

ESSAY

**POWER OF MOBILE AND PERVASIVE SYSTEMS-
ENABLING PEOPLE TO HAVE BETTER DECISION MAKING
CAPABILITY AND ALSO INFLUENCES BEHAVIOR**

By Brainwritter's Experts

INTRODUCTION

With technology being integrated more into the society and our everyday life, mobile and pervasive systems are some of the most interesting developments. Such systems, widespread, connected, and intelligent, present unique possibilities for improving human performance. These systems hold the ability to alter the entire processes, starting from decision-making and extending to attitudes and behavior patterns of the society (Cook and Das, 2012). Consequently, this essay aims to demonstrate the great potential to harness the utility of mobile and pervasive systems to enhance the lives of the end-users and lead them towards more preferable states while simultaneously revealing the ethical and, in particular, privacy considerations that may accompany them.

THE EVOLUTION OF MOBILE AND PERVASIVE SYSTEMS

In order to discuss the potential applications of mobile and pervasive systems, it is important to look at how those concepts have developed. In the past, mobile technology was restricted to simple communication applications only. Nonetheless, with the use of smart devices such as smartphones. They are now enhanced with sensors, IoT, AI, as well as machine learning, to design and deliver individualized experiences (Shuib, Shamshirband and Ismail, 2015). This evolution is also evident with the rise of wearable devices and smart environments making a world with ubiquitous computing and applications responsive to personal needs (Martin, 2003).

ENHANCING DECISION-MAKING CAPABILITIES

The use of mobile and pervasive systems can improve decision making by a lot through integration of real time information access, recommendations and tools for cooperation. For example, using of mobile health applications which can continuously check the vital signs of the person and immediately share the results promoting better decisions concerning health of the individual (Ventola, 2019). Likewise, such applications in the financial domain can help consumers with their decision making by providing the information on purchasing conduct and proposing use of money (Burstein et al., 2008).

The combination of AI and ML in mobile and pervasive systems increases their impact even more. These technologies can provide complex advice, forecast tendencies, and potentially, make certain decisions independently based on huge data sets. For instance, AI based travelling applications can help to find the best way to travel based on the traffic conditions in real time, thereby enhancing the quality of transport choices (Singh, Shahare and Arora, 2019).

A. Enhancing Coordination in a Surgical Ward

In the area of healthcare, mobility and pervasiveness are helping in improving the management and co-ordination in the surgical wards. For instance, wearable devices and smart sensors allow patients' vital signs to be closely looked at to detect any signs of changes and alert the relevant medical staff to act appropriately (Baker, Xiang and Atkinson, 2017). Further, flexibility attained by the use of mobile communications also enhances the coordination of the health practitioners in the operating theatre, the surgeons, nurses and other ancillary staff to a correspondingly higher level

of healthcare delivery to patients (Morte et al., 2021). Such systems support faster decision-making and resource utilization; thus, increasing efficiency in the surgical operations.

B. Increasing Awareness of Daily Activity Levels

With the help of pervasive computing, people become more aware of physical activity levels, health, and possibilities of chronic diseases prevention. Actually, current fitness trackers inclusive of smartwatches can track the number of steps taken, the distance covered, and the calories used, booming information on the wearer's activity level (Sullivan and Lachman, 2017). More vital than this, it keeps people fit, and motivates them to work out in matters concerning their health more than any other system. Through the interaction with mobile applications, such devices can deliver targeted recommendations and set up goals to improve users' effectiveness in making health-related choices.

C. Case Study: Weather Apps and Emergency Preparedness

Weather apps have proven to be very useful for individuals and communities and have keenly filled this gap. By providing real-time weather updates, forecasts, and alerts, these apps empower users to:

- *Prepare for extreme weather events:* Thus, users can receive notifications concerning hurricanes, tornadoes, floods, or wildfires, to avoid staying in the risky zone or prepare for consequences.
- *Optimize daily activities:* Weather knowledge assists individuals in determining when to go outside, what clothes to wear, as well as reflecting on travel arrangements.

Example: A major form of risk during Hurricane Katrina was the absence of adequate and accurate weather data that led to the disaster (Eisenman et al., 2007). If people had been in possession of good weather forecasts that enabled them to get early preparedness, evacuation could have been effective enough and minimized on the loss of lives and property as well (Pelone and Arellano, 2024a).

This example shows an instance in which mobile and pervasive system as if in the form of weather apps can enhance decision making hence resulting in better results for not only individuals but also other entities. Such systems release important information to individuals during particular moments since they help the individuals make right choices that can reduce most risks while improving general wellbeing.

