High Resolution Laser Speckle Imaging of Blood Flow

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BACKGROUND

Since its introduction in the 1980s, laser speckle imaging has become a powerful tool in flow imaging. Its high performance and low cost made it one of the preferable imaging methods. Speckle contrast measurements, also referred as Laser Speckle Contrast Imaging (LSCI), use statistical properties of speckle patterns to create mapped images of the blood vessels. Currently, computer processing technology holds the potential to modernize and innovate LSCI to create a fast and fully functional quasi-real time blood flow imaging system.

BRIEF DESCRIPTION

Prof. Guillermo Aguilar and his colleagues from the University of California, Riverside have developed a new approach to laser speckle imaging, called Laser Speckle Optical Flow Imaging (LSOFI) to be used for autonomous blood vessel detection and as a qualitative tool for blood flow visualization. LSOFI works by capturing the speckle displacement caused by different physical behavior and use the data to create a mapped image. It has been shown that LSOFI has many advantages over LSCI methods both in temporal and spatial resolution. Namely, LSOFI can be used to produce higher resolution images compared with the LSCI method using less frames. Combining this technology with Graphics Processing Unit (GPU) computation increases the speed of LSOFI, so GPU enabled LSOFI shows potential to create a fast and fully functional quasi-real time blood flow imaging system.

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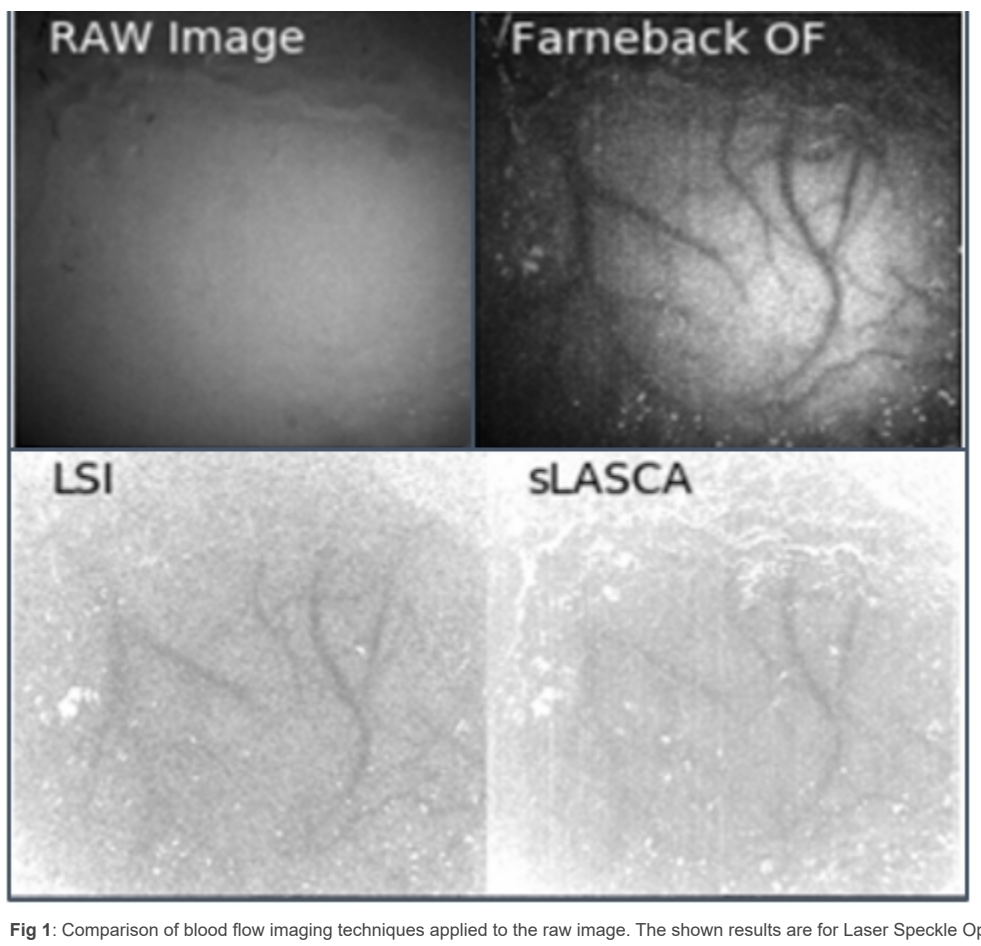

Fig 1: Comparison of blood flow imaging techniques applied to the raw image. The shown results are for Laser Speckle Optical Flow Imaging (LSOFI) using the Farneback Optical Flow algorithm, traditional Laser Speckle Imaging (LSI), and Temporal Frame Averaging (sLASCA).

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OTHER INFORMATION

KEYWORDS

laser speckle imaging, optical flow

speckle imaging

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Imaging**
  - Medical
- **Medical**
  - Devices
  - Imaging

RELATED CASES

2018-125-0

APPLICATIONS

- For autonomous blood vessel detection and blood flow visualization
- Can be applicable for various medical imaging devices

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20200037896	02/06/2020	2018-125

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