

氏名(本籍)	MA Xiaozhi (中華人民共和国)		
学位の種類	博士(学術)		
学位記番号	甲第450号		
学位授与年月日	令和8年3月18日		
学位授与の要件	学位規則第4条第2項		
研究科・専攻名	工学研究科・基盤工学専攻		
学位論文題目	Culprit Lesion Detection and Pathogenesis Classification of Acute Coronary Syndrome in X-ray Angiography Images 冠動脈造影動画を用いた人工知能による急性冠症候群の責任病変検出と病態識別		
論文審査	(主査) 高知工科大学	教授	栗原 徹
	高知工科大学	教授	福本 昌弘
	合肥工業大学	教授	Zhan Shu (外)
	高知工科大学	教授	任 向実
	高知工科大学	教授	松崎 公紀

## 審査結果の要旨

### 1. 論文の評価

The dissertation focuses on the development of medical image AI technologies for acute coronary syndrome (ACS) and consists of three principal contributions.

#### 1. Still image stenosis detection by ensemble learning:

The candidate developed a strategy for integrating multiple YOLO-based models to improve the detection of coronary stenosis in single-frame images.

#### 2. Temporal-enhanced detection of culprit lesion in ACS video:

Since still-image-based stenosis detectors may fail to identify culprit regions in certain frames, the candidate introduced a Kalman filter-based temporal modeling approach to enhance stenosis detection in coronary angiography (CAG) videos.

#### 3. Pathogenesis classification of Acute Coronary Syndrome:

Recognizing that ACS is not a single disease entity but primarily consists of plaque rupture and plaque erosion, the candidate developed a classification framework to distinguish between these major pathogenic mechanisms.

Across all three topics, Mr. Ma conducted his research with originality and a distinctive perspective, demonstrating both technical competence and clinical relevance.

After the review, the submitted dissertation, the oral presentation, and the question-and-answer session were carefully deliberated by the examination committee. As a result, the dissertation was evaluated as containing original and pioneering work that generates novel findings not previously reported.

Based on the above assessment, the committee concludes that the dissertation is worthy of the degree of Doctor of Philosophy.

### 2. 審査の経過と結果

- (1) 令和8年1月14日      5名の審査委員のもと協議され、博士後期課程委員会で学位論文の受理を決定した。
- (2) 令和8年2月16日      公開論文審査発表会及び最終試験を実施した。
- (3) 令和8年3月2日      博士後期課程委員会で学位授与を可とし、教育研究審議会で承認された。