Stance Detection
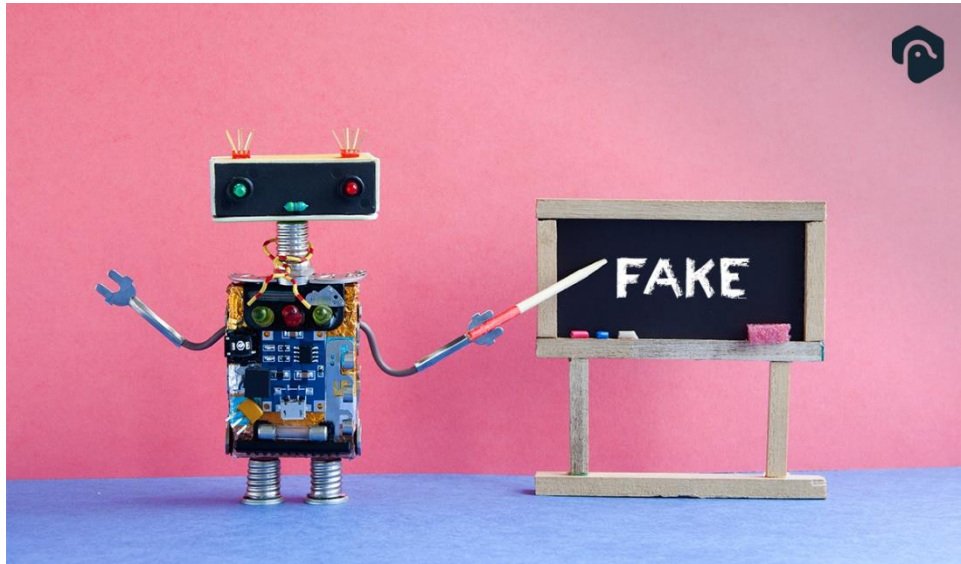
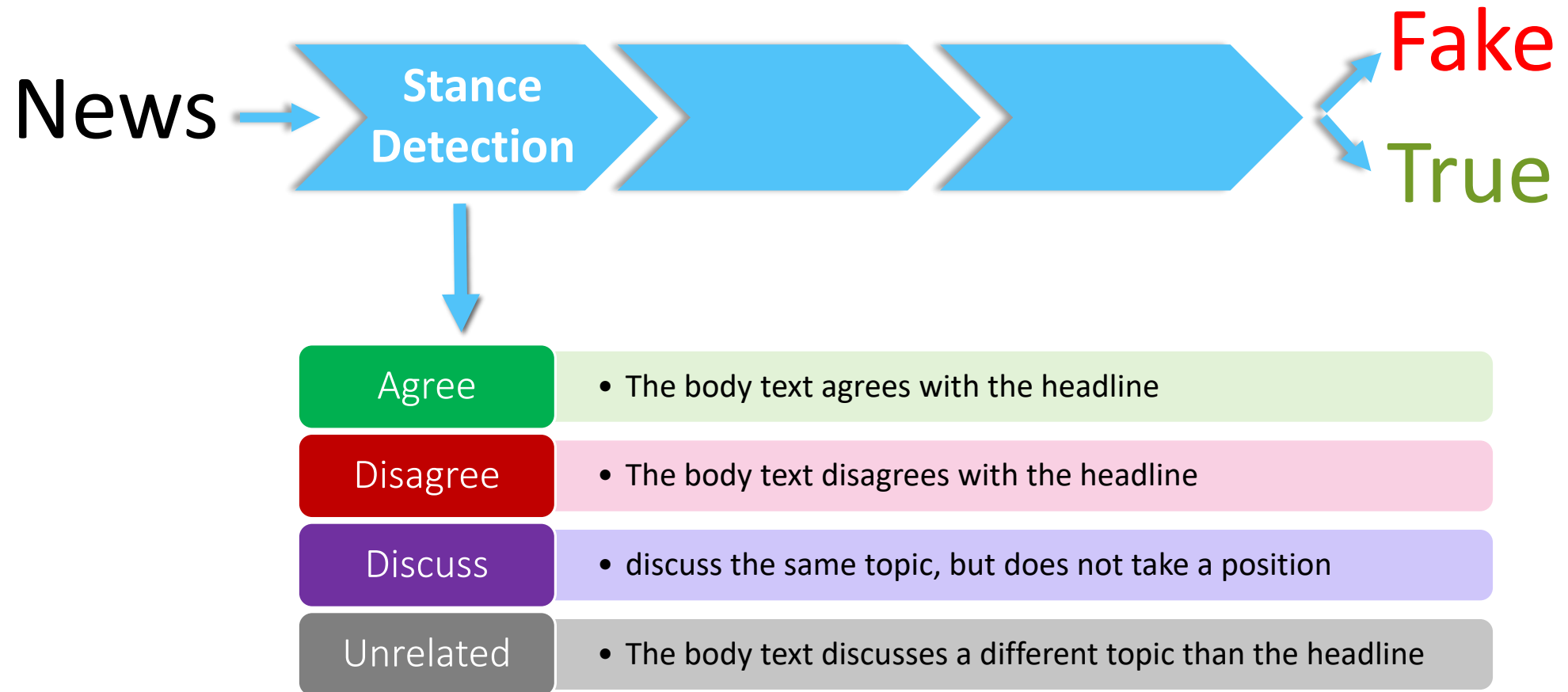# Problem!

