Keynote talk

on

Artificial Intelligence for Radiation Therapy

Organised by

Indian College of Radiation Oncology (ICRO)

Regional Cancer Centre, Thiruvananthapuram

Title: **Reporting Guidelines for AI based Research (TRIPOD+AI)**

TRIPOD (Transparent Reporting of a multivariable prediction model for Individual Prognosis or Diagnosis)

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Top 2% World Scientists Ranking by Stanford University and Elsevier BV for years 2022, 2023

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27th & 28th July 2024

https://www.youtube.com/watch?v=__7TH71SJBo&t=268s

Outline

- Title and Abstract
- Background and Objectives
- Source of Data
- Participants
- Outcome
- Predictors
- Sample Size
- AI/ML Model Development
- Model Performance
- Model Interpretation
- Results & Discussion

Title and Abstract

- Include AI or machine learning in the title.
- Provide a structured summary with key information.
- It highlights key content areas, your research purpose, the relevance or importance of your work, and the main outcomes.
- Write max 150- 200 words
- The abstract for empirical articles (qualitative or quantitative) should usually reflect the IMRAD format

(I: Introduction, M : Method, R: Results, A: Analysis, D: Discussion

Background and Objectives

- Describe the need and rationale for using AI/ML.
- State the specific objectives of the study.

Source of Data

- Detail the data source, including how and why it was collected.
- Mention its primary or secondary
- Specify any preprocessing steps applied to the data.

Participants

- Define the study population.
- Explain inclusion and exclusion criteria.
- Describe the eligibility criteria of the participants

Outcome

- Clearly define the outcome to be predicted.
- Describe how the outcome was measured.

Predictors

- List all predictor variables used in the model.
- Explain how predictor data was handled and processed.

Sample Size

- Justify the sample size.
- Discuss the handling of missing data.

$$n = \frac{Z^2 P(1-P)}{d^2}$$

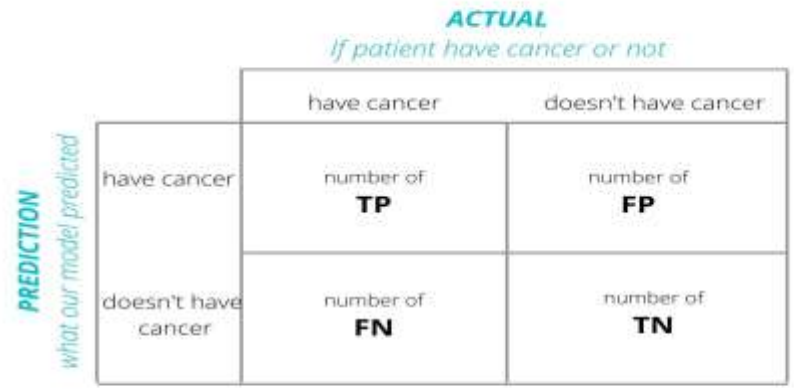
where n = Sample size,
Z = Z statistic for a level of confidence,
P = Expected prevalence or proportion
(If the expected prevalence is 20%, then $P = 0.2$), and
d = Precision (If the precision is 5%, then $d = 0.05$).

AI/ML Model Development

- Describe the AI/ML techniques used.
- Detail hyperparameter tuning, training, validation, and testing processes.
- Specify the number of participants and outcome events in each analysis

Model Performance

- Report metrics used to assess model performance (e.g., accuracy, ROC-AUC).
- Provide details on internal and external validation.



$$Precision = \frac{TP}{TP + FP} \qquad Recall = \frac{TP}{TP + FN}$$

$$Accuracy = \frac{TP + TN}{TP + FP + FN + TN}$$

$$F1\ Score = 2 \times \frac{Precision \times Recall}{Precision + Recall}$$

Model Interpretation

- Explain how model predictions are interpreted.
- Discuss any feature importance or interpretability methods used.

Results

- Present performance results of the AI/ML model.
- Compare with existing models or baselines.

Discussion

- Discuss the implications of findings.
- Data Interpretation
- Highlight strengths and limitations, particularly related to the AI/ML components.

Supplementary Information

- Provide code, data, and model artifacts where possible to facilitate reproducibility.
- Source of funding information for the present study

Key Considerations

Ethical Considerations

- Address ethical issues related to data use and model deployment.
- Discuss potential biases and fairness in the model.

Regulatory Compliance

- Ensure compliance with relevant regulations and standards.

Reproducibility and Transparency

- Share code and data to allow others to replicate findings.
- Document the entire workflow thoroughly.

Collaboration with Domain Experts

- Collaborate with clinicians or other domain experts to ensure relevance and validity.
- These guidelines aim to improve the quality and transparency of AI-based research in healthcare and other fields, facilitating better understanding, assessment, and utilization of AI models in practice.

Finished!!! You did it!!!