for the invention of a mobile phone was to improve its previous invention that is the telephone, the earlier mobile phone was just like a telephone which was mobile and people could move around while using it. But the revolutionary era came into existence when the mobile phone was edit with and functionality of the internet[1]. The internet functionality added various functionalities to the mobile phone and eventually it got smarter, and does the name smart phone. The smartphone market had various types of Brands entering and exiting. However there were some brands which were The pioneers for the smartphone industry, such as Apple. There were various new technologies that Apple had invented which helps many telecom as well as telephone industries. Most of the times the other brands use Apple's technology in their products as Apple is been known for its new and innovative Products and software, most of the brands like Xiaomi Redmi and even in some cases Samsung also copy Apple's innovations. However Apple continues to contribute their success and technologies into the market event today.[2] In the smartphone industry there are two brands or the two operating systems which compete with each other that is Apple's iOS and Google's android operating system.[3] All the smartphones in the market except Huawei has the android operating system, as the android operating system is an open source platform wherein the developers from these brands can customize the operating system to their wish.[4]However the Apple's iOS is not an open source and it is been licensed only to function on Apple products. Due to this fuss there are various events that have been occurred wherein Apple has sued android over copying each other's technology and vice versa.[5] Along with the software technology there are various other hardware components that are been booming into the market[6].

One of the examples of such hardware is the solid-state battery, currently most of the smartphones have a lithium ion battery where in a polymer gel is present inside the battery. But in this new technology that is the solid-state battery there are solid components and the anode and cathode are tightly packed into the battery some of the features or benefits of this technology are More density, safer to use and long-lasting [7]Along with the smartphone industry the solid-state battery will be used in various electric vehicles, for example Toyota has been working on the solid-state battery and has reviewed to launch electric vehicle with solid-state battery soon. However lithium ion batteries will be updated with the solid-state battery within two to three years.

III. ANALYSIS OF LITERATURE SURVEY

The technologies are being invented rapidly. Also most of the brands are frequently launching the new models every year, and some less than it. However in this situation predicting about the technology is impossible. But there are some things that we can conclude by seeing the past events. As seen Google's example, Where in Google is considered to be one of the top brands which has a huge market share, but still Google has committed so many mistakes in the past which most of the times have given It a loss. But still Google is considered as one of the best companies. And some of the miracles that it has made in the past are really unbelievable. There are many companies apart from Google which are competing head-to- head in the market. In the cell phone industry the two brands which are competing with each other is Samsung and Apple. All the Samsung smartphones have an android operating system, Which means it is indirectly inked with Google, where on the other hand Apple has its own operating system that is iOS which is been licensed under Apple and no other cell phone brands can use it.
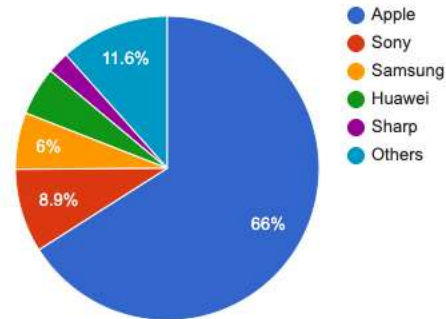

Fig 2: Smart-Phone market shares in Japan

But considering the general market place Samsung sells more devices compared to Apple but Apple has more profit over its products. But there are some situations where Apple has performed miracles. One of the examples is in Japan due to the mistakes committed by other brands Apple could overcome those mistakes and has occupied more than 66% in Japan. Apple does not have 66% in its own home town that is Canada. So here we can conclude that being the rapid development in technology is it is very difficult to predict the moves or the happenings.

IV. TECHNICAL DEVELOPMENTS

The rapid growth of technology has led to many inventions. Some of them were at turning point some of them failed. In this topic we have discussed the good things along with some negative things. As there are a lot of competitors in the market so from the brand's point of view It has to stay ahead in the market and that the decision by the technologies are getting developed so rapidly. Also the technology has invented so many things where in it was not possible some years back. Also in the initial stages when the mobile phone was used only as an communication device that is for calling, if we would explain the idea of video calling nobody would believe. Along with the rapid invention of technology there are some facts or the objectives which are being developing at a slower speed. Some of those objects are battery, screen type, processing as well as network speed. As in the era where the technology is developing so rapidly there are some objectives that are been developed very slowly as mentioned above. For example battery, though the company tries to make the battery life of their devices better on every launch but it improves only by few minutes. There isn't a drastically change which is seen in the development of such objectives. The same goes with the touch along with the device speed, back in the time we used the resistive touchscreen which is the concept wherein two screens were a sandwich between electrical signals, but now we use the capacitive touchscreen for more than five years which means the technology in touchscreen has not evolved. Same goes with the network as well as the processing speed of the device is there in it is not been evolved drastically.

