Serge BOBBIA

"Software R&D Engineer"

Expertise: Computer Science, Image processing, 3D data and HPC

Projects Highlights

Researcher, R&D engineer : 11/2019 – 01/2022

Gambi-M - Bagnols-sur-Cèze (FR)

- Project leader and technical referent
- Management and distribution of tasks with mechanical technicians and software engineers (ML, IA, embedded systems, HW, 3D design…)
- Real time 3D reconstruction with color + depth camera
- R&D : Automatic drone detection by supervised audio signal processing: deep learning, Human detection on scene with YOLO on embedded CUDA Devices

PH.D IN COMPUTER SCIENCE AND IMAGE PROCESSING: 2015 - 2018

Laboratoire d'éléctronique informatique et image (Le2i) – Dijon (FR)

- New method proposition for unsupervised rPPG measurement with implicit living skin tissue segmentation
- New superpixels and temporal superpixels segmentation method with reduced algorithmic complexity for real-time rPPG measurement

INTERNSHIP IN ENGINEERING ON EMBEDDED DEVICE : 2015

Laboratory Le2i, université of Burgundy: Dijon (FR)

- C++ framework development for resources sharing on multi-process implementation
- Optimization of image processing algorithm for embeddability on low computational power devices…

Expertise & Skills

- Python programming ●●●
- Project management ●●●
- CUDA, Thrust ●●●
- C/C++ ●●●
- Linux System ●●●
- Image processing ●●
- Git, Git-flow, Azure devops ●●
- TensorFlow, Pytorch, Keras ●●
- Virtualization(KVM/Xen) ●
- Matlab / Simulink (3D) ●
- Make, Cmake ●
- JS, PHP, SQL ●
- Qt ●

Education/Trainings

PH.D IN COMPUTER SCIENCE AND IMAGE PROCESSING Oct. 2015 - Oct. 2018 : **Laboratoire Électronique Informatique et Image (Le2i)** Dijon, FRANCE
• Subject : Toward the development of a remote photoplethysmographic (rPPG) sensor

ESIREM (École Supérieure d'Ingénieurs de Recherche en Matériaux et Infotronique) Dijon, FRANCE
MASTER DEGREE IN ENGINEERING: COMPUTER SCIENCE AND ELECTRONICS FOR EMBEDDED SYSTEM (WITH HONOURS)
Sept. 2012 - July 2015

Researcher, R&D engineer : since 11/2019

Gambi-M - Bagnols-sur-Cèze (FR)

CONTEXT

*I have been hired at Gambi-M in 11/2019 as a researcher & engineer in R&D, I have been working since 06/2020 as **a project manager** on a project for the detection of suspicious elements in a 3D scene with real time reconstruction (450 K€) and since 06/2021 to correct continue a surveillance project (400 K€ and 1,5 M€ of potential command) with gestion and management of a 5 to 7 people team.*

My role within Gambi-M was transverse to many projects and I intervened mainly as a technical expert in order to identify the source of technical problem and propose optimal solutions in terms of time, cost of production and uptime.

Here's a recap of the things I've worked on:

Management:

- Management and distribution of tasks with mechanical technicians and software engineers.
- Project and planning envelope management by phase: POC, PROTO, 1st in series.
- External communication with customers.
- Documentation and project management in accordance with ISO 9001 for certification of the emerging company.
- AGILE management for projects.

ACHIEVEMENTS

Research :

- Automatic drone detection by supervised audio signal processing: deep learning.
- Automatic drone detection by unsupervised audio signal processing: Mel filterbank.
- Automatic decomposition into simple primitives (cylinder, plane, sphere) of 3D model for the construction of BIM model.
- Real-time 3D reconstruction of a vehicle by color + depth camera scan.
- Real-time automatic detection of suspicious elements in 3D by comparison with a reference or by learning.

Mechanical engineering and production by 3D printing:

- Modeling under Fusion 360 of complex mechanical elements: 3-axis ball joints with 5 ° steps for fixing microwave sensors as part of a monitoring project.
- Modeling of protective casing of various elements: camera, LED projector, infrared sensor for a surveillance project.
- Mechanical qualification of materials for 3D printing by filament deposition.
- Production by 3D printing by depositing prototype parts filament to reduce the costs of prototyping solutions for different projects.

Software engineering:

- Configuration of a SIP server (Asterisk) for IP communication between a vehicle under surveillance and a remote-control station.
- Debugging and technical expertise on various projects to identify and resolve functional latency issues among others.
- Development under GPU for accelerated processing of 3D data: point clouds and MESH.

These developments were carried out in Python, Matlab, CUDA and C ++

PH.D IN COMPUTER SCIENCE AND IMAGE PROCESSING: 2015 - 2018

Laboratoire d'éléctronique informatique et image (Le2i) – Dijon (FR)

CONTEXT

- New method proposition for unsupervised rPPG measurement with implicit living skin tissue segmentation
- New superpixels and temporal superpixels segmentation method with reduced algorithmic complexity for real-time rPPG measurement
- New temporal quality metric for rPPG signals based on HMM (Hidden Markov Models)
- GPU implementation and performance evaluation for superpixels segmentation

ACHIEVEMENTS

Writing/Publication:

Real-Time Temporal Superpixels for Unsupervised Remote Photoplethysmography
Salt Lake City, USA
AUTHOR, SPEAKER, INTERNATIONAL CONFERENCE CVPR WORKSHOP CVPM - June 2018

Periodic Variance Maximization using Generalized Eigenvalue Decomposition applied to Remote Photoplethysmography estimation
Salt Lake City, USA
SECOND AUTHOR, SPEAKER, INTERNATIONAL CONFERENCE CVPR WORKSHOP CVPM - June 2018

Unsupervised skin tissue segmentation for remote photoplethysmography
AUTHOR, INTERNATIONAL JOURNAL PATTERN RECOGNITION LETTERS - October 2017
• *In depth study on unsupervised rPPG measurement, signal optimization and public dataset release.*

Remote photoplethysmography based on implicit living skin tissue segmentation Cancun, MEXICO
AUTHOR, SPEAKER, INTERNATIONAL CONFERENCE ICPR December 2016

WiseEye: A Platform to Manage and Experiment on Smart Camera Networks Dijon, FRANCE, April 2016
• *Description of a sensors network middleware for intelligent building : network dynamice.*

INTERNSHIP IN ENGINEERING ON EMBEDDED DEVICE : 2015

Laboratory Le2i, université of Burgundy: Dijon (FR)

CONTEXT

INTERNSHIP IN ENGINEERING ON EMBEDDED DEVICE
Feb. 2015 - July 2015

- C++ framework development for resources sharing on multi-process implementation
- Optimization of image processing algorithm for embeddability on low computational power devices
- Implementation on low performance device : Raspberry PI 1.