REVIEW PAPER ON AI IN FUTURE WARFARE

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Analysis Report on Artificial Intelligence in Future Warfare:

Abstract:

This research report uncovers the facts and figures regarding the future of wars when artificial intelligence is taking over the world; it also describes the challenges and threats of autonomous robotic drones in future wars where artificial intelligence will have the tendency to do the job but the question remains the same whether artificial intelligence can take this responsibility of battlefield by taking the ethical issues? Is AI certain to make authentic reasoning a critical situation in the battlefield? For all these questions, the author has read two research papers. One is titled as 'The Artificial Intelligence and The Future Warfare' by Professor Marry Missy L. Cunnings from the University of Duke USA. Cummings and the other is 'AI and The Future of War' by Professor Lingjuan Li from the University of Northern Arizona.

Introduction:

Let's begin with the L. Cunnings research papers. She has discussed the many factors behind the slow advancement of artificial intelligence in the military of US and the world. First of all, she takes into account that the commercial market of autonomous robots is increasing than the military, and the big tech companies and entrepreneurs are willing to invest more money in commercial robotics whereas there is no military involvement and interest in building autonomous unmanned aerial vehicles means drones. See this figure for comparison on how global commercial market has invested more money on commercial robots than the US military.

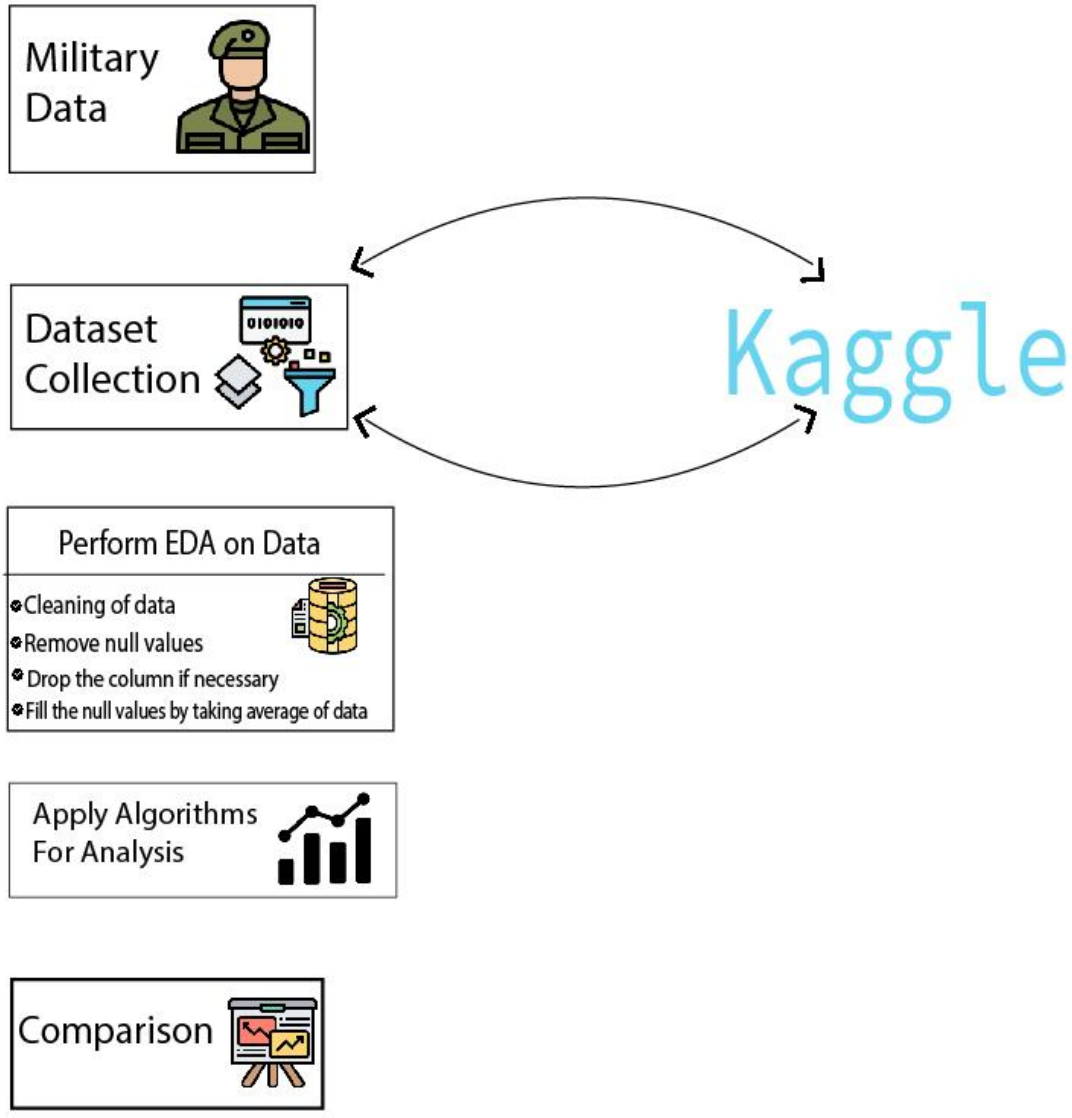
Literature Review:

