Global Issues Champion Booklet

Competition: 2021 International Conference
Topic: Neurotechnology
Division: Junior
Affiliate: North Carolina
Student: Anya
Award: Junior Division First Place Individual

Step 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 8 most important challenges and write them in the space provided.

1.	SInce CIN adolescent users such as Oliver have bad sleep patterns after getting the implant, it might cause them to get medical disorders such as insomnia, which may lead to poor physical and psychological health.
2.	SInce CIN adolescent users such as Oliver have lost interest in sports since getting the DBS implant, it might cause him to go into isolation and avoid his friends, which may lead to poor social relationships for him.
3.	Since CIN military users such as Nikola who got the implant during active duty can't take it out even after retirement, it may force her to have the implant to stay in her brain without her free will, which may lead to ethical issues.
4.	Since CIN military users such as Nikola have the implant forced to stay in her brain even after retirement, it might cause the implant to malfunction and still collect brain info, which may lead to risking her privacy.
5.	Since CIN military users such as Nikola have the implant staying in their brain even during retirement, it might happen that spies from other countries can maliciously hack into her implant and steal secretive military-related intel which she has, which may lead to putting USA at risk and cause defense risk.
6.	Because CIN's EESAAs are very expensive and insurance only covers part of the cost, it might cause patients such as PrIsha to get stressed because of the big financial burden to pay for the therapy, which may lead to psychological issues.

7.	Because CIN's EESAAs is genetically designing and altering the animal's brains, it might cause animal cruelty, which may lead to poor ethical impacts.
8.	Because CIN non-invasive EEG-based technology is outdated and not very effective, it may force CIN users such as Ricardo to use the invasive technology which they might not be very comfortable using, which may lead to stress and poor psychological health.

Step 2. Select an Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the Future Scene situation. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Since many of the effective CIN neurotechnologies are invasive and causing various physical, psychological, security, and ethical issues, how might we increase the effectiveness of non-invasive neurotechnology so that CIN users can confidently continue to use Neurotechnology in 2045 and beyond in Seattle, Washington, USA?

Step 3. Produce Solution Ideas

Generate solution ideas to the Underlying Problem in Step 2. Choose the 8 most effective solutions and write the elaborated ideas in the space provided.

1.	Neurotechnology centers of Columbia University will work with other professors and scientists to develop noninvasive technology which uses clean EEG signals and has high accuracy. Such BCIs will help in developing effective noninvasive technology.
2.	Companies such as BrainCo will innovate and develop wearable neurotechnology which is discreet and not bulky, yet still very accurate. Such innovation will be leveraged by companies like CIN to make their noninvasive neurotechnology effective.
3.	EEG sensor designing companies such as Neuroscan will develop a technology to smartly separate out only the relevant and needed data from brain signal collected from noninvasive wearables and hence won't transmit all brain data which can be possibly collected from neurotechnology devices. As only necessary data is transmitted, user data will be less exposed and will stay more private and secure, hence making the user more confident to use it.

4.	CIN will collaborate with companies such as Kernel Neuroscience and Datwyler will develop high-quality advanced dry EEG electrodes which will provide low-noise recording, high signal quality leading to accuracy, convenience in installation, and comfort even in long-term wearing. CIN can use this advanced technology can make noninvasive devices to be more comfortable and effective.
5.	Technology companies such as Google will develop advanced AI solutions where AI algorithms will be embedded to run directly on noninvasive neurotechnology devices and will not require user data to be transferred or stored in external systems or databases. As customer brain data doesn't need to be transferred, it will make their information remain private and make them use noninvasive devices more confidently.
6.	Professors from institutions like Columbia and WashingtonUniversity will collaborate with other scientists to run initiatives such as Neurorights which will establish solid guidelines for the responsible and ethical development of Neurotechnology. Such initiatives will define ethical codes and human rights directives that will promote responsible and ethical development of neurotechnology can protect people from potentially harmful neurotechnologies and make them more effective.
7.	Large technology companies such as IBM will use advanced Blockchain technology to make the brain data from neurotechnology to be secure. Blockchain technology basically is based on the something called distributed ledger concept which saves the data by distributing it in highly encrypted small blocks so that data can't be corrupted, hacked, or altered. This will make the brain data to be very secure. CIN can leverage this secure IBM technology and make its technology more effective.
8.	The US government will enforce Neurotechnology companies to clearly disclose to the customers how their brain information is recorded, stored, used and will also require them to get formal legal consent from the customer about all direct and indirect use of their brain data, so that customer is fully aware of the purpose their data is being used for and data is used securely/ethically and hence making neurotechnology effective.

Step 4. Select Criteria

Generate criteria to determine which solution idea does the best job of solving the Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

1.	Which solution will best increase the effectiveness of non-invasive neurotechnology?
2.	Which solution will make CIN user most confident in continuing to use Neurotechnology in 2045 and beyond in Seattle, Washington, USA?
3.	Which solution will be most acceptable to CIN users in 2045 and beyond in Seattle, Washington, USA?
4.	Which solution will be least expensive to implement for CIN users continuing to use neurotechnology in 2045 and beyond in Seattle, Washington, USA?
5.	Which solution humane for CIN users in 2045 and beyond in Seattle, Washington, USA?

Step 5. Apply Criteria

From the solution ideas written in Step 3, select the 8 ideas with the most potential to solve the Underlying Problem and list them on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 8 (best).

Solution Number	Solution Ideas	Criteria					Total
		1	2	3	4	5	
# 1	clean EEG signals	3	3	2	2	2	12
# 2	discreet wearable neurotech	4	2	5	4	3	18
# 3	secure data neuroscan	1	1	1	1	1	5
# 4	dry electrodes	5	4	4	5	5	23
# 5	Neurorights	2	5	3	3	4	17

STEP 6. Develop an Action Plan

Development of Action Plan

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the Future Scene will be affected.

CIN will collaborate with companies such as Kernel Neuroscience and Datwyler who will develop high-quality advanced dry EEG electrodes which will provide low-noise recording, high signal quality leading to accuracy, convenience in installation, and comfort even in long-term wearing. CIN can use this advanced technology can make noninvasive devices to be more comfortable and effective. This solution will be implemented in multiple phases.

First, the CIN research team will work with Kernel and Datwyler research lab and innovation team to develop advanced dry electrodes based on EEGs.
Then, CIN will work with their manufacturing team to pilot it for some users.
Finally, they will do mass production of noninvasive devices using this.

The first phase will be implemented in 2047, and the rest of the solution will be implemented in 2050. This solution will solve the underlying problem of increasing the effectiveness of non-invasive neurotechnology so that CIN users can confidently continue to use Neurotechnology by making noninvasive neurotechnology more accurate, secure, and ethical. This solution will be most acceptable because users will be more in control by being able to take noninvasive devices off (Criteria 3). This solution will also be the least expensive to implement (Criteria 4). Also, this solution will be most humane because it is not forcing uses without their will(Criteria 5).

The main obstacle in implementing the solution which I could foresee is people still hesitating in believing in the effectiveness of neurotechnology. This obstacle can be overcome by creating an educational program to make people aware of the benefit of noninvasive Neurotechnology devices in long run and how it makes them happier and healthier if they work towards making it more accurate and effective.