DUPLICATE BUSTERS

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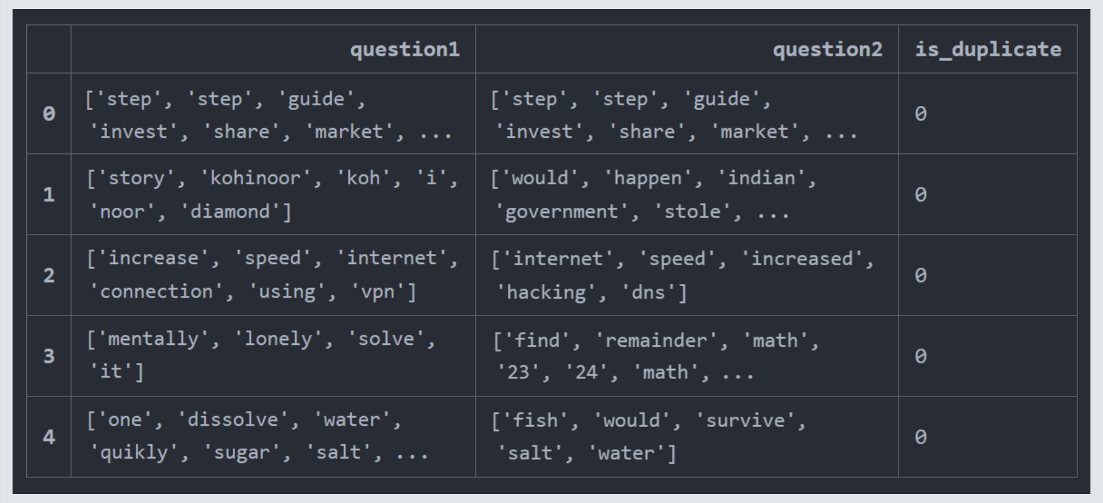
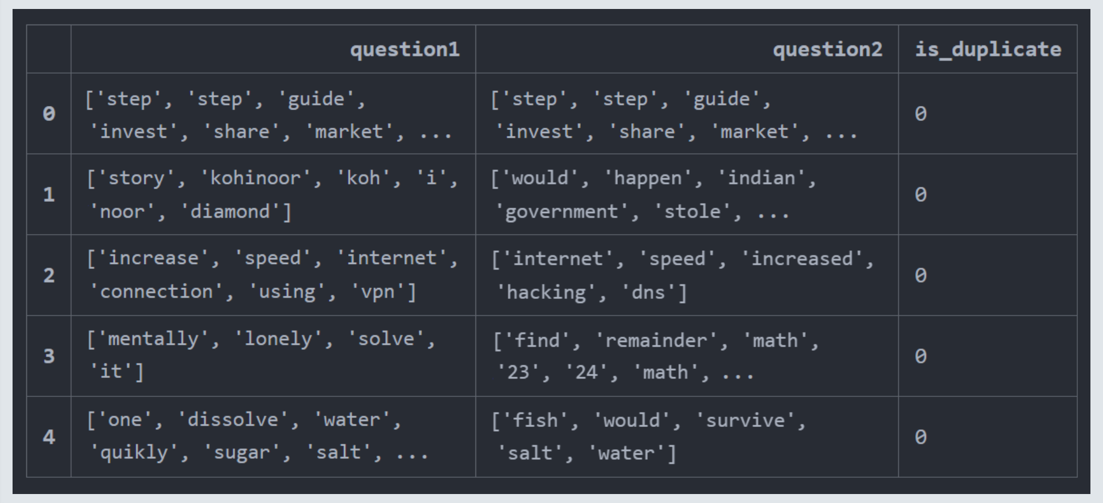
Predicting Quora Question Similarity with a Siamese deep MaLSTM network

Data Processing



	question1	question2	is_duplicate
0	['step', 'step', 'guide', 'invest', 'share', 'market', ...	['step', 'step', 'guide', 'invest', 'share', 'market', ...	0
1	['story', 'kohinoor', 'koh', 'i', 'noor', 'diamond']	['would', 'happen', 'indian', 'government', 'stole', ...	0
2	['increase', 'speed', 'internet', 'connection', 'using', 'vpn']	['internet', 'speed', 'increased', 'hacking', 'dns']	0
3	['mentally', 'lonely', 'solve', 'it']	['find', 'remainder', 'math', '23', '24', 'math', ...	0
4	['one', 'dissolve', 'water', 'quikly', 'sugar', 'salt', ...	['fish', 'would', 'survive', 'salt', 'water']	0

