

THE MONASH VISION CORTICAL PROSTHESIS QUALITY ASSURANCE

Fahad Rasool¹, Muhammad Aamir Awan², Muhammad Usman³
^{1,2,3} Alhamd Islamic University, Quetta.
fahadrasool32@gmail.com

ABSTRACT— Monash software was developed for the people with no eye so they came up with idea of bionic eye. For every tile have 43 dynamic terminals on its base, and a remotely controlled electronic framework to translate control signals and drive the cathodes with biphasic heartbeats. Refined picture handling, depicted in a buddy paper, guarantees that the client encounters most extreme profit by the modest number of cathodes. And quality will be assured after the results to make it more feasible and easy to use for the laymen.

Keywords— Bionic eye, cortical-implant, **electro stimulation**, **visual** cortex, visual prosthesis.

I. INTRODUCTION

The rebuilding of sight is an honourable objective and has driven a lot of inventive research. These Tretinal inserts can just serve an extent of the clinically visually impaired populace, and are especially unacceptable for the individuals.

In the mid 1960's Brandest and Lewisen spearheaded the incitement of the outside of the visual cortex, right off the bat by energizing each cathode in turn, at that point by animating a few anodes. Every anode was fueled by a straightforward recipient loop and full capacitor, with a diode envelope indicator – fundamentally the same as a 'gem set' radio.

Automated vision masters, specialists and ophthalmologists, physiologists, remembering specialists for the human visual pathway mathematicians, immunologists, materials and mechanical designers, therapists and individuals who are clinically visually impaired. On this software they look deep in it and focused on the right path to provide the blind person the best facilities and to help them live a beautiful life again with the artificial eyes. According to this software they had done all the testing just to make sure that the software will work fine according to the framework.

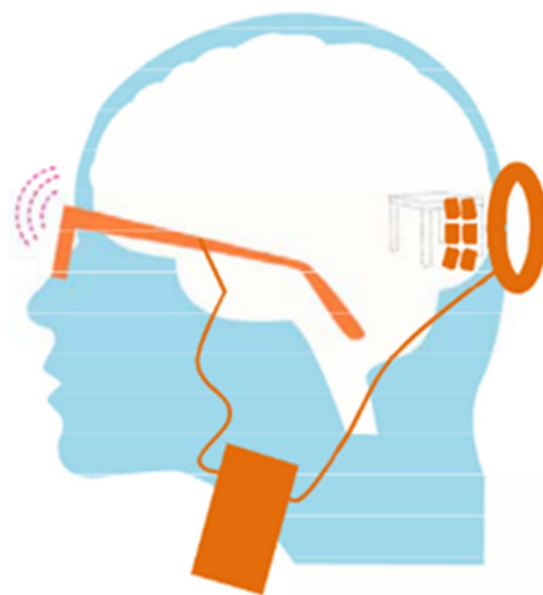


Figure 1: Bionic vision system (Artistic impression of the monash vision group's)

Monash Visual Prosthesis

In this prosthesis they had make the software and put into the quality assurance area to just to make sure that the quality of the software is ensured. Monash visual provide the best facilities to a blind person on how to face the hurdle and to tackle the coming obstacles. In this prosthesis they had done the electrical chip fixation with the help of the doctors and they had got success after two years. Ion chips with axons electrodes helped them

tackling the positive and negative side of the electrodes and to help the blind person they had planned to come up with strong software which they did after so many years.

During past 10 years millions of people lost their eye sight due to accident, chemical lab, disease etc. And they had totally ruined their eye sight which was impossible to recover after the injury. To help them the university comes up with the strong idea and with the needy help of doctors they both decided to work together and they both worked on the brain side and on the vision side cortex. They fitted the chip on the back side of the brain.

Prosthesis as a Communications System

In a remote prosthesis, similar guidelines apply: the camera and outer sign preparing can be unpredictable thus less solid – for they can be supplanted without medical procedure; the inserts must be straightforward and incredibly dependable In early cochlear inserts, astute flagging organizations were utilized to limit the intricacy of the inserts, like the surrounding of 1950's raster-examine frameworks. Since computerized rationale has contracted altogether over the most recent 20 years, we can use unmistakably increasingly complex flagging organizations, with blunder amendment.

Electric work

Image processing

High definition (HD) scaled down advanced cameras are modest and copious, because of hand-held figuring gadgets, so won't be examined further. The high-goals picture from the camera is taken care of to a hand crafted Pocket Processor (Fig. 2), Every beneficiary will be given 2 Pocket-Processors, with the goal that one T can be charged while the other is utilized.

