Legal and ethical issues in robotics

With the development of the technology over the past decade the Robotics has become one of conversational subject areas. As a result of mankinds ultimate innovations and accomplishments regarding to the Robotics, the social, ethical and professional norms have been affected in both positive and negative manner. Therefore, identify and analyze issues which might occur when implementing robot technologies an important and contemporary need.

According to the VEX Robotics, Inc. (2012) the robotics is the science and technology which is used for inventing, accumulating, manufacturing and information processing of robots. With the robots, the tasks which are performed by humans can be automated in order to gain higher effectiveness and efficiency. “ A robot is an electronic device controlled by a program and able to carry out tasks of various kinds-it is a machine made to perform that humans might otherwise do” (Wilson, C. 2007). In the current society robots are used in many different areas like education, entertainment, surgery, surveillance, military, farming, factories etc. The robots are capable of performing tasks accurately, high quality, speedily, safely than human beings and also they can perform dangerous tasks without much effort. Thus the robots and related robot technology provide various advantages for human lives and society with its technology.

Currently robots are used to handle sensitive, critical and complex surgeries in accurate and effective manner. The robots are capable of performing surgeries with less pain, miniaturization, decrease blood loss, smaller incisions and quicker healing time. Unlike human surgeons these machines can perform tasks more smoothly with fewer side effects. It is true when

there are fewer side effects patients' lives will not get negatively impacted in the future after having a surgery. With the use of robots the surgeries can be done remotely, anywhere in the world without requiring the presence of a surgeon. This is very useful when handling surgeries where the surgeon and patient are not in the same geographical location. The technology made specialized surgeons to be accessed globally at anywhere in the world. Thus the robot science enhances the flexibility and availability of the medical field.

Although Robots provide numerous benefits for human beings, on the other hand it might lead to create several ethical issues which may affect the patient's condition negatively. Will people like to get treated from a soulless, emotionless machine? Most of the people will not like to get treated from robots because those machines don't have any idea or impression about the patient's situation. Valuable human qualities like sensitiveness and carefulness is unforeseeable from robots. Another main issue is robots will not get trusted like a human surgeon. But in these cases patients are forced to trust on a machine. Thus, trust and freedom ethical principles are getting invaded. Robots are created by assembling heavy metal arms and other metal gadgets. Occasionally patient will get scared after seeing the robot because its appearance is not pleasant and familiar like a human surgeon. The situations like this might impact negatively for the patient's condition. During a surgery, if machine gets malfunctioned or misused who will take the responsibility? The soulless, emotionless machine cannot take the responsibility like a specialized, well experienced surgeon. Thus moral responsibility and liability ethical principles are invaded. The researchers at the Harvard University has developed tiny organic DNA robot device to

destroy cancer cells by sending important molecular instructions to infected cells (Mowatt 2012). This is significant invention in robot technology which can provide greatest benefit for human being by saving thousands of lives. Although these types of robot devices provide remarkable advantages, the technology can be misused. For an example if robot collected data (DNA) is used for further researchers or tests without having permission from the owner might leads to raise several privacy and security issues.

DNA is strictly sensitive and confidential information of an individual where characteristics of a person can be fully exposed by analysing information. According to the Data Protection Act UK 1998 the information must be kept secure and must not be routed in any mode incompatible with the original use. When the data about a patient's health is used for further researches without their knowledge, the Data Protection Act will get violated.

Under the Public Interest section, British Computer Society (BCS) code of conduct defines to IT professionals that " have due regard for public health, privacy, security and wellbeing of others and the environment". When robots are used as surgeons, the professionals who design those robots should concern about public health and wellbeing because it will be used to treat humans. Robots actions are very important during a sensitive and complex surgery as human life will depend on the tasks done by robot. Therefore professionals who design robots should accept the professional responsibility of their creation or design.