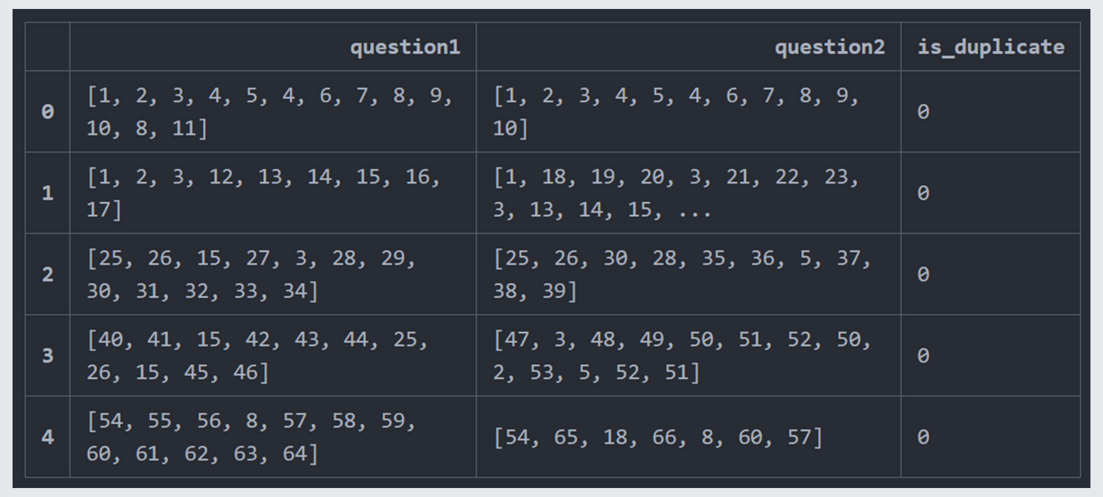
Pre-Processing
- Load the train, train labels and test data sets;
- Join the train labels with the train data set;
- Remove id rows from both train and test data sets.



	question1	question2	is_duplicate
0	['step', 'step', 'guide', 'invest', 'share', 'market', ...	['step', 'step', 'guide', 'invest', 'share', 'market', ...	0
1	['story', 'kohinoor', 'koh', 'i', 'noor', 'diamond']	['would', 'happen', 'indian', 'government', 'stole', ...	0
2	['increase', 'speed', 'internet', 'connection', 'using', 'vpn']	['internet', 'speed', 'increased', 'hacking', 'dns']	0
3	['mentally', 'lonely', 'solve', 'it']	['find', 'remainder', 'math', '23', '24', 'math', ...	0
4	['one', 'dissolve', 'water', 'quikly', 'sugar', 'salt', ...	['fish', 'would', 'survive', 'salt', 'water']	0

Text Cleaning
- Convert words to lower case;
- Remove punctuation;
- Normalization (What's to What is)
- Remove stop words;
- Split sentence into words separated by white space.

Feature Extraction



	question1	question2	is_duplicate
0	[1, 2, 3, 4, 5, 4, 6, 7, 8, 9, 10, 8, 11]	[1, 2, 3, 4, 5, 4, 6, 7, 8, 9, 10]	0
1	[1, 2, 3, 12, 13, 14, 15, 16, 17]	[1, 18, 19, 20, 3, 21, 22, 23, 3, 13, 14, 15, ...	0
2	[25, 26, 15, 27, 3, 28, 29, 30, 31, 32, 33, 34]	[25, 26, 30, 28, 35, 36, 5, 37, 38, 39]	0
3	[40, 41, 15, 42, 43, 44, 25, 26, 15, 45, 46]	[47, 3, 48, 49, 50, 51, 52, 50, 2, 53, 5, 52, 51]	0
4	[54, 55, 56, 8, 57, 58, 59, 60, 61, 62, 63, 64]	[54, 65, 18, 66, 8, 60, 57]	0

Words to Indices
- Convert words to indices;
- Start at index 1 to reserve 0 for zero padding.