INFLUENCING ATTITUDES AND BEHAVIORS

Mobile and pervasive systems are also capable of enriching attitudes and behaviors through the delivery of messages, raising social awareness, and encouraging community participation. For example, there are applications that focus on conserving the environment by informing the user about environmentally friendly behavior and motivating them to engage in environmentally safe actions (Mosca et al., 2024). Being inherently invasive, social media can be used as a

tool to raise population awareness concerning social issues and gather people's support for fighting these issues (Bond et al., 2012).

Mobile and pervasive systems contain also other features with persuasive characteristics, of which the use of gamification is one more where users may be influenced to change their behaviors. However, when integrated into a non-game context, where the system can even combine elements of game design into everyday activities including those geared toward fitness tracking, such systems can encourage healthy behavior. It is especially suitable in order to enhance physical activity as well as mental health and any other positive behaviors and activities (Ndulue et al., 2022).

LEGAL ISSUES INCLUSION OF ETHICAL CONSIDERATIONS AND PRIVACY CONCERNS

Mobile and pervasive systems can bring proactive manners to facilitate organizational decision making and behavioral change but with conflict of ethical issues and privacy. At the same time, the collection and analysis of personal data by these systems raise the issue of informed consent and security of data, the issue of manipulation. Therefore, there is a need for the application of these technologies to enhance the autonomy and privacy of the individual citizens as advocated by Osasona et al. (2024).

CASE STUDIES AND INNOVATIVE APPLICATIONS

One can identify a number of examples to demonstrate the effects of mobile and pervasive systems: For instance, the integration of mobile phones in farming has helped farmers make the right decisions such as market prices and weather conditions that they would usually forego due to lack of technology skills and access to necessary information (Aker and Fafchamps, 2015). In education, pervasive systems have enhanced learning models and addressed learning needs, hence enhancing the learning process (Shubina and Kulakli, 2019).

FUTURE DIRECTIONS AND EMERGING TRENDS

Building on progression of mobile and pervasive computing, advanced technologies like 6G, edge computing, and block chain will advance the functionalities of mobile and pervasive systems in the future. These innovations shall further advance the data processing as well as the security of the exchange and utilization of information, the creation of smart contracts and other decentralized processes; making it possible to forge a world in which technology continually augments the human decision-making and actions (Nguyen, Nguyen and Tuan Nguyen Gia, 2024).

CONCLUSION

Mobile and pervasive systems have the capability to revolutionize decision-making and action by putting in our hands real-time information, individualized and filtered suggestions, and group support systems. They also have the potential of impacting on people's perception and actions because they offer specific messages, raise the community's

awareness and engage the people. Further, these technologies are defining the advance of digital and social media marketing research, encouraging the coordination in the surgical ward, and raising the awareness of daily activity levels. Nonetheless, certain legal and moral issues arise when it comes to these technologies that should be addressed so as to maximize the benefits of the technologies for the larger population and minimize adverse effects. When incorporating mobile and pervasive techniques into societies, it becomes the duties and responsibilities of everyone to enhance mobile and pervasive systems for improving the quality while preserving the rights and freedoms of individuals.