Mary 'Missy' L. Cummings has worked on the involvement of AI in the military especially in autonomous drones and she has proved that how military market of autonomous UAVs is like a small shack in front of the commercial market of

autonomous robots. She further argues that this could lead to the danger of the commercial market of autonomous robots when military has not enough resources to manipulate autonomous UAVs.

Methodology:

We preferred the secondary data source to write this review paper which the author has taken as her/his final data for the findings. At the same time we applied our own analysis on the data by using algorithms and gave the results for those algorithms at the results section.



She also acknowledged that despite this fact there are many several reasons that stop the US military to invest money in building autonomous drones: the cultural and organizational barriers. She gives the example of F-22 and X-47 aircraft, both were aimed to have the autonomous but they both faced technical issues and consumed much higher budget: the cost of F-22 for one hour operation is $68362 however the same job can be done by the Predator aircraft with cost $3679 and it does not have any technical issue. These two are the core reason for the disruptive condition of AI in military.

She has given another reason for slow down the advancement of AI in battlefield that is the matter of uncertainty in robots. For that aim, she has discussed the state of art through any autonomous device learns and perceives around the world. She said that AI lacks the expert behavior when there is the extreme condition of uncertainty in critical time: to the extent, she gives two example one is about the landing on the river and the other is about the 'Intelligent Computer'. In 2009, the US pilot chose to ditch the river rather to land on the near airbase when the both engines of plane were failed. Professor Cunnings argues that this decision of pilot shows the high degree of knowledge-based behavior when the autopilot could not respond in such extreme situation of uncertainty; the pilot made mental model in the do or die situation where AI lacks for this kind of expertise.

To that extend, she gives another example of 'Intelligent Computer'. She said IBM had built a computer with 90 servers each has 3.5 GHz for searching vast database and generating formulaic responses which also confused people in which there was the low uncertainty in the operating environment. She further argues that that machine learning and deep learning algorithms are human tuned; they show the accuracy 15.8 per cent when 22,000 objects categories but this can be increased up to 60-70 per cent by other algorithms when the this category collapsed into 1000 objects.

