

EVOLUTION OF MOBILE TECHNOLOGY

Shekharesh Barik*, Raghunath Rout, Pradosh Kumar Gantayat

*Corresponding author: shekharesh@gmail.com

Abstract: The evolution of mobile technology has come a long way over the past century, and though the technology grew at an incredibly slow rate for most of its existence it has now hit the point of exponential growth and doesn't look to be slowing down anytime soon. This document provides an insight to the latest advancement in mobile technology and its linkage with artificial intelligence with specific case studies and what is the future of this fast evolution of mobile technology. A question is going to be analyzed whether mobiles are developing minds of their own. Case studies of J.A.E.S.A an app developed by Ainova Robotics Inc. and Motorola e-tattoo are discussed.

Keywords: evolution, e-tattoo, Artificial Intelligence, exponential

1. Introduction

People are hooked on touch screens, apps and smart-phone smugness but there are still plenty of surprises in store. From wearable device to chip installed in brain the mobile technology is the fastest evolving technology of this era. The days are near when social networking and calling someone will be possible by just thinking the same. We can imagine a world where mobile will be a virtual wearable or installable technology. Motorola Mobility, for instance, has recently patented a mobile system that's implanted under the skin of the neck (where it can better capture human voice). What's not so fun about this gadget is that it can detect when the user is lying by analyzing his nervous alterations. Mobile technology has transformed our lives in a way that couldn't have been predicted 20 years ago. However, the potential for even more jaw-dropping developments in mobile phones over the next five years is huge.

1. Current Mobile Development Projects

2.1 Biometrics for Mobile

Google has gone one step further in wearable tech: the company has applied for a patent for a multi-sensor contact lens system. Details of this new desirable gadget, which was filed late December, were published last month by the US Patent and Trademark Office, according to Patent Bold. With this contact lens we will be able to control smart phones and Google Glass by blinking. Impressive, don't you think so? These contact lenses have a structure plenty of sensors, which activation depends on the user's eye blink. Of course, it is understood that it is not an automatic eye blinking but rather a voluntary blink, something like winking. They have been developed to control glucose levels and have caused furor among all the people who suffers from diabetes, because it can be their lifes much easier.

2.2 Biometrics Passwords And Wearable Devices



Fig.1 Example of a wearable Smartphone

It is predicted that biometrics will be mainstream on mobile devices by the end of 2015 and will start being used a lot on wearable devices during the second half of 2014. Initially fingerprints sensors should integrate into high-end tablets and smart phones, then other biometric technologies will follow the process.

Wearable devices like bands, smart watches and glasses have a great potential to support biometrical technology for authentication.^[8]

2.2.1 Bendy Screens

Touch screens made phones more intuitive than ever, and the next generation of screens promises to revolutionize our habits yet again. Several companies are working on the first phones with flexible screens, expected to hit the shops by late 2012.

The innovation inside these bendy screens is OLEDs (Organic Light Emitting Diodes) - thin films of organic molecules that produce light when you run an electric current through them. Often less than a millimetre thick and offering a bright, crisp image with low power consumption, it's not just flexibility that makes OLEDs a popular choice. OLEDs could pave the way for bigger screens that fold away neatly, and new ways of controlling your phone by bending or twisting its screen. OLEDs are also being used to treat skin cancer.

2.2.2 Self-Powered Phones

It's a simple trade off: the more processing power is packed into your smartphone, the faster its battery charge vanishes. A phone that powers itself sounds like a dream come true – and it might just happen.

Piezoelectric devices can convert mechanical movement into electric current. They rely on piezoelectric materials, which generate a tiny electric current when flexed or pressed. Microphones, amongst other things, use this effect to turn sound into an electrical signal.

The amount of power produced by piezoelectricity is usually miniscule, but at the nano scale, even the tiniest of movements can be harnessed. The latest research into nanomaterials promises ultra efficient systems that could power your phone using the vibrations of your voice or the tapping of your fingertips on a touchscreen.