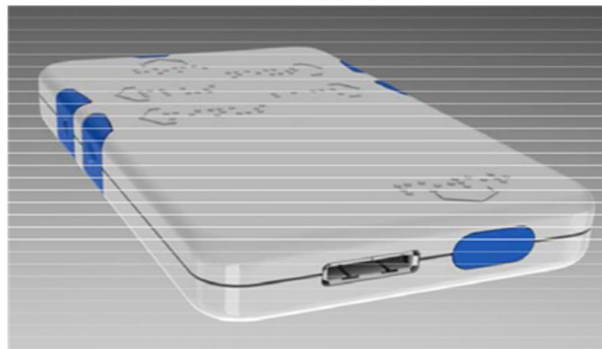


Figure 2: Image of Pocket-Processor

Wireless Power

Wireless power and the connection with the data link help the various tiles which helped them fueled and to look after the connection.

It was connection which was surrounded by the transmitter and with the curl, which were reverberating recipient. (Fig. 3), it was done and then it was isolated about 1 and or 2cm. This is fundamentally the same as idea to the 'halfway recurrence transformers' in simple radio collectors. The 100Kbit/s information is plentifulness regulated onto 5-MHz transporter.

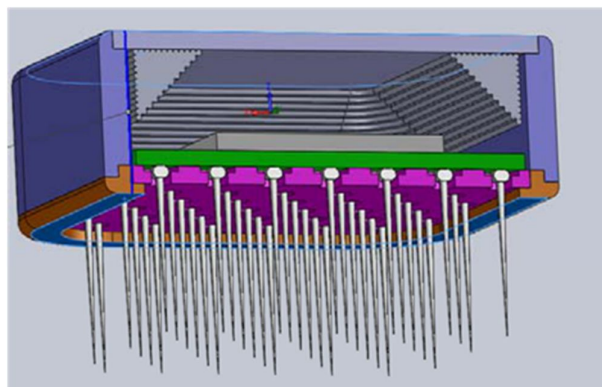


Figure 3: Cross-section of the Implant Tile. The Wireless receiver coil sits at the top of the package.

II. METHOD

Software quality assurance

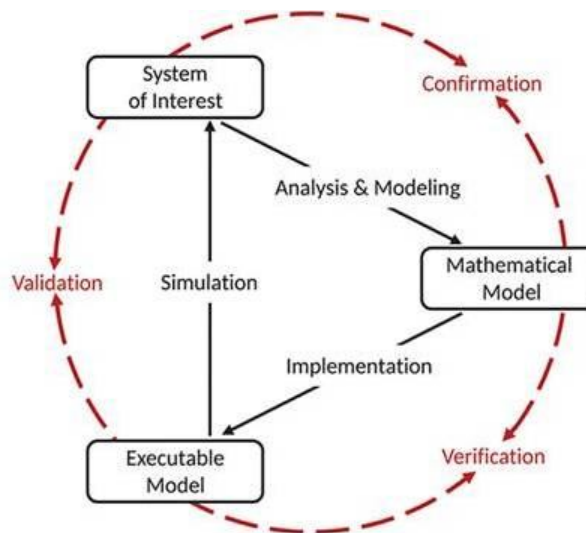
Software quality Assurance (SQA) is a procedure which guarantees that all product building forms, strategies, exercises and work things are observed and go along against the characterized guidelines. SQA joins all product improvement forms beginning from characterizing necessities to coding until discharge. In Montash-Visual-Cortical Prosthesis they did experiments on a Dummy and they took the results and then updated the software as per the user requirements. It took 2 year in testing phase which helped them in taking the best results and to finally pass the Montash Visual Cortical Prosthesis.

Validation & Verification

Validation is the way toward assessing programming toward the finish of the amendment life cycle to guarantee consistence with programming necessities.

Verification is the way toward deciding if the results of a given period of the modification life cycle satisfy the necessities set up during the past stage.

Validation process had been done in Monash visual process and it was they gathered every single information and come up with a list of requirement and then started the process. This software was built in a manner that it will provide the blind person to look from the chip pasted in vision sense back in the head through surgery.



Validation Testing

Neurosurgeon and Radiologist came with the positive results and it was extremely difficult to validate results having almost no ground results for the results tested.