In present robots are used for military purposes in many countries because it reduces the number of human involvement by saving lives in war. According

to the article written by Marchant, G. E. et al. (2011) there are number of robots used for several wars. For an example U. S. military used unmanned aerial vehicles for unmanned air attacks in Pakistan, Afghanistan, and other countries. Further the article mentions that self-directed robots may be able to act more effectively than human beings because they can be designed without emotions, able to act independently, conservatively and also can process more information. When looking at the theoretical perspective according to the Deontological theory killing is wrong as destroying human life, freedom and property is not a right action. But the consequences of the action will be positively impacted on the massive number of people. Because of that from the perspective of Consequentialist theory the war can be a right action.

Although robots provide various advantages for military purposes, on the other hand several ethical principles will raise. War is something about killing people and destroying their property. Human lives and property will get severely impacted though use human soldiers or robots. As a result of that right to life, liberty and security ethical principles are getting invaded. Sometimes war can be very unethical when one party uses military unmanned vehicles and other party use humans as soldiers. The situations like that become a war between humans and machines. The value of the human life will be compared with the value of soulless, emotionless machine. Human life is precious because once it lost we can’t have it back. But once a machine damaged or malfunctioned, it can be repaired or replaced by another machine. Human life cannot be regenerate or replaced like robots and it is valuable gift. When using military unmanned vehicle robots against

human soldiers, the value of human life will be degraded in front of those metal machines. Thus human recognition and dignity ethical principles are getting invaded.

The Public Interests section in BCS Code of Conduct mentions that IT professionals should have care for public health, privacy, security and wellbeing of others and the environment. When robots are used in wars human lives, privacy and security will be invaded and as a result of that public interest section of the code of conduct is getting violated. Avoiding injuring others, their property by false or malicious action or inaction is mentioned under Professional Competence and Integrity section of BCS Code of conduct. When robots are used to destroy human life and property in wars, the associated code of conduct is invaded.

In wars, human life and property will be severely damaged and destroyed. According to the Human Rights Act 1998, everyone has the right to life and protection of property. Thus destroying human life and their properties in war will violate the act. The article 5 in Human Rights Act mentioned that everyone has the right to liberty and security of person. When war destroys human lives by depriving people’s liberty and protection that will also violates the Human Rights Act.

Tracking someone via a robot equipped with surveillance camera can create both positive and negative issues in society. For an example tracking a criminal or terrorism suspicious person by authorized party to expose drug trafficking information and many more illegal activities can be identified as

positive effects while secretly spying a person with intent to cause or harm is a negative effect.

On the other hand, the privacy and freedom can get invaded when use robots to track whereabouts of an individual as these robots are capable of secretly spying without user's knowledge by hiding itself. According to the article written by Hambling (2011), the Lockheed Martin's Advanced Technology Laboratories has developed a robot which is capable of spying at night, hide itself when hear footsteps of an unseen guard and move again when the road is clear. Using a robot like this for tracking can be very harmful because it cannot be easily detected. When an individual is tracked or monitored by using surveillance robot wherever that person moves will be notified to a third party and that may leads to affect privacy, security and freedom of that individual. When a third party is more knowledgeable about an individual, that person can be easily controlled or blackmailed. Thus individual's freedom, autonomy and privacy rights are getting affected. Spying or tracking might not only be a risk for the person who is subject to spying but also the people that person interacts or having relationships with. If the tracker has the intention of harm to person's life, the family, relations and the society around that person might get negatively impacted.

Under the Public Interest section, BCS code of conduct defines that IT professionals should have due regard for public privacy and security. When the unethical tracking is performed through a surveillance robot, the tracker breaks the public interest section of the code of conduct. Avoiding injuring others, their property by false or malicious action or inaction is characterized under Professional Competence and Integrity section of BCS Code of

conduct. If the tracker does tracking with the intention of harm to an individual’s life or their property, according to the professional rules the action is guilty. Tracking a person secretly can provide inappropriate ethical, religiously and politically offensive results which may be viewed as the violations of Human Rights Act UK 1998.