2.2.3 Near Field Communications

Near Field Communication (or NFC for short) chips already exist inside some smartphones and they're predicted to get bigger and bigger in the next few years. As the name suggest, NFC allows contactless communication between two devices – a bit like Bluetooth, except that you don't need to program the devices to 'speak' to each other. The short range of NFC chips (about 4 cm) also means they can be used to transmit information securely.

NFC chips are used in transport passes in many cities worldwide (including London's Oyster card), but adding them to phones opens new possibilities. Japan is leading the game when it comes to NFC technology, with Japanese consumers already using their phones as payment cards, hotel keys, airport boarding passes and more.^[6]

3 Case Studies

3.1 J.A.E.S.A



Fig.2 J.A.E.S.A user interface

The future of Artificial intelligence is here. J.A.E.S.A, a cloud-based open-source user-friendly A.I. unlike any you've seen before!

J.A.E.S.A is able to talk to you about literally anything - from relationship issues to your political preferences, joke, get upset, learn and help you with everyday tasks.

She can also perform live real-time voice-to-voice language translation, set reminders, search and play YouTube videos, use Google, provide you with weather information, open apps, send messages and emails and much more!

J.A.E.S.A. is constantly learning to new things due to innovative cloud neural network technology. Every new piece of information from you and thousands of other people all over the world will make her smarter and allow her to improve even further..Just talk! She will naturally remember your name, what you like or dislike and other information about you. And as you get to know each other better, she will get smarter and unlock new awesome features!

J.A.E.S.As API is available to thousands of developers worldwide, so that anyone can contribute to this global futuristic project. The AI is developed by Ainova Robotics Inc.

3.2 Motorola E-Tattoo

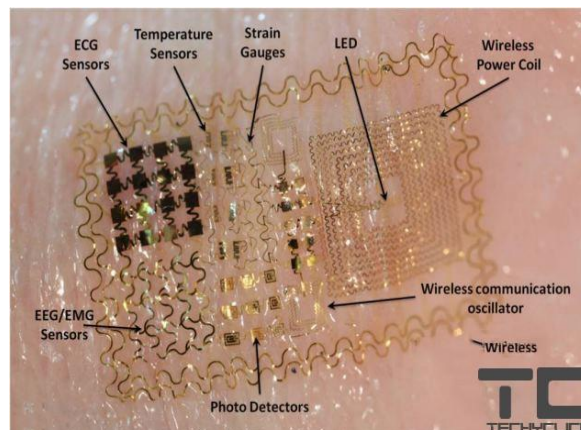


Fig 3:- Motorola E-tattoo installed in neck

Motorola patents e-tattoo that can read your thoughts and send them by listening to unvoiced words in your throat. The tattoo they have in mind is actually one that will be emblazoned over your vocal cords to intercept subtle voice commands — perhaps even sub vocal commands, or even the fully internal whisperings that fail to pluck the vocal cords when not given full cerebral approval. One might even conclude that they are not just patenting device communications from a patch of smartskin, but communications from your soul.

4. Future Mobile Development Scope

Imagine a world connected virtually. Social media is a part of brain activity. Everyone communicates via a chip installed in the brain. Files are downloaded and uploaded via brain.

A world of automated technology where the apps will be developed up to such an extent that it will control your environment and change your preferences and decisions according to your mood or location.

International researchers are reporting that they have built the first human-to-human brain-to-brain interface, allowing two humans — separated by the internet — to consciously communicate with each other, with no additional sensory cues. One researcher, attached to a brain-computer interface (BCI) in India, successfully sent words into the brain of another researcher in France, who was wearing a computer-to-brain interface (CBI). In short, the researchers have created a device that enables telepathy. In the future, rather than vocalizing speech —

or vainly attempting to vocalize your emotions — your friend/lover/family member might just pluck those words and thoughts right out of your head.

