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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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HANAA ALY

IMAGE ENHANCEMENT FOR CORONARY VESSELS IN X-RAY CARDIAC CATHETERIZATION

By

Mina Mounir Ramzy Halim

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfilment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
Biomedical Engineering and Systems

Faculty of Engineering, Cairo University
Giza-Egypt
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Title of Thesis:

Image Enhancement for Coronary Vessels in X-RAY Cardiac Catheterization

Key Words: (must be 5 words only)
Catheterization; stenosis; eigenvalue; histogram; labelling

Summary:

Our research is based on the coronary images resulting from cardiac catheterization. Cardiac catheterization is an operation performed for diagnosis and treatment of cardiovascular diseases. Dye, is injected into the catheter so that the artery can be seen on X-rays. The dye and X-rays make the surgeon able to have a good vision to diagnose..Our objective is to develop an algorithm to enhance the blood vessels in the angiogram sequences using the least amount of dye and X-ray dosage. We started the algorithm by processing the histogram to enhance the global

image. This is followed by a multiscale vessel enhancement. Finally, the labelling process is used to remove the artefacts. The outcome of our research satisfied many cardiologists. Our algorithm is additionally tested on peripheral and cerebral vessels and satisfying results are produced. We compared our work with Frangi, the results are better especially in low X-ray dose images.

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AHE	Adaptive Histogram Equalization
AIBA	Artificial Intelligence Based Approaches
CTA	Computed Tomography Angiography
CPB	Cardiopulmonary bypass
CHD	Coronary Heart Disease
CAD	Coronary Artery Disease
CT	Computed Tomography
CLAHE	Contrast Limit Adaptive Histogram Equilization
CDF	Cumulative Distribution Function
DG	Differential Geometry
DFB	Directional Filter Bank
DGBA	Differential Geometric Based Approach
DM	Deformable Model
DSA	Digital Subtraction Angiography
ECG	Electrocardiogram
EE	External Energy
FMM	Fast Matching Method
FEM	Finite Element Method
GC	Generalized Cylinders
GCM	Generalized Cylinders Model
IVUS	Intravascular Ultrasound