Summary

This research will find the explanatory power of force ratios under the effects of Leadership and Morale for the outcome of the battle. Natural Language Processing and Deep Learning techniques of Artificial Intelligence will be used with Python Programming Language to achieve this. This research is important because force ratios, although explained mathematically, never systematically analysed through leadership and morale senses. Results would be used in leaders development in defence sector. I am well placed to deliver it because I am doing this in the Cranfield University School of Defence and Security which is perfect match to realize this project.

Impact

Defence organizations has its own way to analyse true reasons of the battle outcomes. This could be based on the official reports, memoirs of the commanders, and lessons learned analysis and so on. According to these analyses they figure out their force development and personnel development needs.

Current information technology allows us to add one another to these methods, which is artificial intelligence. This approach will make the need analysis of a leader and force development with a systematic approach. The latest developments on the AI, which is now has a potential to diagnose the illnesses with image processing, lets us examine the real causes of the selected phenomena with vectorization of the key terms.

This research will show what kind of leaders needed on the battlefield. Furthermore, it will show how leaders leverage the morale of man and women to be effective on the battlefield.

Innovation

Novel Technology/Service: I offer using Artificial Intelligence (AI) in deciding true reasons of battle outcomes. Especially I will use Natural Language Processing and Deep Learning fields of AI.

Using AI in social sciences relatively new when comparing other applications such as translation, image processing.

Stage of development: It is now TRL 5 (Technology Basic Validation in a Relative Environment).

Technical Approach: I will use 3 basic tools&approaches to explain relationship between outcome of the battle and the factors effectin it.

1.Multiple regression analysis to explain difference in variance by each factor (example: to what degree number of troops effects outcome).

2.Case study to explain the qualitative factors (leadership and morale)

3. With using AI techniques of Natural Language Processing and Deep Learning:

-I will annotate the named entities,

-I will train named entity recognition (NER) and relation extraction (RE) models with language representation techniques,

-And I will create new features to build deep learning models to find relations between the outcomes and leadership and morale factors.

Innovation: This information technology never applied to this subject of defence sector.

The literature on force ratio shows us, since know, historical experiences and mathematical formulations is used to explain the outcome of the battle.

This innovative approach will provide the required explanations about the commander’s role and the morale of the soldiers, which according to Clausewitz, main determinants of the battle outcome. He sees material factors as wooden hilt, while moral factors are true weapon.

But due to their qualitative nature these two phenomena are never analysed in systematic manner as pointed out by the Stephen Biddle, writer of the book “Military Power”, who shares the same ideas with Clausewitz and tries to explain the outcome by the force employment phenomena.

Evidence in-place for this idea:

-Sentiment analysis made to measure performance in the big malls (They link certain letters with satisfaction and shifts all feedback written in text to vectors to decide relationship).

-Image processing in diagnosing the illness: Computer fed with enough data on certain illnessess then treat new ones to decide helathy or not.

-Automatisation of recruitment: Association of certain words with success to decide for hiring.

How my innovation provides an advantage: Other approaches couldn't achieve to explain relationship between qualitative factors with the outcome o the battle in systematic manner. Only one approach exists, of Stephen Biddle, where he explains relationship with case studies.