4.1 Tools and Technology

The technology is getting involved very fast. However in this era the brands are competing among themselves to stay ahead in the market the top brands which rule the current cell phone market or Apple ,Samsung and Xiaomi. But all these devices work from a different perspective and all have different ideas of marketing. In case of Apple which is considered as the most expensive and premium product among the three brands. Though it is expensive it is considered one of the top brands and also had been declared the trillion dollar company in 2018. As Apple believes in perfection and does not sacrifice with comfort and needs of users. Where on the other hand Xiaomi is a brand which sells a products at a cheaper rate. Where the last brand is Samsung is the mixture of Apple and Xiaomi where in their products are premium but they sell at a cheaper rate. The topmost competitor of Apple is Samsung Where in the past it has also committed some mistakes or blunders. Where in August 2016 Samsung had released a new smartphone in the note line-up that is the Samsung Galaxy note 7, which had extraordinary specifications. The with such best specifications the phone was called off in December 2016. As there was a flaw in the battery, which was also the charging issue. Most of the users complained about the heating issue when the phone was kept for charging, later on the phone got spotlight when most of the smartphones randomly burst into flames. This had created a problem in for Samsung in the industry. Also to add up to the problems most of the Airlines did not allow Samsung Galaxy note 7 into their aeroplanes. This

Was caused due to lack of beta testing before the product release. The major issue with the product was with the battery which was the lithium ion battery which caused this issue.

4.2 Analysis

The smartphone industry is a multibillion dollar industry where in almost every week cell phones are been released. Where in this topic we have seen the 20 year journey of the cell phone industry where in a lot of brands succeeded and also some of them couldn't sustain. Also while releasing any product a lot of tests have to be done so that it does not fail into the market. The market consist of a lot of competitors for any brand to stand on the top it has to be updated and should have new technology. Along with this lot of research and development has to be performed and lot of testing procedures have to be followed before releasing any product, as we have seen in the Samsung note 7 example where in it had caused blunders for Samsung. Also we have seen the example of Nokia and blackberry wherein they did not evolve with the technology and decided to settle on the old technology, which was the downfall of both the companies. In the topic we have also covered the Japanese example where in Apple has managed to conquer 66% in the country wherein it prompts user for local brands and has a lot of inventions in technologies.
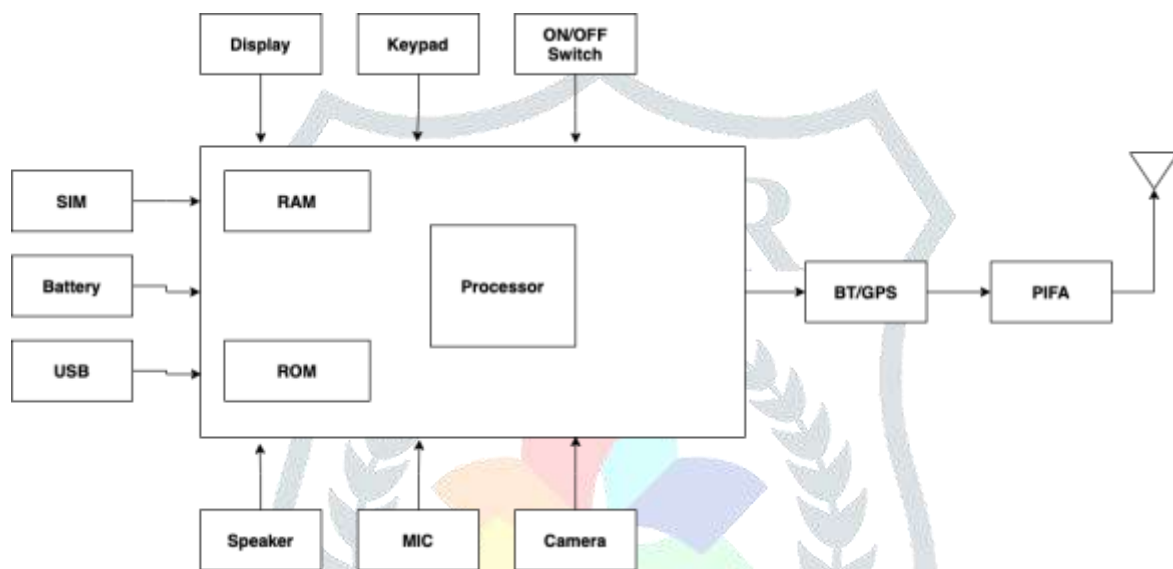

Fig 2: Architecture Diagram of Smart Phone

4.3 Description

The evolution of mobile phone is the topic as the name suggest deals with mobile phones and smartphones. Along with the software side the topic also contains the hardware components which were invented in the spam of last 10 years along with the components which are yet to be developed in 10 years are discussed in this topic. Currently in the market there are two types of operating systems which are leading the market, The first is Google's android operating system and the second is Apple's iOS. Both the operating system have pros and cons. Along with the good things, the bad things are also discussed in this topic. The complete market is been captured by two operating system as mentioned above that is android operating system and iOS operating system. The android operating system is widely used where is the Apple operating system is used in a smaller number. But in most of the factors when we compare both the operating systems in most cases Apple's iOS beats android operating system, And it won't be a fair comparison as there are many constraints that have to be compelled along with them. The constraints maybe the cost of the overall design, the system architecture and the customisation of the application.

V. CONCLUSION

The evolution is a rapid process which is been happening continuously. In this topic a lot of concepts have been explained and analysed deeply. Thus with this process we can conclude that a lot of things have happened in the smartphone industry there and very few smartphone brands where a sustainable in the market. And also in some of the situations we have seen that though a lot of brands had many features but still failed into the market. Also it is not compulsory for the smartphone brand to provide customer with advanced features into the smartphones. As in some situations it was difficult for customers to adapt new technologies. Also a proper research and development has to be done before launching a new product. As to any brand the safety is always the top priority wherein a proper research has to be done along with the testing. As we have seen in the Samsung Note 7 example, which had created many problems to Samsung. With this we can conclude that yeah the technology is been evolved rapidly and it is very difficult for anyone to predict anything in terms of technology in the smartphone industry.

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