Currently robots are used by most industries in their manufacturing processes because it is capable of generating accurate, reliable and high quality products when compared to human workers. Robot’s actions are controlled by programmed computer application or electronic circuit. As a result of that there is a low probability of generating inaccurate outputs unless machine gets malfunctioned. “ Due to its mechanical nature and computerized control, a robotic arm can carry out a repetitive task with great precision and accuracy, thus providing improved, consistent product quality” (Bengtson, H. 2010). Unlike robots, human workforce gets tired and bored when carrying out repetitive tasks under long time periods and as a result that the efficiency of generating output will get degraded. When the efficiency of production gets low, the number profits made by company will become low automatically. The mechanical approach and automated control made manufacturing robots more efficient and speedy which redirects business into higher production rate where company can attain competitive advantage than with human workforce. There are some manufacturing industries where humans are required to work at uncomfortable and dangerous environments like defusing bombs, mixing chemical ingredients, attaching equipments under higher temperature etc. But robots will not get impacted by these environmental conditions as humans. Companies can

purchase most suitable robots for their working environment and manufacturing process. Thus manufacture will get benefited greatly by reducing costs involve in production process through replacing human workforce by automated robot workforce. When looking at the shareholders perspective, replacing current workforce by robots will leads to make more profits for them as overall efficiency in production gets increased. Thus shareholders are greatly benefited by using robots in manufacturing processes. Consumers will able to experience accurate, reliable and high quality products because of robot workforce.

Although robots will maximise productivity by reducing costs, this might leads to create serious social issues like unemployment, employee relationships and attitudes towards to the work. When current workforce is replaced by robots the employees will become jobless. According to the studies carried out by American Psychological Association (2009), 78% of Americans reporting money as a significant source of stress. The stress created as a result of unemployment will not only affect negatively for an individual but also individual's family and well-being. The trouble of unemployment can also affect unexpected conclusions for children like sicknesses, distress and depressive symptoms. The unemployment will also create social divide within society by increasing the gap between families with children that both parents are get paid and families with children both parents are not get paid. This is terrible social issue which has indirect relationship on poverty and inequality. When poverty within a society gets increased, there is a high probability of increasing illegal activities like burglary, theft, fraud etc. According to the researches carried out by

Carmichael and Ward (2000), there were high accretion in burglary, theft and robbery in 1992, 1993 and 1994 years because overall rates of youth and adult men unemployment get increased during those years. The article illustrate in 1989, 1990 and 1991 the youth unemployment rate varied between 12-18 per 100, 000 population and total number of crimes were about 6562. 7, 7845. 8 and 9213. 7. Between 1992 and 1994 the youth unemployment rate has increased and varied between 21. 94 -19. 5 per 100, 000 population and total number of crimes were about 9816. 8, 9727. 5 and 9234. 0. According to the statistics there was a visible increment of crime activities along with the growth of unemployment. It is true there is a fine impact on illegal activities with unemployment and poverty of a society. When human workforce is replaced by robots, there is a high possibility of amplifying illegal and crime activities in the society because of the increased unemployment population.

Robots in a workplace will also create negative impact on human relationships, employee attitudes towards to the work and employer. When human workforce replaced by robots, the faith that the employees have kept on the organization will be dented as employees will began to think the employer only concerned about the efficiency and productivity of the work not the relationships or friendly working environment. Thus employee attitudes towards to the work and employer will get negatively affected. Robots can’t be friendly or emotional like human workers and as a result of that there will not have a pleasant working environment filled with employee relationships. As robots are not able to communicate like humans the

relationships and bonds among robots and rest of the employees will remain in a lowest level.

Actually it is hard to justify whether the work or individual life is more important but the employer is always responsible for protecting relationships and job security of employees. What will be the impact when employees are fired from job without prior notice and compensations? The situations like this will create pathetic condition around individuals and their families. However in the social perspective, organisations can validate the importance of the robot workforce relating it to rising productivity, efficiency and minimise the wastages.

Under the Employment Rights Act 1996, UK dismissing an employee without giving prior dismissal notice is illegal. The law also give right for employees to complaint the tribunal about unfair dismissal. Therefore employers are legally bound to take the responsibility of dismissing an employee.