❗ Exploring how artificial intelligence technologies could be leveraged to combat fake news.

FAKE NEWS

Problem!

News → **Stance Detection**

Fake
True

Agree	• The body text agrees with the headline
Disagree	• The body text disagrees with the headline
Discuss	• discuss the same topic, but does not take a position
Unrelated	• The body text discusses a different topic than the headline

Problem!

headline
وجود جی پی اس در گذرنامه ها

Body text
اخیرا ویدئویی منتشر شده که در آن شخصی با باز کردن جلد یک پاسپورت و پیدا کردن یک تراشه می گوید که آن یک جی پی اس است...

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Application
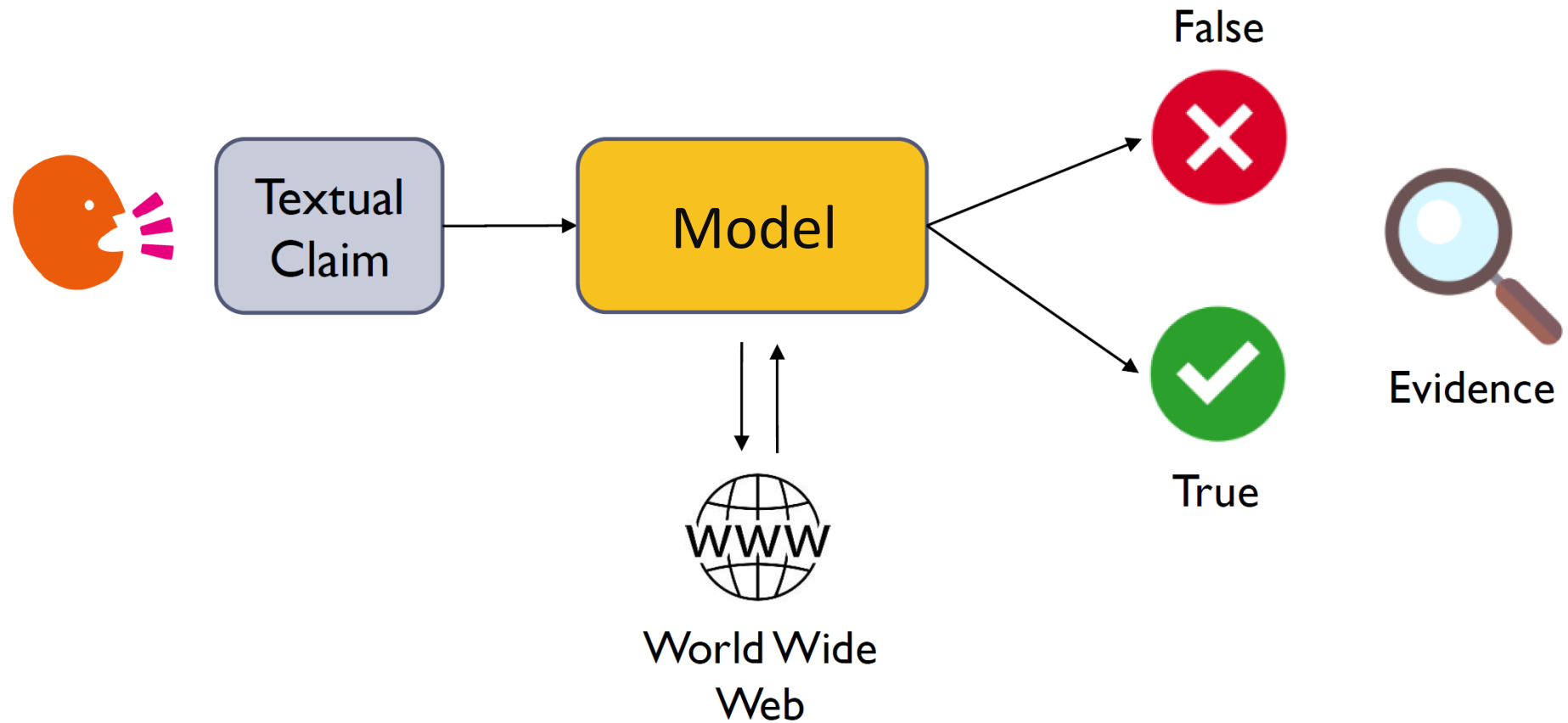
Is deep-learning suitable for this problem?