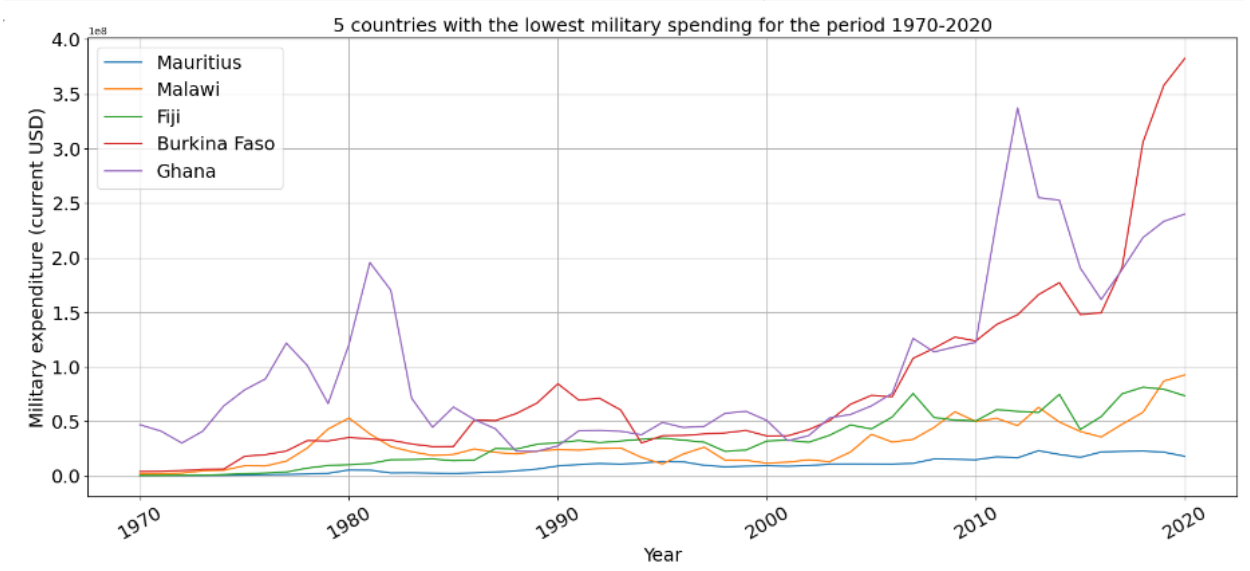
As far as the second research paper is concerned, I don't seek it as strong as Miss Cunnings's work because it discussed the implications of machine learning on military fields such as face recognition for security reasons, ML algorithms could be used to measure the threat analysis. He discussed the importance of ML algorithms in the field of network where data can be leaked through cyber attacks; ML algorithms can be used to measure the threat by analyzing the traffic pattern.

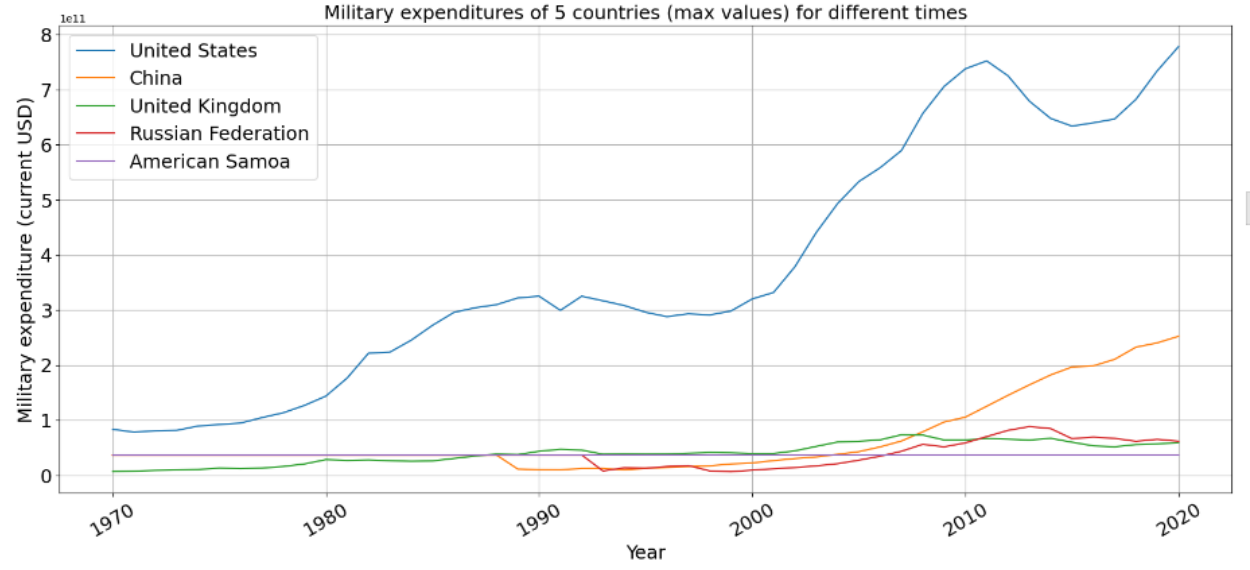
Furthermore it describes the importance of ML algorithms in the biometric field where face recognition could be the great tool border control. He also discussed the idea of encryption and decryption because the ML is based on the large scale of data which is trained and optimized through algorithms which can be stolen through cyberattacks. To protect this data, the encryption must be used.