Currently robots are mostly used as human companions for elderly and childish people. Assist elderly or disable people, clean household equipment are some of core functionalities of robot helpers. United Stated National Institute of Standards and Technology (US NIST) has developed a robot to help disabled people move around their home. This robot acts as a wheelchair but also gives a helping hand to get out of bed and get on and off other seats. The robots like this are really useful to overcome physical difficulties that are faced by disable people when performing day to day tasks. The Nuresebot, Pearl is another multi-disciplinary, multi-university effort aimed to provide assistance for elderly people at homes. This robot is

capable of reminding elders about regular activities such as eating, drinking, taking medicine, using the bathroom, guiding them through their environments, calling for help if they fall and display messages on the screens for people with hearing loss (Carnegie Mellon University n. d.). Elders need more care and attention because they are more vulnerable to abuse and also physical changes in old age reduce the ability to conduct activities of daily living by maintaining independence. Robot helpers or robot companions mentioned above will be a fair solution for taking care of elders and protecting them by being abused. Using robots for taking care of elders and children is very helpful in current busy life styles. Unlike Asian countries, Europeans are not having strong relationships with their parents after get married or being matured. In a situation like that robot helpers would be a best solution where protection of elders is assured.

Although using robot helpers for elders is an effective, opportune solution this will leads to create several ethical issues. Elders will not able to get same experience and exposure like having companion with human being because these robots can’t gossip, share ideas, emotions and communicate like humans. Therefore robots will not able to fulfil the emptiness in old heart like a human companion and as a result of that human relationships will get negatively affected. When using robot companions for children, their personality, behaviour and attitudes will get impacted. The robot will do everything that child command without questioning. Then the child began to think everyone will do everything that command without questioning and he/she can get everything without any interference. Thus robot companions will lead to create drastic negative attitude and behavioural change in child.

During the infant and child years, children grow quickly and tend to learn about the environment they are interacting with. Without having a proper guiding adult to teach and guide in to the right path, child personality will also get degraded. Soulless, emotionless and inexperienced robot will not able to teach values and norms associated with human lives. Parents are the most important character in child's life and they are capable of understanding child's needs than anyone does. Love, affection and caring are critical requirements for better growth and development in a child. A metal robot is not able to fulfil these emotional feelings which are unique to living beings. Thus effects on human relationships, human personality and changes in attitudes social issues are raised when using robots as human companions or home helper. " Experiences with touch, movement, voice sounds, and chances to see faces and their changing expressions– these seem to be essential contributors to emotional and mental development" (Mercer 2009). Without having these factors, the language development, ability to understanding in the child will be weakened and as a result of that child will become socially isolated.

Robots are expensive and everyone can't get the technology experience because of its high price. That will create a digital divide in the society, where only rich people can have robot's experience. According to the Public Interest section in BCS code of conduct, the professionals should support equal opportunities and benefits of IT by including all sectors in the society. When robots are unaffordable and cannot experience for every human being as equal, this will breaks the following BCS code of conduct.

Every technology has associated limits and vulnerabilities which may create severe negative impacts on individuals. Robots are reacting according to the limited set of tasks they are programmed into and any action that is out of the program might not be fulfilled. For an example a human companion that is programmed to take care of elderly or childish person might not be able to respond emergency situations like fire, explosion, theft etc. The situations like above can harm for people who are vulnerable to abuse. Elders are more vulnerable to abuse because physical changes appear with the age, made them to slow respond or inability of responding properly for actions. Children are also vulnerable like elders because they don’t have knowledge or experience to respond emergency situations like matured people. These vulnerable groups may tend to trust on robot machine because it will be the only companion they have to interact in most of their time. If machine gets malfunctioned, the life of these vulnerable groups will be in a danger. Thus the negative implications and possible risks which may arise when adopting technologies like robotics should be much concerned.

The individuals have to face both positive and negative Ethical, Social, Legal and Professional issues related to robot technology. The negative implications of robot should be clearly identified by IT professionals in order to make human lives more comfortable via secure information technologies while protecting ethical, social and legal rights of human being. By analysing and understanding both negative and positive impacts prior adopting technology may assist to reduce several issues which may arise related into robotics. In the conclusion, I recommend organisations and individuals to implement suitable policies when using new robotic inventions in their

business and household that is transparent to ensure negative effects of the technology has been controlled and prevented.