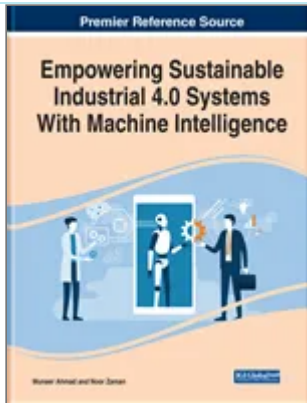


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## A Review of Artificial Intelligence Models in Prognosticating Abdominal Aorta Aneurysms

Shier Khee Saw (Department of Surgery, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Kubang Kerian, Malaysia), Syaiful Azzam Sopandi (Department of Surgery, Hospital Raja Perempuan Zainab II, Kota Bharu, Malaysia), Rosnelifaizur bin Ramely (Department of Surgery, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Kubang Kerian, Malaysia), Chow Khuen Chan (Department of Biomedical Engineering, Universiti Malaya, Kuala Lumpur, Malaysia), Michael Pak Kai Wong (Department of Surgery, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Kubang Kerian, Malaysia) and Shier Nee Saw (Department of Artificial Intelligence, Faculty of Computer Science and Information Technology, Universiti Malaya, Kuala Lumpur, Malaysia)

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## Abstract

Abdominal aorta aneurysm (AAA) is defined as an abnormal dilatation of the aorta at least 50% more than the adjacent normal vessel diameter. AAA is usually asymptomatic until complications occur such as aorta dissection and ruptured AAA, which has a direct relationship with the size of the aneurysm. Early detection with early intervention of AAA reduces the mortality rate related to rupture. In the era of digitalization, medical data such as electronic medical record, ultrasound images, and physical measurements are available for analysis. Furthermore, with the advancement of artificial intelligence (AI) technologies, numerous AI models have been proposed and shown to improve AAA diagnosis and prognostication. AI technologies, with no doubt, possess an infinite potential to improve the services of healthcare providers. Hence, this chapter targets the audience from all professions: clinicians, radiologists, and computer scientists. This chapter aims to close the gap between the medical profession and computer scientists and thus to design an AI model that can be clinically used.

## Abdominal Aorta Aneurysm Risk Factors

Risk factors such as age, gender, hypertension, dyslipidaemia, coronary arterial disease (CAD), smoking and family history of AAA are associated with AAA. The following paragraph discussed the findings related to each risk factor.

According to the report from the Hospital Kuala Lumpur, which is the capital city of Malaysia, the median age group of AAA is 69 years old, which 87.9% of the cohort is 60 years old and above (Zainal & Yusha, 1998). In the state of Sarawak, which is located at the east of Malaysia, the median age group of AAA is slightly higher, 70 years old but the incident rate of AAA rises significantly if patient is 70 years old and above (Yii, 2003). It was also reported that progressive increase in abdominal aorta diameter occurs with advancing age (Dixon et al., 1984). Guidelines have been in placed to manage AAA patients. For example, NICE guidelines recommended that above 66 years old with certain risk factors should be subjected for AAA screening (Powell & Wanhainen, 2020) and Society Vascular Surgery recommends that age between 65 and 75 years with a history of smoking or healthy patients older than 75 years old should undergo AAA screening (Chaikof et al., 2018).

Gender, in fact, plays a role in affecting the AAA risk. Epidemiologic studies show that male, in fact, suffers 4-6 times more frequent in developing AAA (Mladenovic et al., 2012). Similar findings are also found in Zainal et al. study, where 84.7% of their study cohorts re male (Zainal & Yusha, 1998) and Ming Kon Yii's study, where male to female ratio of the AAA incidence is 3.5 to 1 in Sarawak (Yii, 2003).

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A Review of Artificial Intelligence Models in Prognosticating Abdominal Aorta Aneurysms (/chapter/a-review-of-artificial-intelligence-models-in-prognosticating-abdominal-aorta-aneurysms/301505) (pages 101-112)

Shier Khee Saw, Syaiful Azzam Sopandi, Rosnelifaizur bin Ramely, Chow Khuen Chan, Michael Pak Kai Wong, Shier Nee Saw

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Aamir Farooq Khan, Rafia Mumtaz, Muhammad Usama, Taimoor Khan Mahsud

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## Chapter 7

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Machine Intelligence in Customer Relationship Management in Small and Large Companies (/chapter/machine-intelligence-in-customer-relationship-management-in-small-and-large-companies/301507) (pages 132-153)

Ainul Balqis Sawal, Muneer Ahmad, Mitra Anusri Muralitharan, Vinoshini Loganathan, N. Z. Jhanjhi

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Suja A. Alex, Ponkamali S., Andrew T. R., N. Z. Jhanjhi, Muhammad Tayyab

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Tasnim Mohamad Naim, Siti Nurnabila Abdul Rashid, Muneer Ahmad, N. Z. Jhanjhi

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## Chapter 11

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Role of Machine Learning in Handling the COVID-19 Pandemic (/chapter/role-of-machine-learning-in-handling-the-covid-19-pandemic/301511) (pages 212-250)

Sadia Aziz, Qazi Mudassar Ilyas, Abid Mehmood, Ashfaq Ahmad

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A Rural Healthcare Mobile App: Urdu Voice-Enabled Mobile App for Disease Diagnosis (/chapter/a-rural-healthcare-mobile-app/301512) (pages 251-280)

Afaq Ahmed, Ahmad Ali Khan, Ismail Shah, Muhammad Ali Tahir, Rafia Mumtaz

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