**Team Name :** \_\_\_Cancer no more monster. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Note:**

1. One can participate either as a part of a team or an individual basis. Switching teams is not allowed.
2. The uploaded ideas will be screened to go to the second round.
3. Judging : competition entries shall be judged, or winners selected based on the following criteria

* Is the problem worth solving
* How innovative or novel is the idea
* Scientific accuracy
* Social impact
* Scalability

1. Decisions of IIC JSSSTU in respect of all matters to do with the competition will be final and no correspondence will be entertained.
2. In second round, the selected teams will have to present their idea in front of the jury panel.
3. Payment of INR 50 should be made to the UPI ID **[anju.marina.lobo@oksbi](mailto:anju.marina.lobo@oksbi)** and submit the transaction ID above.
4. Idea should be submitted in **.pdf** format.

**Abstract: (not more than 150 words)**

**Technology is application of scientific principles and methods for effective resource utilisation. As technology has its dominance over sectors of communication,transportation,markating,it has gained it's own importance in biological sector also. Although there are many biomedical equipment which can diagnose/treat certain diseases,Cancer is still challenging platform that technology is facing. With all the scientific principle and methodology,there is need to build a sustainable technological system which can diagnose the Cancer symptoms and support the treatment with very less error.**

**This particular idea discusses,how a bio-electronic equipment can be developed using proved scientific basic principles along with cell biology.**

**Introduction ( not more than 200 words)**

**Advancement in Technology leads to combination of different domains to achieve more efficient way of problem solving. like combination of mechanical and electronics works together and evolve as new stream called Mechatronics. similarly what is combination of biology and electronics will blend together and solving health related challenges.Among them Cancer is challenging field.**

**Cancer is second leading cause of death globally,and is responsible for estimated 9.6 billions deaths per year and affecting 14 billions families each year.**

**Bio electronics based diagnosis of cancer will overcome all disadvantage in traditional methods of diagnosis that is Biopsy. This modern way of approach to cancer diagnosis will help to have very good result and flexible usage, easy operation principle. Because every cancer cell is different from each other and diagnosing them in only one technique certainly leads to maximum error.Mininising all these uncertainty and come up with more reliable and more effective module, this idea will certainly helpful.**

**Motivation (not more than 100 words)**

**Early stage proper diagnosis of cancer is very fundamental step in treating cancer. Traditionally it's done by Biopsy. Biopsy involves extracting small piece of cancer cell by doing little operation.**

**Several time it will lead to wrong diagnosis result. Also this method will take days of time to come up with result. According to world cancer.org stastical data 20% of patients are misdiagnosed by this traditional method.But this much of error is not at all in allowable range. Also equipment used in traditional method of diagnosis is very much costly and sensitive to external noise. Example HEPA filter it's self cost soo much dollars. Another one is Advanced level centrifuge instrument.**

**Methodology (block diagram, related figures etc)**

**Cell is very fundamental building block of our bod. Nearly trillions of cells together constitutes this body.Essentially growth of cell is very important but it crosses limits then it will become no more good development. Ultimately this uncontrollable growth of cell leads to cancer. Death of cell also critical point.In biology this is called as "appoptosis".Appoptosiss is one of the important criteria to develop this idea. As it deals with biology fundamental knowledge about cell is very important.**

**Human body is non linear system, only one result on the interested part of the diagnosis will not be sufficient. So system will diagnose, at three different individual stages. First step in Cancer diagnosis is, identifying cancer region. Cancer cell has its own blood circulation and it takes more blood than the normal blood cells. Automatically the blood circulation is increased where the cancer cell is abundant. This blood flow can be measured by ultrasonic Doppler effect and Laser Doppler effect.**

**Main differential character between cancer cell and normal cell is conductivity Cancer cell are more polarized than the normal cells. Cancer cell has dielectric constant of 5110, 7052 or above medium level constant of 2,000.Mathematical equation i.e Vm=1.5ERcos(a),where R is radius of diagnostic region, E is Electric field and "a" is angle between R vector and electric vector. Thus by calculating the membrane potential of the cell conductivity can be measurable. Normal cell conductivity is above 0.30S/cm.But cancer cell conductivity is below 0.20S/cm. All these conductivity and membrane potential measured by "interdigitated" electrode of very small size.**

**Since cancer has strange behaviour character and it differ from one type cancer to the other system result can't relay on only one result. Cancer cell don't die because of overexpression of Bacl2 and death inheater proteins such as survin. In the year of 2017, for the first time MIT engineers developed the tool which can detect the proteins inside the cell.Sensor consist of chemically modified carbon nanotubes. DNA, proteins and other molecules that will bind to the carbon nanotubes and turn them to the sensors and bind to the target cell. When specific protein inside the cell changes or depending upon concentration of protein ,nanotube fluroscence changes in measurable way. Cancer cell has much more concentration of survin and Bacl2, by measuring these protein concentration second method will support Cancer diagnosis.**

**Adaptive filter algorithm with suitable image enhancement technologies will also provide very fundamental knowledge about cell structure during its death. Since Cancer cell won't die image processing can be done using digital image prossseor along with simulation software like Matlab.This will clearly differentiat between dying normal cell and rapidly growing cancer cell.**

**Since Human body is not linear system, all these steps works together and give more accurate results.So this is "Advanced Cancer diagnosis using bio electronics.**

**Social Impact**

**Market Survey**

**Combine technology of Biology embedded with the basic electronics and computer fundamentals surely increase the accuracy in diagnosis. Hence this technology create its own territory in the biomedical instrumentation market. Since instruments required to do biopsy and analyse the cancer cells in the precise temperature and humidity at the set point values are very costly.Surely this type of approach will reduce cost and gives more accurate results compared to traditional Biopsy method.**