

AI

CSPC54 AI-ML Project Design

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CSE-B

A Deep Learning Approach for Automatic Detection of Fake News

Introduction

Fake news detection is a very prominent and essential task in the field of journalism. This challenging problem is seen so far in the field of politics, but it could be even more challenging when it is to be determined in the multi-domain platform.

In this paper, Two effective models based on deep learning for solving fake news detection problem in online news contents of multiple domains are proposed. Evaluation of the techniques is done on the two recently released datasets, namely *FakeNews AMT* and *Celebrity* for fake news detection. In order to exploit the datasets, available for the related tasks, We will perform Cross-domain analysis (i.e. model trained on FakeNews AMT and tested on Celebrity and vice versa) to explore the applicability of our systems across the domains.

Literature Survey

A sufficient number of works could be found in the literature in fake news detection. We could detect fake news at two levels, namely the *conceptual level* and *operational level*.

- ⇒ The work of Rubin et al. (2015) (<https://dl.acm.org/doi/10.5555/2857070.2857153>) defined that conceptually there are three types of fake news:
 - i. Serious Fabrications
 - ii. Hoaxes and
 - iii. Satire.
- ⇒ The work of Conroy et al. (2015) (<https://dl.acm.org/doi/10.5555/2857070.2857152>) fostered linguistics and fact checking based approaches to distinguish between real and fake news, which could be considered as the work at conceptual level.
- ⇒ Thorne et al. (2018) (<https://aclanthology.org/N18-1074/>) introduced a novel dataset for fact-checking and verification where evidence is large Wikipedia corpus.
- ⇒ The Fake News Challenge 2 organized a competition to explore, how artificial intelligence technologies could be fostered to combat fake news. Almost 50 participants were participated and submitted their systems. Hanselowski et al. (2018) (<https://aclanthology.org/C18-1158/>) performed retrospective analysis of the three best participating systems of the Fake News Challenge.

⇒ The work of Saikh et al. (2019) (<https://dblp.org/pid/00/9019.html?view=joint¶m=1>) detected fake news through stance detection and also correlated this stance classification problem with Textual Entailment (TE). They tackled this problem using statistical machine learning and deep learning approaches separately and with combination of both of these. This system achieved the *state-of-the-art result*.

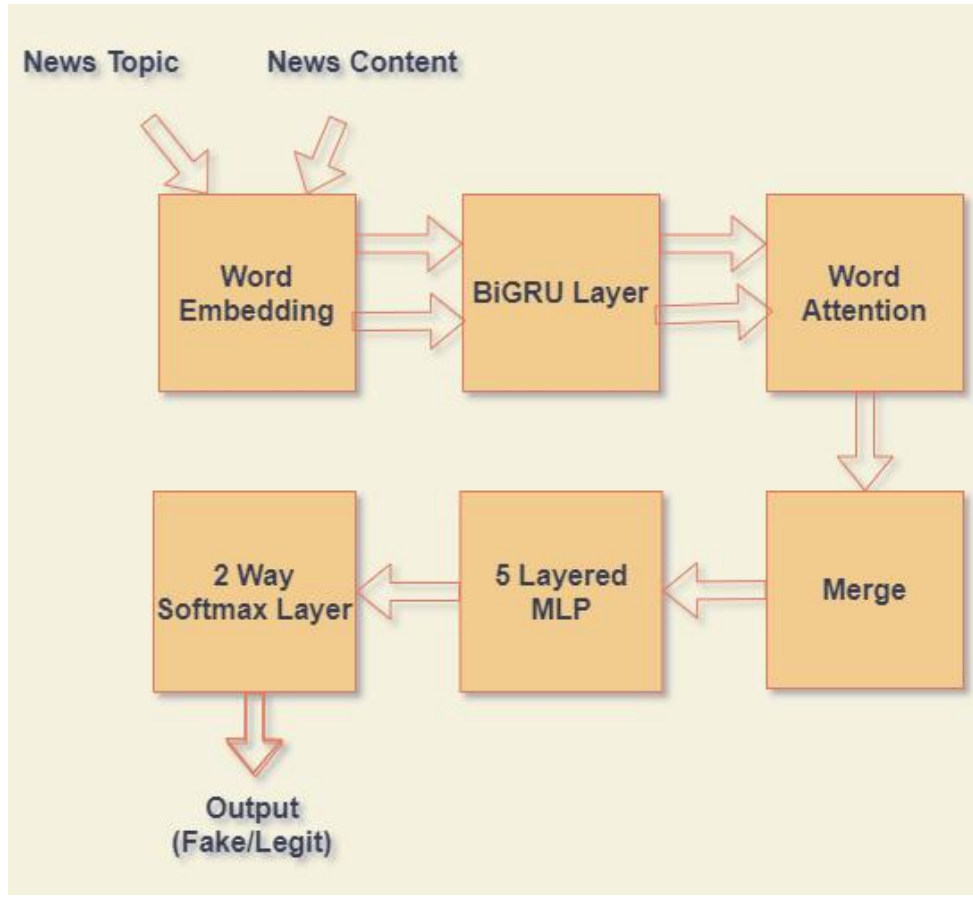
Improvements on above works:

Existing prior works for this problem mostly employ the methods that make use of handcrafted features. The proposed systems *do not depend* on hand crafted feature engineering or a sophisticated NLP pipeline, rather it is an *end-to-end deep neural network* architecture.

