**Business Proposal**

In hospitals and clinics I’ve seen doctors and nurse struggling to find a vein for intra venal injections and attempting multiple trials putting the patient in ultimate discomfort. It is also very difficult to find veins in neonatals. A detector which helps the detection of veins in neonatal will help paediatrics a lot and makes the procedure easy and error free. My idea is to develop a vein detector which will be useful for both paediatrics and geriatrics.

**Brief Technical Detail**

According to the technology there are basically two types of vein detectors. The simple one and the advanced. Vein imaging devices use near infrared wavelength of the electromagnetic spectrum (~650nm to 1000nm), to illuminate the area where the vein is present. Generally LEDs are used as a light source. In the spectral region, since the absorption coefficient of deoxygenated haemoglobin (deoxy-Hb) is more than that of oxygenated haemoglobin  
(oxy-Hb), therefore light is mainly absorbed by deoxy-Hb present in the vein. Moreover the skin component has less attenuation to NIR wavelengths and therefore light can penetrate deeper inside the tissue. This absorption by deoxygenated venous blood compared to the constituents of the skin results in visibility of veins as dark streaks. However this technique cannot be used for wavelengths above 1000nm as water absorption comes into picture.

The advanced vein imager uses IR rays of the NIR wavelengths to illuminate the body part. Some gets absorbed by the immediate subcutaneous veins, some gets scattered in the surrounding tissues and some gets reflected from the upper layer of the skin. The sum total of this is captured by an IR camera and is image processed to detect the vein. The image is projected back using a DLP projector at a distant wavelength (centered around green light) to avoid recapturing by the camera. This is a much better technology compared to the simple LED imaging technique and has a higher contrast ratio.

**Information Regarding Already Existing Products**

In US and other advanced countries commonly use these vein detectors in clinics and hospitals. Some of the commercially available vein detectors are veinlite PEDI, veinlite LED, Veinlite EMS, veinlite and V600.These are different variants of the same product. They use the red visible light spectrum imaging technique for vein detection. Philips has recently come up with a vein detector for the neonatals called the ‘wee sight’.

The cost of veinlite products vary from $179/- to $1600/-

The paediatric version is cheaper. Cheaper Chinese versions are also available in the market.

But in India only Morepen labs has the distribution for VeinliteTM . A company from kerala (ibis medicals) which is incubated at NIT Calicut has recently started manufacturing vein detectors for neonatals along with other bioelectronics products. Accuvein manufactures the advanced model of veinlite LED ie, system with image projection back on patients body. The cost of the current product (the simple one itself) in the market is well above INR 10000 and the advanced model may go upto INR 2 lakh.

**Regarding the Patent**

Prof. Harshawardhan wanare of IIT Kanpur has identified a specific band of wavelength where the imaging contrast is better compared to the existing. He has applied for patent (Patent Application No: 1525/DEL/2012). The patent will be held jointly by the professor and IITK. If I need to market the product using the same wavelength I need to purchase the patent from IIT K or I and my professor can jointly start a company for which he has agreed to.

**Current Market**

In India I have not seen any clinics or hospitals using this technique to image vein for intravenous drug delivery. To confirm this I had done a survey 4 months back in some of the nearby hospitals and interviewed some doctors which confirmed the absence of any such products and threw light on the requirement of this product. It could be because of the huge amount that these products are tagged with and needs to be imported from the US and other European countries. Since this product can be made at an affordable rate compared to its competitors I’m quite confident that I’ll be able to find market all over India. I target all the hospitals and small clinics in India to market this as every where this finds use. I’ve also seen diabetic patients struggling to get vein on their body to deliver insulin. Hence I can also find market among the vast diabetic population.

Another variant of the product suitable for neonatal can be produced targeting the paediatric medicare. **So I aim at a cheaper and a better (in terms of our new patented technology) variant of the same product.**

**Prototype**

The product which I have currently in my mind is the one using the simple technology.

I’m including a photograph of an already existing item in the market. This product is from VeinliteTM

For a protorype of this type I require

1. A few LEDs of the required wavelength (10 to 20)
2. Rechargeable cell and charging circuit.
3. A small electronic circuitry for proper control of light.
4. Plastic casing for ergonomic handling.

And the advanced one require

1. IR lEDs (of required illumination) *Fig.The simple model with LED lighting*
2. Digital light projector (small handheld one which cost approx $500/- )
3. Image processing circuitry
4. Casing for ergonomic handling
5. Handling stand for proper fixation without movement.



*Fig.The advanced model with image projection Fig. The advanced model with handling stand*

**Funding ideas**

We initially had a plan to apply for TePP funding which comes under the DST, govt. of India for the prototype. But currently we came to know that the funding is in abeyance and we will have to look at some other source of funding. Since the cost of prototype development for the simple LED device is very very less, the company can itself manage to fund for its development.

IIT K also provides incubation facilities for the companies born out of its own students or faculty members at SIIC(SIDBI innovation and incubation centre) . They provide necessary office space, a mentor, lab facilities, professionals for accounting, IP, legal and management expertise, consulting and market research services and a soft loan.  Companies will be permitted to stay in the incubator for a period of two years. Two extension period may be granted for 6 months each at a time at the discretion of the Advisory Committee of SIIC.

A company is entitled to get a maximum of INR 15 lakh as the seed fund .The loan amounts to the same as invested by its founders. The incubatees would have option of deferring 50% of the rent till the time they exit from SIIC. For the deferred amount an interest rate of 3% would be charged to incubatee. However, the incubatee would need to provide a personal guarantee for the total sum deferred and interest (at 3% per annum) thereof. This amount would have to be paid back at the time of exit or converted to equity. The price for conversion would be as per the guidelines for seed fund.

**Future plans of the company**

I had talked with one of my professor Dr. Asima Pradhan of our department here at IITK .She is currently working on the development of a handheld probe for cancer detection. This helps in completely avoiding the currently used biopsy technique. She is also willing to transfer the technology of the same to me once it is developed.

At present her lab is ready with another product for the detection of cancer tissues. It is actually automatization of a microscope which differentiates between cancerous and noncancerous tissues and hence avoids the requirement of highly experienced histologists to diagnose the samples. She is also willing to transfer the technology immediately if I’m ready with the company.

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