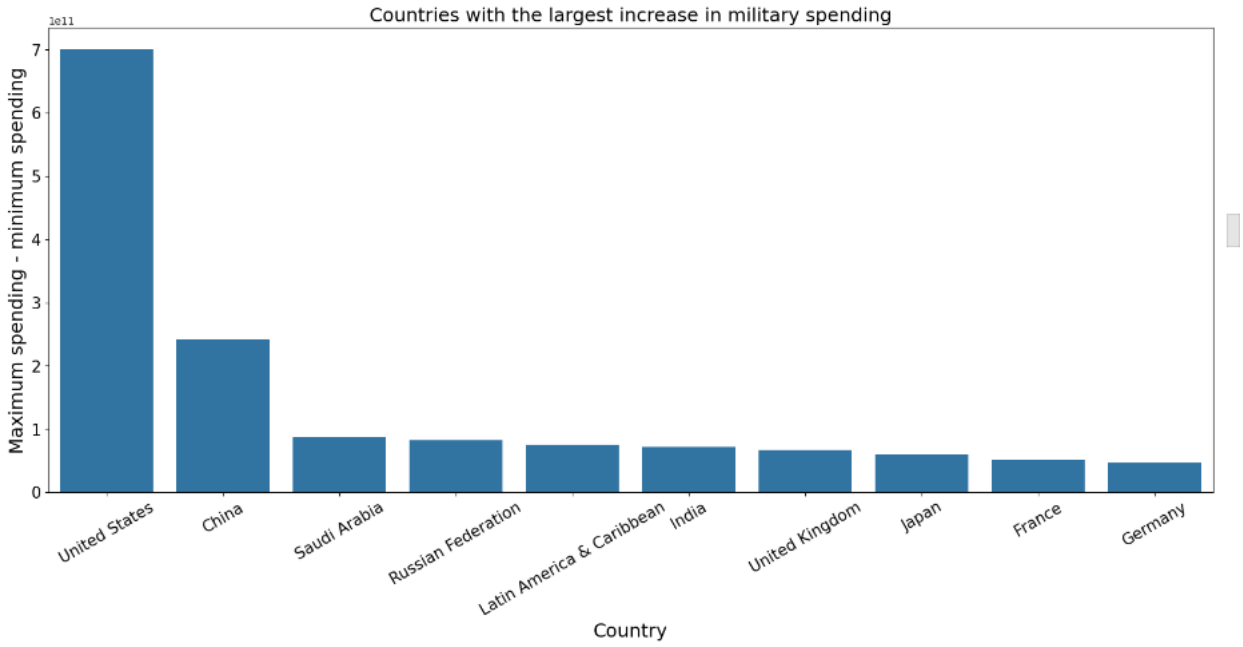
To sum up the Mr. Lingjaun Li's paper, it suggests the importance of machine learning for improving the accuracy and efficiency can be improved in security protection in the military and we can rapidly analyze the threat by using ML algorithms. He also addressed the ethical issues in war by maintaining the relationship between AI and international security. He countered that the safety practices can be achieved through machine learning in the military.

