Argument-Aware Fact Checking for Explainable Medical Decision Support

EPSRC funded PhD studentship with full fee waiver and £21,805 pa stipend (2026/27 rate)

Project Code: DLA_DTP_2026_20

Main Supervisor: Dr Quratul-ain Mahesar

Co-Supervisor: Professor Mauro Vallati

Project Introduction

Healthcare systems may benefit from using AI for clinical decision support, however limited explainability and weak claim verification hinder safe adoption. Existing systems often assess medical claims in isolation, providing little insight into underlying evidence or reasoning, which can reduce trust and risk patient safety. Medical decision-making is inherently argumentative, requiring justification of claims using reliable evidence and clinical guidelines. This PhD project aims to develop argument-aware fact-checking methods that verify medical claims while generating structured, evidence-based explanations aligned with clinical reasoning. By enhancing transparency, reliability, and accountability, the research seeks to improve clinician trust and support safe AI deployment.

Project Details

This PhD project aims to develop argument-aware fact-checking methods for explainable medical decision support. Rather than verifying medical claims in isolation, the project will model the argumentative structure underlying clinical reasoning, including claims, premises, evidence, and counter arguments drawn from clinical guidelines and biomedical literature. By integrating argument mining with automated fact checking, the project seeks to assess not only whether a claim is correct, but why it is supported, contested, or uncertain. The research will develop NLP models to extract medical arguments, construct structured representations of evidence, and verify claims using argument completeness, evidence quality, and consistency. These outputs will be integrated into an explainable decision support framework that generates structured, human-interpretable explanations aligned with clinical reasoning. The expected contributions include new methods for argument-aware medical fact checking, explainable verification models, and empirical evidence demonstrating improved transparency and trustworthiness in medical decision support systems.

The work plan for the project with specific objectives is given below:

1. **Medical Argument Analysis**
   Extract and model argumentative structures from clinical guidelines and biomedical literature, identifying claims, supporting evidence, counterarguments, and strength of recommendations.
2. **Dataset Development**
   Create a novel annotated dataset of medical arguments with a structured annotation argument schemes capturing claims, premises and evidence types, counterarguments, evidence quality indicators, recommendation strength.
3. **Argument-Aware Fact Checking**
   Develop NLP and machine learning models that verify medical claims within their argumentative context by evaluating factual correctness, evidence completeness, evidence quality, and logical consistency across sources.
4. **Explainable Decision Support Prototype**
   Implement a prototype system that integrates argument extraction and verification into a clinical decision support framework, generating structured argumentation-based explanations and visual representations of evidence chains.

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Project-specific entry requirements

- Strong knowledge and background of Computer Science.
- Experience of fundamental Natural Language Processing (NLP), Machine Learning (ML) techniques and Large Language Models (LLMs).
- Knowledge of argumentation theory and defeasible reasoning would be advantageous.
- Good written and communication skills.
- Strong motivation, with evidence of independent research skills relevant to project.

Further Information

This call is open to **UK Applicants only**.

Applicants should be of outstanding quality and exceptionally motivated.

The studentships are funded for 3 years (subject to satisfactory annual performance and progression review) and will provide for tuition fees and a tax-free stipend paid monthly.

Please note that there are more projects than funded studentships available and therefore this is a competitive application process which will include an interview. Shortlisted candidates will be contacted for an interview in person or via Teams. After interview the most outstanding applicants will be offered a studentship.

Queries about the application process are welcome and should be emailed to pgrscholarships@hud.ac.uk.

Informal enquiries about this project should be directed to Dr Quratul-ain Mahesar.

Type of Award: Doctor of Philosophy (PhD).

Eligibility: UK applicants only. First Class or Upper Second-Class Honours degree or equivalent in a relevant subject area, please refer to the entry requirements on the specific projects being advertised.

Location: Huddersfield.

Funding: 3 years full time research covering tuition fees and a tax-free bursary (stipend) starting at £21,805 for 2026/27 and increasing in line with the EPSRC guidelines for the subsequent years. Funded via the Engineering and Physical Sciences Research Council Doctoral Training Programme.

Duration: 3 years full-time plus 12 months writing up (please note no funding available for writing up period).

Closing date: 28th April 2026

Start date: 1st October 2026

Application details

- Go to the EPSRC webpage and download the Expression of Interest Form 2026.
- Provide copies of transcripts & certificates of all relevant academic and professional qualifications.
- Provide references from two individuals – please contact your referees and ask them to send them directly to pgrscholarships@hud.ac.uk from their email address.
- Proof of eligibility – e.g. scan of passport photo page.
- Completed forms, including all relevant documents should be submitted via-email to pgrscholarships@hud.ac.uk.

Please note: if you do not attach all the relevant documentation prior to the closing date your application will not be considered.

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