- **Map symmetric**— Notwithstanding repeatability we can likewise perform balance tests in which we think about engine cortex map produced on the sides of the mind. Quantitative assessment of such outcomes is hard to accomplish. yet, the subjective we anticipate the different sides of the engine cortex to be symmetric.
- **Map repeatability**— At the very least they copy the useful mapping results on similar subjects at various time focuses. such outcomes are not complete pointer of the mapping precision, however check the dependability of our enrollment and following methods with regards to the utilitarian mapping.
- **Surgical validation**— At careful approval can be acquired in the working room on account of tracheotomy medical procedures. Specialists utilized electric test systems to straightforwardly invigorate the mind surface when they are working close to the engine and detecting cortex.

• **Software validation**— Software was tested in an environment where they put hurdles and let the blind people walk and identify the images. They also let them play the games and to solve the puzzle through the cortical software.

Verification Testing

After the completion of the software they tested the software and update it on each and every phase. At initial point it was working on average point and the person using the software were having lots of difficulties and after each phase up gradation the monash software got better and better.

Software quality parameter

We will measure software with qualities here which will going to describe the requirements of the functions in the software and the requirements must be satisfied. We will follow the following parameter aspects below.

- **Software functional quality:** It is a property
- **Testability:** What and the we are going to test the software and we will also describe the limitations of it.
- **Usability:** The software will have to be user friendly in order to work better.
- **Understand ability:** If a new person or laymen use this software it will be easy for him to use.
- **Consistency:** If there is any inconsistency in the software it should be fixed.
- **Efficiency:** Performance of the software will matter here and it should be time saving and with the minimum resources.
- **Effectiveness:** The should must meet the requirement of the users.
- **Accuracy:** To test the software and the result in order to work accurate.
- **Maintainability:** The errors, bugs, updates must be solved in order to maintain it properly.
- **Reliability:** To put the software in different environment, and to check if the software is reliable and working fine or not.

III. RESULTS

They took the results in a both X-axis and y-Axis by moving the head two and fro. As shown in fig 6 and captured the pictures in a camera so that while moving slow, average or fast it takes the best results and make the blind person understand what comes in his/her hurdle.

Montash provided the average results in the earlier stage where they updated the software time to time by testing the sample software and after getting the perfect results after 2 years the software quality was assured and it was launched by the Montash University.

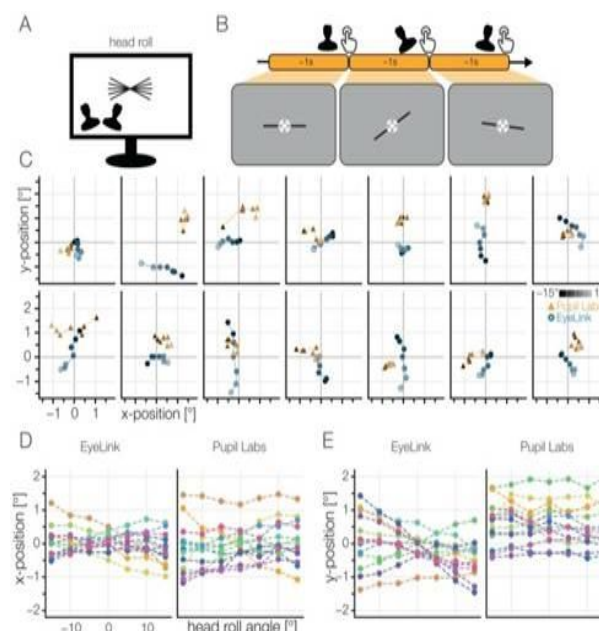


Figure 4: It shows the head moving results

The camera which they were on 32*32 which gives them the low quality results so they decided to upgrade the quality. Then they upgraded the software from 32 to 64*64 but still the results was blur and was not cleared to them. At last they jump to 128*128 which provided them the better results and they completed the software.

IV. CONCLUSION

The task's point has been to build up a start to finish framework that can inspire visual sensations in a human. At the hour T of composing, a total framework, from camera to cathodes has been created and tried on the seat. In 2013 this framework will be tried in preclinical preliminaries, in anticipation of human preliminaries in 2014. The quality was assured during the process. The task has been a motivating case of how different controls can cooperate towards a shared objective. The entirety of the group took in an immense sum about their associates' orders, and everyone has encountered point by point venture arranging. An especially fascinating cross-over has been the use of PCT vision methods, proposed for independent robots, to bionic vision. These will be talked about in detail in the paper: "Going Beyond Vision to Improve Bionic Vision".

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