Embedding
- Use Google's Word2Vec embedding to turn words into their embedding;
- Model with 300 dimensional vectors for 3 million words and phrases (pre-trained over about 100 billion words);
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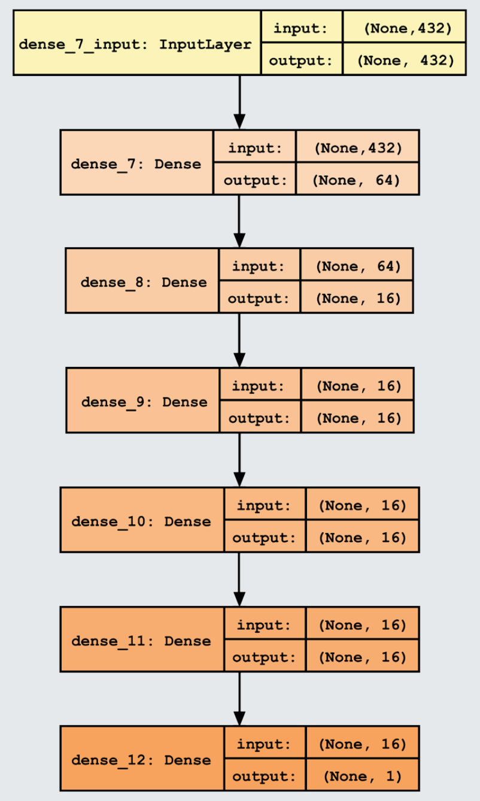
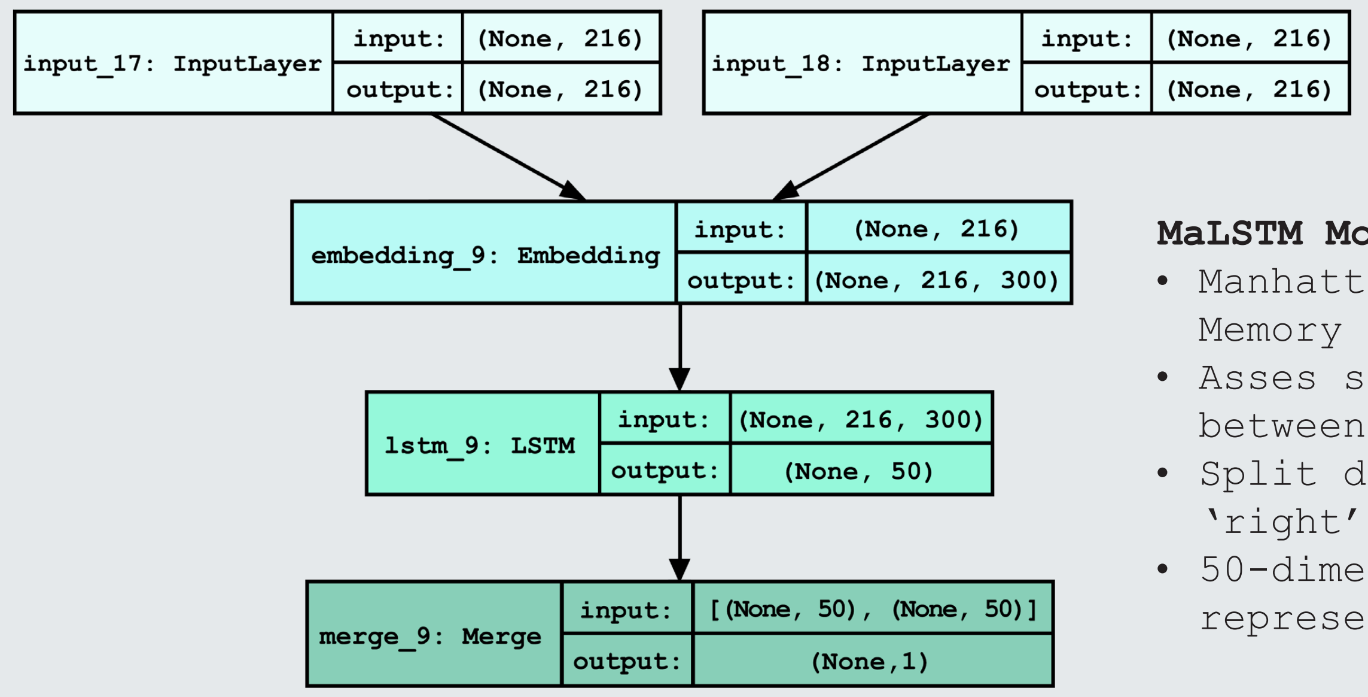
Model Selection



Dense Concatenation Model



MaLSTM Model
- Manhattan Long Short-Term Memory (MaLSTM) network;
- Asses semantic similarity between sentence;
- Split data to 'left' and 'right' inputs;
- 50-dimensional hidden representations

Model Training

Model Evaluation

Technical Information