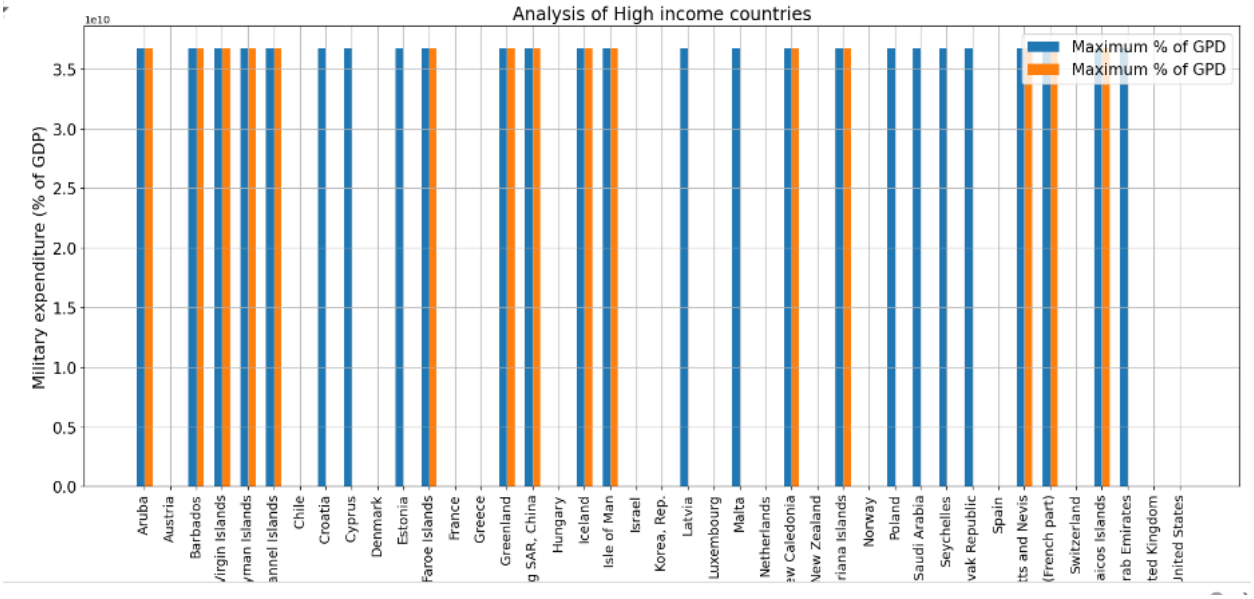
Results:

