PhD Position Proposal

Brest – France – October 2013

Research topic: Health & Bio Sensors

PhD Title: Development of RF miniaturized bio-sensors for non invasive blood parameters auto-analysis

THESIS Supervisor: Pr. Christian Person – LabSTICC – Telecom Bretagne - France

CO-SUPERVISORS : Prof. C Quendo – Ass. Prof. B. Potelon – F Penaranda (UPV)

Location : Telecom Bretagne – France + UPV Valencia

Research Teams :
Lab-STICC/ Telecom Bretagne/UBO - Brest - France
UPV/ ITACA/Valencia - Spain

DOCTORANT : Le CV du doctorant sera transmis dans les délais demandés, avec un profil santé numérique – Technologies de communication

Key Words : Electromagnetic sensor, Biosensor, Multiband System, non invasive Blood Analysis, Glycemy

Summary:

This PhD project proposes to develop a new technology for microwave miniature integrated sensors for monitoring blood parameters, and especially glucose control. Preliminary experiments and literature reviews performed in the Lab-STICC laboratory have been conducted in order to analyse blood with perfectly control sugar doses. They show the existence of a link between electromagnetic signature and concentration of glucose in the blood.
In this thesis, we focus on the development of sensors capable of tracking not only glucose but also other concentrations (serum sodium, potassium, calcium ...).

The main difficulty is the compromise between sensitivity of the miniature microwave sensor and its immunity to the operating environment due to complex media involved and the diversity of existing metabolisms.

The technical solution proposed is based on multiband miniature sensors to discriminate useful information within the electromagnetic spectrum. The non-invasive nature of this characterization method also aims to respond to users expecting self-monitoring medical solution based upon non intrusive sensors body-worn.

➢ Candidate profile

Master /Engineer student with skills in the domains of physic, electromagnetic, antenna and sensor design and eventually medical applications

➢ Supervising

The thesis will be supervised by Christian Person, Professor at Telecom Bretagne. He is involved in research activities dealing with the implementation of sensors and modeling techniques for evaluating interaction between microwaves and human body, and also studies BAN systems.

The co-supervision will be also ensured by Pr. Cedric Quendo (Pr) and Benjamin Potelon (associate Professor), researchers of the research team of Ch Person (www.lab-STICC.fr). They will bring their expertise on the synthesis and design solutions for ultra-miniature cavities, in a complementary way wit respect to developed sensors. They will also ensure the link with the medical team of the University Hospital of Brest.
Finally, Felipe Peñaranda, Professor at University Politechnic of Valencia, will be part of the team and will consolidate the trio coaching concerning materials characterization. We envision that the candidate will spend part of his time at UPV in year 1.

Références :

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