AI-Assisted Revisions for Curricula (ARC), an AI Research Center of Excellence for Education Project

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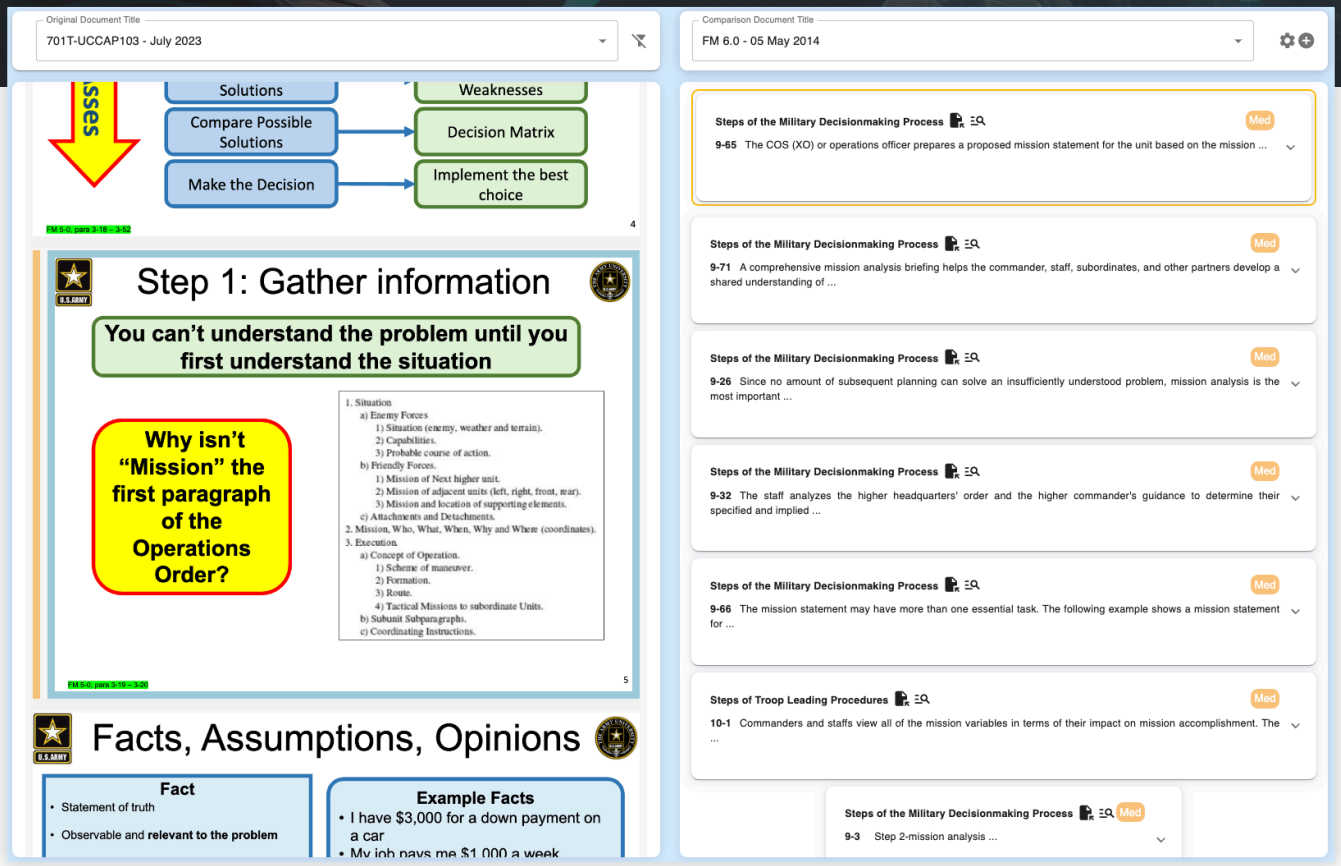

Background

AIRCOEE (AI Research Center of Excellence for Education) is a two-year $4.5 million dollar collaboration between the University of Southern California and Army University to address two fundamental questions: "How do we use AI to improve education?" and "How do we upskill our population in AI and prepare them for the jobs of the 21st century?"

Funded through the AIRCOEE, the AI-Assisted Revisions for Curricula (ARC) project aims to support Army developers who maintain courses by recognizing changes in doctrine, policy or manuals that impact curriculum content such as lesson plans or slides through identifying individual slides, sections or references that may need updating and in some cases suggesting changes.

Objectives

When new doctrine and manuals are introduced, extensive time is spent identifying and updating relevant training materials. To speed up what is currently a manual process, the ARC tool will process a variety of document types

(e.g., PDF doctrine, PowerPoint slides, Word lesson plans), make connections between documents (e.g., matching sections of old and new doctrine, linking references to doctrine), recognize when referenced material has changed, and potentially suggest changes (e.g., update terminology). This work focuses on three problems:

- Indexing Training Materials: Text analysis pipelines for training materials to extract and tag meaningful passages (e.g., "ADP 6.0 Section 1-5") and metadata. Collecting a corpus which includes both current and prior versions of doctrine.
- Change Analysis: For any passage in a training document, analyze if the relevant doctrine passage(s) were substantially changed in new doctrine versions.
- Ranking Document Updates: Applying change analysis at the document level, search and rank which documents should be reviewed for updates.

A hybrid approach leveraging classical search algorithms as well as modern transformed-based models detects connections and identifies changes. Color coding allows course developers to easily inspect and confirm results (e.g., green indicates a close match between old and new doctrine, yellow indicates substantial changes, red indicates new doctrine does not cover the material) and take action as needed (e.g., ARC may suggest terminology updates based on changes to glossary terms). ARC offers the potential to greatly accelerate updating content, enabling greater relevance of content to the latest doctrine and best-practices.

Results

Data collection is critical to ARC and LTC Fortuna of Army University is leading the effort in building an archive of Army doctrine documents as well as associated slides and lesson plans. Using the initial version of this corpus, the first version of the ARC tool was developed with the ability to process PDF doctrine and PowerPoint slides allowing comparison of old and new doctrine (e.g., all the paragraphs in the old doctrine are colored green for a good match, yellow for a partial match and red for no match in the new doctrine) as well as comparison with PowerPoint slides (e.g., find match in old doctrine for a slide then look for match in new doctrine). Based on the ability to analyze changes for an individual document, a scoring algorithm is being developed to search for and rank training resources that are most likely to need updates due to a change in doctrine.

Next Steps

Ongoing work is exploring Army-specific AI tools (large language models trained on doctrine, such as TracLM) and support for a wider variety of lesson plans and resources. User testing will guide this process as well as exploration of different Army focus areas (e.g., sustainment, recruitment, medical). ARC is also prototypes that integrate with Microsoft SharePoint as well as Army-specific tools (e.g., Central Army Registry) would allow access to a larger collection of doctrine and training materials. This work would pave the way to enable Army users to test and leverage the system in combination with tools that they already use for lessons (e.g., MS Word).

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