Jiaren Li
E322
Homework #2
01/28/2014

Enhanced Human-Machine Interaction

The focus of this project was to design a device that assist user inputs while providing greater degree of freedom and utility than traditional keyboard, mouse and other input devices. The conceptual components in order to achieve such enhanced human-machine interaction include a primary wired physical component, a wireless physical component, and the software component. After a thorough consideration from concepts explained in the previous report, it is imperative to make the primary wired and physical component as versatile in usage as possible.

This project has numerous strengths. If a successful prototype is developed, this device will have a high potential demand and reach. From a general survey, many felt that the way they can interact with a machine is approaching limits due to advancement in technology. As a result, a device that can enhance human-machine interaction and provide great degree of freedom can easily capture large market and open up opportunities that are previously unknown. Additionally, this device has large potentials to be further utilized beyond its original purposes, and many other products can be developed based on this product and impact our lives significantly.

This project's weaknesses are not negligible. The initial cost might be high and the durability of this product might be questionable at best. That combined with the high ramp-up time of this product will make it an overall riskier and longer investment. This product is also vulnerable to endless possibilities of software glitches and intentional sabotage, as well as other unforeseen risk in integrity and usage. That will compromise the increase in efficiency that this product was meant to bring in the first place and make the user experience frustrating.

The agile development cycle necessitated by this project provides many opportunities. During development of initial product, this product can be rapidly modified or even redesigned based on primary experiments and early adapters' experiences. This product is also designed primarily with interaction of human to personal computer in mind, but can also be modified to fulfill increase in degree of freedom of interactions with other machines beyond using traditional input methods.

On the other side, in order for this product to succeed, there are many critical sides that must be kept in mind. Based on current projection, even with the usage of agile development cycle, developing first minimal prototype will still be painstaking and difficult. Additionally, this product might be limited in usage based on how well it integrates with existing products and software. On that note, the success of this product depends entirely on how well it is accepted by rest of the markets that it relates to – failure to achieve that and this product will not generate profit.

With that said, there are three major stakeholders that this product can relate to. First and most direct stakeholders are the users of this product. Physical quality wise, users would require this product to be durable, flexible, comfortable and aesthetic if it ends up being wearable, and mobile. Electronically, this product needs to be sensitive to user input motion but maintain accuracy at same time, which fulfill the whole purpose of enhancing human-machine interaction. From software perspective, this product will need to have smooth integration with existing and upcoming software, as well as a user-friendly interface and convenient customization and troubleshooting settings.

The second stakeholders will be electronics and software manufacturers and developers. If they accept the concept and usage of this product as a method of input, this product will need

to fulfill a whole new set of criteria. This product will need to be reliable and sturdy in workmanship, and versatile in usage. The inputs of this product will need to be secure and yet easy to work and interface with, while maintain both versatility and accuracy. The software interface of this product will need to provide understanding to various potential functions. Overall, manufacturers and developers will require this product to be stable and versatile, and yet fully customizable if provided correct facility.

A third group of major stakeholders will be related associations and regulatory bodies. For them, the first priority would be the safety of the product as well as its overall quality. The product needs to not be a hazard to its user in any way, which, according to my prediction, can be a major problem this project can run into. The quality of the product will need to be maintained to protect the reputation and integrity of the product as a whole. Too low of quality will considerably damage its impact of market, and increase in quality is often associated with increase in sales, which in turn potentially lower sales and profits.

Despite the apparently grand scale in project. The plan had agile development cycles applied and will involve the lean startup approach. The first phase of this project will solely focus on developing a minimal viable product in a two-semester project. After which, the first phase will be considered successful and a more thorough project plan will be developed to be accomplished after the two-semester period. Otherwise, this project was designed to be versatile with adjustable and yet significant milestones and a clear vision. This project is intended to include multiple senior students with experience in mechanical, electrical, and software expertise, and utilize extensive knowledge in related fields. Currently, the projected cost of this project is marginally too high to be accepted, but, with the right management and alternative methods, that can be handled.

Currently, much of my knowledge that are needed for a project like this is lacking but within my grasp. To accomplish this project, I will need collective knowledge in advanced electronic circuit, basic port and data interfaces, as well as microcontroller programming expertise. Otherwise, all other skills and knowledge for this project can be readily picked up or researched on. Despite the complexity of the project, it will be fairly straightforward in execution with proper management and effective group.