BME363e Applications of Artificial Intelligence in Healthcare

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

E-Learning: FULL - Learning is done ENTIRELY online using interactive study materials in Canvas. Students receive guidance and support from online instructors via discussion forums and emails. There are no face-to-face sessions. If the course has an exam component, this will be administered on-campus.

Synopsis:

BME363 introduces the concept of artificial intelligence through data analytics, which can be used to analyse large amount of data, in order to provide useful information for decision-making. In the context of healthcare, large amounts of data such as electronic health records (EHRs) and "omics"
data have become available through various stakeholders of the healthcare industry (payers, providers, pharmaceuticals). These data can be used to derive insights for improving medical care, disease staging and therapy monitoring. This course involves the use of open-source Python software and related toolboxes for data processing and also highlights specific biomedical applications in the field of bioinformatics, personalised medicine, diagnostics and medical informatics.

Topics:

- Introduction to artificial intelligence (AI) in healthcare
- Key concepts and terminology in healthcare
- Overview of various AI-based platforms, tools and techniques
- Data protection and security
- Basic Python programming and AI-based toolboxes
- Application of AI in drug discovery
- Application of AI in patient data collection and management
- Application of AI in disease diagnostics and treatment guidance
- Application of AI in predictive analytics: "omics" data for precision/personalised medicine
- Case studies of AI-based platforms/projects in healthcare, e.g. IBM Watson, Microsoft's InnerEye initiative
- Case studies of AI-based startups in healthcare, e.g. Sentient.ai
- Current and future AI trends in healthcare

Textbooks:

by Chandan K Reddy and Charu C Aggarwal (Ed), 2015,: Healthcare Data Analytics (eTextbook)
Chapman & Hall/CRC Press
ISBN-13: 9781482232127-AA

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Learning Outcome:

- Demonstrate a good understanding of key concepts and terminology in healthcare
- Illustrate and describe major characteristics and potential applications of various AI-based platforms, tools and techniques
- Examine and analyse major issues faced in implementing AI applications in healthcare
- Discuss current AI trends and predict future trends in healthcare
- Analyse key data challenges in healthcare and develop data science proposals with clear objectives towards overcoming these challenges
- Design AI frameworks and leverage on existing Python toolboxes and techniques for solving data science problems in healthcare

Assessment Strategies:

Continuous Assessment Component	Weightage (%)
PRE-CLASS QUIZ	1
PRE-CLASS QUIZ	1
PRE-CLASS QUIZ	1
PRE-CLASS QUIZ	1
PRE-CLASS QUIZ	1
DISCUSSION BOARD	10
GROUP BASED ASSIGNMENT	15
Sub-Total	**30**

Examinable Component	Weightage (%)
ECA	70
Sub-Total	**70**

Weightage Total   **100**