- data size is large

- lack of domain understanding for feature introspection

- complex problems
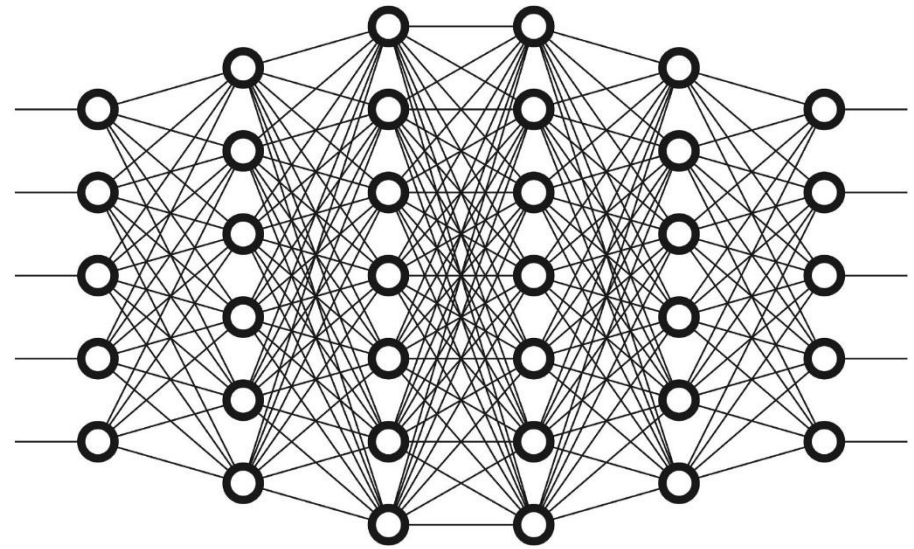
Model
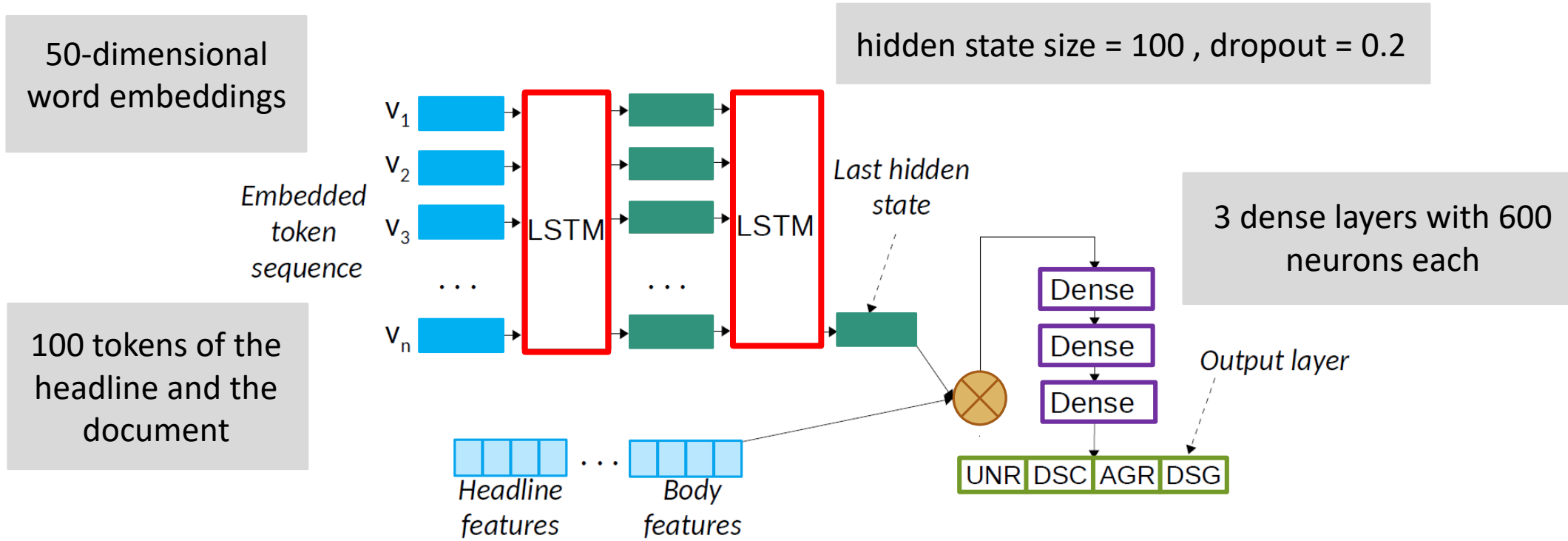
Features