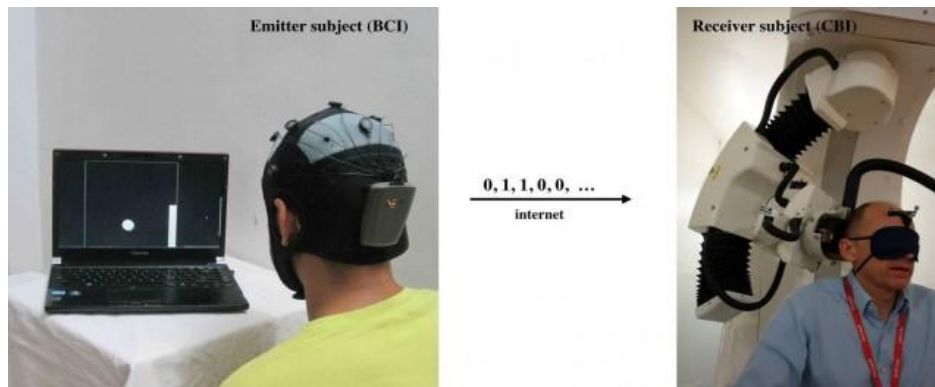


Fig.4: Data packets being send by brain

While we already have apps that track how well you sleep, how much you exercise and the calories you consume, companies will combine this information to help with better decision-making. This trend will be especially apparent when combined with the growth in smartphone sensors and wearable technology. Smart watches, glasses, health trackers: a generation of wearable devices is emerging. In the coming year, expect to see a significant portion of the smartphone-owning population own at least one connected wearable device. In the past 10 years we've seen cell phones transform into electronic Swiss army knives with a wild variety of functions and features. They are replacing the watch, the camera, the standalone GPS, the alarm clock, and many other tools.^{[7][9]}

- *But what will the smartphones of the future look like?*

Here's what we envision .In five years, the Patent Wars are over and Apple emerges victorious. The company has trademarks of many design features, including many types of curves. As a result, competing smartphone manufacturers resort to triangular or angular forms. Fast forward 15 years. With Google's pioneering work, smartphones evolve into wearable devices with augmented reality. These smart glasses provide a constant stream of content and advertisement directly into the user's field of vision^[2]

After the fad of wearable phone glasses, companies go mad with miniaturization in 25 years. Technology allows for extreme miniaturization and phones become single use, disposable devices.

50 years later, wearable phones make a comeback in the form of wristbands. The wrist phone, as it is commonly known, is customized to fit each user's arm perfectly. It includes state-of-the-art voice-command features as well as holographic component that let you chat with your friends as though they are right next to you.

Technology takes a huge leap in 75 years. Microchip can be installed directly in the user's brain. Apple, along with a handful of companies, makes these chips. Thoughts connect instantly when people dial to "call" each other. But there's one downside: "Advertisements" can occasionally control the user's behavior because of an impossible-to-resolve glitch. If a user encounters this .glitch -- a 1 in a billion probability -- every piece of data that his brain delivers is uploaded to companies' servers so that they may "serve customers better. Communication will done by data packets send by brain. Social networking will evolve to a virtual level where people will be fed live updates about others(may be hackers also evolve and know a little extra) . Movies will be watched by retinal implants and security might be checked by familiar and unfamiliar brain waves.

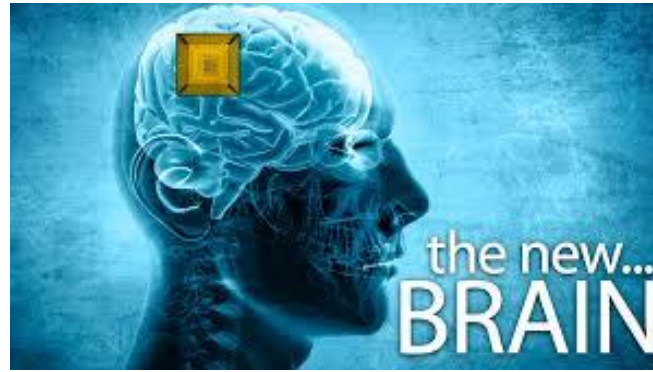


Fig 5. The new brain will communicate with chip installed in the brain

- *The battle of the smartphones*

In the year 2112, civilization crumbles because of climate change and dramatic loss of natural resources. Communication comes full circle as dialogue between humans revert to individuals throwing rocks at each other. But rest assured -- people still laugh out loud.^[3]

CAN MOBILES DEVELOP MINDS OF THEIR OWN?