By Brain writes EXL

REFERENCE LIST

- Aker, J.C. and Fafchamps, M., 2015. Mobile Phone Coverage and Producer Markets: Evidence from West Africa [Online]. *The World Bank Economic Review*, 29(2), pp.262–292. Available from: <https://www.jstor.org/stable/43774154> [Accessed 23 July 2024].
- Baker, S.B., Xiang, W. and Atkinson, I., 2017. Internet of Things for Smart Healthcare: Technologies, Challenges, and Opportunities [Online]. *IEEE Access*, 5, pp.26521–26544. Available from: <https://doi.org/10.1109/access.2017.2775180>.
- Bond, R.M., Fariss, C.J., Jones, J.J., Kramer, A.D.I., Marlow, C., Settle, J.E. and Fowler, J.H., 2012. A 61-million-person Experiment in Social Influence and Political Mobilization [Online]. *Nature*, 489(7415), pp.295–298. Available from: <https://doi.org/10.1038/nature11421>.
- Burstein, F., Cowie, J., Zaslavsky, A. and Pedro, J.S., 2008. Support for real-time decision making in mobile financial applications [Online]. *Information Systems and e-Business Management*, 6(3), pp.257–278. Available from: <https://doi.org/10.1007/s10257-008-0090-4> [Accessed 29 October 2022].
- Cook, D.J. and Das, S.K., 2012. Pervasive computing at scale: Transforming the state of the art [Online]. *Pervasive and Mobile Computing*, 8(1), pp.22–35. Available from: <https://doi.org/10.1016/j.pmcj.2011.10.004> [Accessed 28 May 2020].
- Eisenman, D.P., Cordasco, K.M., Asch, S., Golden, J.F. and Glik, D., 2007. Disaster Planning and Risk Communication With Vulnerable Communities: Lessons From Hurricane Katrina [Online]. *American Journal of Public Health*, 97(Supplement_1), pp.S109–S115. Available from: <https://doi.org/10.2105/ajph.2005.084335>.
- Martin, T., 2003. Wearable and ubiquitous computing [Online]. *IEEE Pervasive Computing*, 2(3), pp.8–12. Available from: <https://doi.org/10.1109/mpvc.2003.1228521> [Accessed 3 February 2020].
- Morte, K., Marengo, C., Lammers, D., Bingham, J., Sohn, V. and Eckert, M., 2021. Utilization of mobile application improves perioperative education and patient satisfaction in general surgery patients [Online]. *The American Journal of Surgery*, 221(4), pp.788–792. Available from: <https://doi.org/10.1016/j.amjsurg.2020.03.034> [Accessed 18 June 2021].
- Mosca, O., Manunza, A., Manca, S., Giuliano Vivanet and Fornara, F., 2024. Digital technologies for behavioral change in sustainability domains: a systematic mapping review [Online]. *Frontiers in Psychology*, 14. Available from: <https://doi.org/10.3389/fpsyg.2023.1234349>.
- Ndalué, C., Oyebode, O., Iyer, R.S., Ganesh, A., Ahmed, S.I. and Orji, R., 2022. Personality-targeted persuasive gamified systems: exploring the impact of application domain on the effectiveness of behaviour change strategies

[Online]. *User Modeling and User-Adapted Interaction*. Available from: <https://doi.org/10.1007/s11257-022-09319-w> [Accessed 8 April 2022].

Nguyen, T., Nguyen, H. and Tuan Nguyen Gia, 2024. Exploring the integration of edge computing and blockchain IoT: Principles, architectures, security, and applications [Online]. *Journal of network and computer applications*, pp.103884–103884. Available from: <https://doi.org/10.1016/j.jnca.2024.103884>.

Osasona, N.F., Amoo, N.O.O., Atadoga, N.A., Abrahams, O., Farayola, O.A. and Samson, B., 2024. REVIEWING THE ETHICAL IMPLICATIONS OF AI IN DECISION MAKING PROCESSES [Online]. *International journal of management & entrepreneurship research*, 6(2), pp.322–335. Available from: <https://doi.org/10.51594/ijmer.v6i2.773>.

Pelone, B. and Arellano, A.J., 2024. Flood preparedness and utilization of early warning systems among households in selected flood-prone areas in Tagum City, Davao Del Norte [Online]. *Davao Research Journal*, 15(1), pp.35–48. Available from: <https://doi.org/10.59120/drj.v15i1.149>.

Shubina, I. and Kulakli, A., 2019. Pervasive Learning and Technology Usage for Creativity Development in Education [Online]. *International Journal of Emerging Technologies in Learning (iJET)*, 14(01), p.95. Available from: <https://doi.org/10.3991/ijet.v14i01.9067>.

Shuib, L., Shamshirband, S. and Ismail, M.H., 2015. A review of mobile pervasive learning: Applications and issues [Online]. *Computers in Human Behavior*, 46, pp.239–244. Available from: <https://doi.org/10.1016/j.chb.2015.01.002>.

Singh, A., Shahare, V. and Arora, N., 2019. Path Finder : An Artificial Intelligence Based Shortest Path [Online]. *International Journal of Recent Technology and Engineering*, 8(4), pp.5177–5181. Available from: <https://doi.org/10.35940/ijrte.d7380.118419> [Accessed 7 May 2021].

Sullivan, A.N. and Lachman, M.E., 2017. Behavior Change with Fitness Technology in Sedentary Adults: A Review of the Evidence for Increasing Physical Activity [Online]. *Frontiers in Public Health*, 4(289), pp.1–16. Available from: <https://doi.org/10.3389/fpubh.2016.00289>.

Ventola, C.L., 2019. Mobile Devices and Apps for Health Care Professionals: Uses and Benefits [Online]. *P & T : a peer-reviewed Journal for Formulary Management*, 39(5), pp.356–64. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4029126/>.