Skilled Engineer for ExSeed Health Developmental Project

Introduction

Exseed Health is a start-up company that specializes in the development of medical devices and mobile applications. Our team consists of various professionals including doctors, biologists, food scientists, programmers and business developers.

At the moment, Exseed Health is focusing on treating male infertility and is introducing a state-of-the-art device that allow men to test their sperm quality from the comfort of their homes. The device is able to detect sperm concentration and motility by simply inserting a glass that contains the sample and then putting a smartphone on top.

The device is equipped with a lens which enlarges the sample and then the camera of the smartphone captures the number and the movement of the spermatozoa. The results are then delivered within seconds through a smartphone-based platform.

Description:

We are aiming to develop our existing device with a more sophisticated version that will not require use of the camera of the phone but will have all the electronic parts embedded into the device and will be capable to deliver better quality results.

The new device should have an autonomous processor, an image sensor and a focus lens and should be able to connect wirelessly to a mobile phone, which will perform the image processing itself, or connect to a cloud solution. The end users should be able to process the results through our application on their smartphones.

Task:

The task involves hands-on work to develop the image sensor and integrate it in an existing optics system while enable it to communicate with a computer via USB and a smartphone using Wifi.

The tasks will include:

- Optimization on the interplay between image sensor and wireless/USB connection
- Building and designing print boards and the processor
- Involved in testing on biological samples
- Making 3D printed mock-ups of the final product
- Ongoing communication with the software analysis team on video quality for the analysis of sperm.
- Being an integral part of the team communicating with persons from biological science and programmers.
- Involved in writing patents and papers on the product.

The project can be part of a master's thesis or/and a special course and the duration can be discussed, with the goal of finding a student that could transitioning into a stable part of the team.

Background:

More than 45 million couples worldwide are affected by infertility, and more than 40% of these cases include some component of male infertility. It is estimated that, on a global scale, up to 12% of men (>30 million) will have fertility issues during their lifetime (1). Semen analysis is considered the cornerstone in male infertility evaluation, but men often feel embarrassed to go to urologists, and women therefore carry the weight of infertility (2,3).

The critical components for determining seminal quality are **sperm concentration**, **motility**, and **morphology**. Manual microscope-based testing and computer-assisted semen analysis (CASA) systems are the current clinical standard methods; however, these methods are labour-intensive, expensive, and laboratory-based. CASA-based techniques require highly trained technicians for producing reliable and repeatable results. CASA techniques currently require bulky microscope-based image analysis systems that greatly limit their point-of-care applications. Many fertility clinics and small hospitals are believed to not have CASA-based platforms and so use a time-consuming manual method for semen analysis (1). Manual test results are subjective, therefore making it difficult to compare results from different clinics (5).

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References:

1. A. Agarwal, A. Mulgund, A. Hamada, M. R. Chyatte, A unique view on male infertility around the globe. Reprod. Biol. Endocrinol. 13, 37 (2015).

2. Y. S. Carmeli, D. Birenbaum-Carmeli, The predicament of masculinity: Towards understanding the male's experience of infertility treatments. Sex Roles 30, 663–677 (1994).

3. M. C. Inhorn, Masturbation, semen collection and men's IVF experiences: Anxieties in the Muslim world. Body Soc. 13, 37–53 (2007).

4. R. P. Amann, D. F. Katz, Reflections on CASA after 25 years. J. Androl. 25, 317–325 (2004).

5. U. Punjabi, C. Wyns, A. Mahmoud, K. Vernelen, B. China, G. Verheyen, Fifteen years of Belgian experience with external quality assessment of semen analysis. Andrology 4, 1084–1093 (2016)