Binary_co_occurence	• Count how many times a token in the title appears in the body text.
Binary_co_occurence_stops	• Count how many times a token in the title appears in the body text. Stopwords in the title are ignored.
Count_grams	• Count how many times an n-gram of the title appears in the entire body, and intro paragraph
negated_context_word	• Negates string after special negation word by adding a "NEG_" in front of every negated word, until a punctuation mark appears.
char_3grams	• Tf-idf for 3-gram head-body
Is_question	• Claim is question or not
Has_more_than_one_part	• Claim is more than one part or not

Results

	Acc	F1- score	AGR	DSG	DSC	UNR
Majority	.522	.36	0	0	1	0
SVM	.61	.58	.834	.405	.361	.04
Logistic Reg	.597	.54	.885	.369	.128	0
Random Forest	.605	.55	**.921**	.243	.298	.04
Naïve Bayes	.51	.575	.866	.369	.021	0
LSTM	.63	.65	.444	.486	.695	.601
stackLSTM	.63	.57	.185	.486	**.942**	.25
stackLSTM_reg	**.72**	**.71**	.185	**.571**	.79	**.758**

3 dense layers with 300 neurons each
Dropout = 0.5

Weaknesses and Strengths

- Bad performance in detecting minority class

- Imbalanced dataset

- We don't have good features for Persian

- Most of our features are based on the similarity of the text with the claim. These feature are not suitable for detecting disagree class

- Reliable Dataset

- 11% increase in total accuracy than the best base model(SVM)

- Improve disagree and unrelated detection

- The lack of similar tasks in Persian language

Dataset

Claims collection

Collect Persian rumors and fake news from *Fakenews.ir* and *Shayeaat*.ir

Labeling

For each body and headline we allocated four stance labels according to the claim.

References

- Andreas Hanselowski, Avinesh PVS, Benjamin Schiller, Felix Caspelherr, Debanjan Chaudhuri, Christian M. Meyer, and Iryna Gurevych. 2018. A retrospective analysis of the fake news challenge stance-detection task. In Proceedings of the 27th International Conference on Computational Linguistics, COLING '18, pages 1859–1874, Santa Fe, NM, USA

- Dean Pomerleau and Delip Rao. 2017. The fake news challenge: Exploring how artificial intelligence technologies could be leveraged to combat fake news.

- Majid Zarharan, Samane Ahangar, Fateme rezvani nejad, Mahdi lotfi, Sauleh etemadi and Mohammad taher pilevar. Persian stance detection. Conference for truth and trust online london · October 4-5, 2019.

- William Ferreira and Andreas Vlachos. 2016. Emergent: a novel data-set for stance classification. In HLT-NAACL.