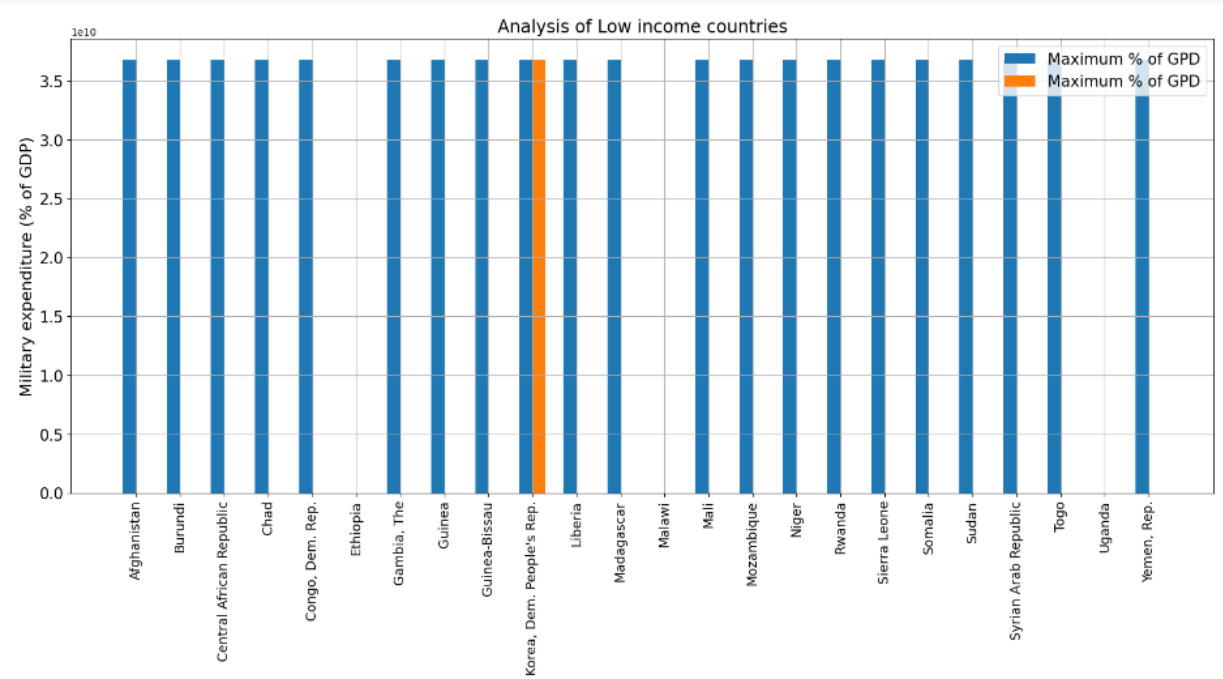
As the researcher confirms that the global market of autonomous robots has huge territory than the military, we have also seen this in our analysis.


5 countries with the lowest military spending for the period 1970-2020
1e8
Mauritius
Malawi
Fiji
Burkina Faso
Ghana
Military expenditure (current USD)
Year
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1970
1980
1990
2000
2010
2020


Military expenditures of 5 countries (max values) for different times
1e11
United States
China
United Kingdom
Russian Federation
American Samoa
Military expenditure (current USD)
Year
8
7
6
5
4
3
2
1
0
1970
1980
1990
2000
2010
2020


Countries with the largest increase in military spending
1e11
Maximum spending - minimum spending
0
1
2
3
4
5
6
7
United States
China
Saudi Arabia
Russian Federation
Latin America & Caribbean
India
United Kingdom
Japan
France
Germany
Country


Analysis of High income countries
1e10
Military expenditure (% of GDP)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Maximum % of GPD
Maximum % of GPD
Aruba
Austria
Barbados
Chile
Croatia
Cyprus
Denmark
Estonia
France
Greece
Hungary
Iceland
Israel
Latvia
Luxembourg
Malta
Netherlands
New Zealand
Norway
Poland
Saudi Arabia
Seychelles
Spain
Switzerland



Conclusion:

Now to give the authentic analysis of both papers, as far as the critical analysis and comparison are concerned, I would like to give my opinion in the most unbiased way. I found out the genuine and logical reasoning in the L. Cunnings's paper because she discussed the cause behind the disruptive AI in the military with facts and figures. She debated on the uncertainty in artificial intelligence that is the one of the core causes of slowing down the advancement of artificial intelligence in the military: the concept has been revealed above then she discussed about the commercial market of tech companies who are pushing billions of dollars to make commercial robots than the military. The military is not taking interest in building the autonomous drones because it demands heavy money to make such autonomous UAVs. That is also one of the major reasons behind the disruption of artificial intelligence in the battlefield. However, Mr. Lingjaun's paper suggests the importance of machine learning algorithms in the military department controls that is what we observe in daily life and that is already happening in the military, but what makes difference is that the miss

Cunnings talks about the autonomous drones not the organizational implications of artificial intelligence both are different things.

References for Both Papers:

1- https://www.chathamhouse.org/sites/default/files/publications/research/2017-01-26-artificial-intelligence-future-warfare-cummings.pdf

2- **https://wepub.org/index.php/IJCSIT/article/view/990**