Witnessing the fast evolution of mobile technology the question arises can mobile phones have minds of their own? In the other words can it possess artificial intelligence like modern day computers? The answer is yes.

For example, Tempo, a calendar app uses machine learning algorithms to get smarter about what information you're looking for. For an event like "Meeting with Raj at Hotel Taj" the app would bundle together Raj's contact information, any email correspondence about the meeting and any attached documents, the location information for the Hotel Taj, and directions on how to get there. It would package all of this into one entry within the app, along with buttons to easily send a message or email Raj if you wind up running late to the meeting. The benefits are clear. With a "dumb" calendar app, you'd need to scour multiple apps to get all that information — the calendar, email, messages, contacts, maps and directions. Here, it's all in one place. An app called Triposo uses machine learning techniques to help predict what you'd like to do when you're traveling — like a smart travel guide.

Days are not far when mobile phones will play songs analyzing your mood or notify you about new offers and discounts when it analyses your e-wallet has ample amount. This trend will be brought by AI based mobile phones and due to the increase in mobile technology.

1. Conclusion

It is hard to tell what will exactly happen in the future, technology evolves every day and people's imagination runs wild; each day we can see new videos of prototypes and re-imaginings of mobile phones and future technologies. One thing is for sure, mobile technology is no longer defined by a device as limited as a phone, the capability of connecting with other people and the technology that allows it could be in your wrist as a bracelet, or in the glass of a window. New materials like graphene or advanced technologies like nanotechnology, artificial intelligence will lead to the creation of more complex, durable and interactive devices, with stretchable and transparent screens.

Acknowledgement

The authors express their sincere gratitude to Dr. Chandralekha, Associate professor in Computer Science and Engineering for giving us an opportunity to accomplish National Seminar on Evolution of Mobile Technology. Without her active support and guidance, this seminar would not have been successfully completed. The authors also wish their deep appreciation to our friends and coordinators for their encouragement throughout our Seminar work. The authors shall forever remain indebted to parents for helping

them in all phases of their life. It is their constant encouragement enthusiasm and support that help them to face the challenges of life.

References

- [1]. "Mobile cellular, subscribers per 100 people", International Telecommunication Union Statistics, 2002 available at:http://www.itu.int/ITU-D/ict/statistics/at_glance/cellular02.pdf
- [2]. Kim, Y., Jeong, B.J., Chung, J., Hwang, C., Ryu, J.S., Kim, K., Kim, Y.K., "Beyond 3G: Vision, Requirements, and Enabling Technologies", IEEE Communications Magazine, March 2003, pp. 120-124
- [3]. ITU-R PDNR WP8F, "Vision, Framework and Overall Objectives of the Future Development of IMT-2000 and Systems beyond IMT-2000," 2002.
- [4]. Schiller, J., "Mobile Communications", available at: <http://www.jochenschiller.d>
- [5]. Tachikawa, Keiji, "A perspective on the Evolution of Mobile Communications", IEEE Communications Magazine, October 2003, pp. 66-73 [6] Hui, Suk Yu, and Yeung, Kai Hau, "Challenges in the Migration to 4G Mobile Systems", IEEE Communications Magazine, December 2003, pp. 54-59

Biographical Notes



Mr. Shekharesh Barik, Assistant professor in the Dept. of CSE, DRIEMS, Tangi, Cuttack. He has 12 years of industry and teaching experience. He completed his M-Tech in the year 2010. His area of interest is in image processing, Algorithm Analysis and Design, Data mining. He has published 4 papers in national and international journals.



Mr. Raghunath Rout is working as an Associate Professor in the department of Computer Science and Engineering, DRIEMS, since 2004. His area of Interest includes Soft computing, Real time system, embedded system. He is continuing PhD under BPUT.



Mr. Pradosh Kumar Gantayat, Associate Professor in Dept. of CSE, DRIEMS, Tangi, Cuttack. He has 13 year industry and teaching experience. He completed his M-Tech in the year 2007. His area of interest is in Computer Networking. He has published 08 papers in national and international journal.