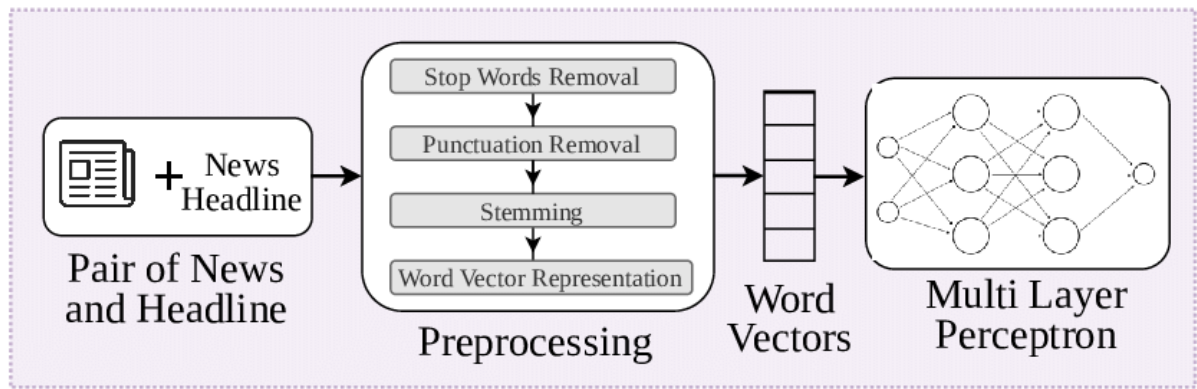
Which is why, Both the proposed models have the potential to outperform the state-of-the-art systems.

Block Diagrams

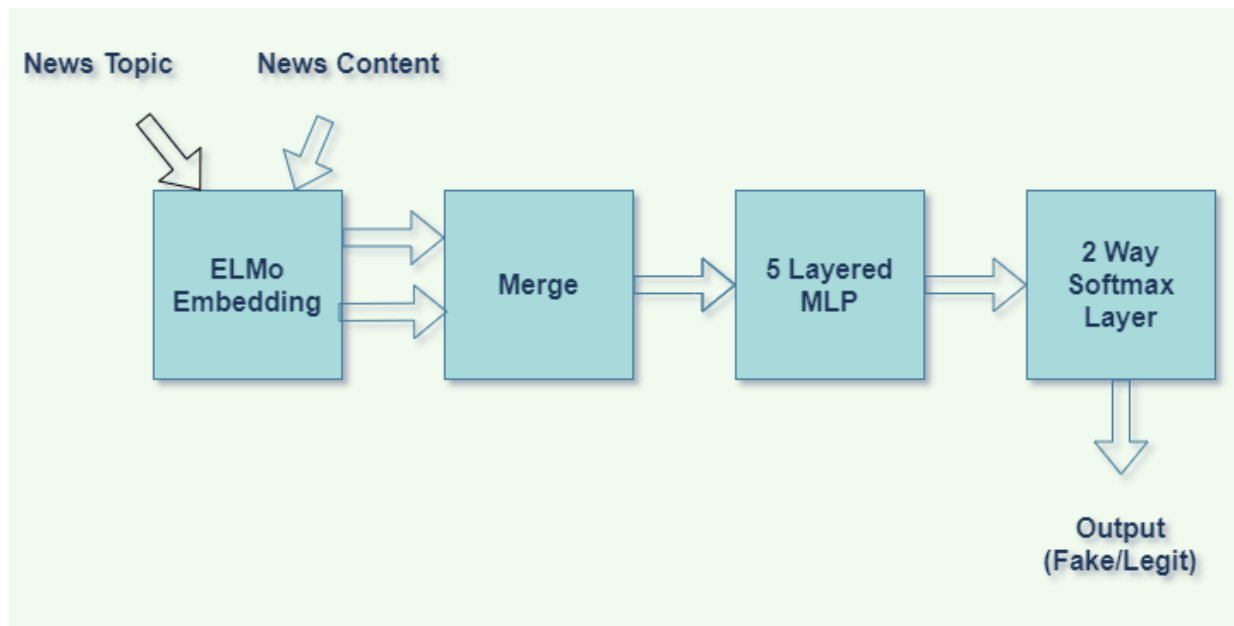
Architectural Diagram of the Second Proposed Model



Broad Workflow Diagram for First Proposed Model



Architectural Diagram of the Second Proposed Model



Workflow for ELMo used in Embedding Layer of Second Proposed Model

