Leveraging LSTM and Attention Mechanisms for Improved Fake News Detection

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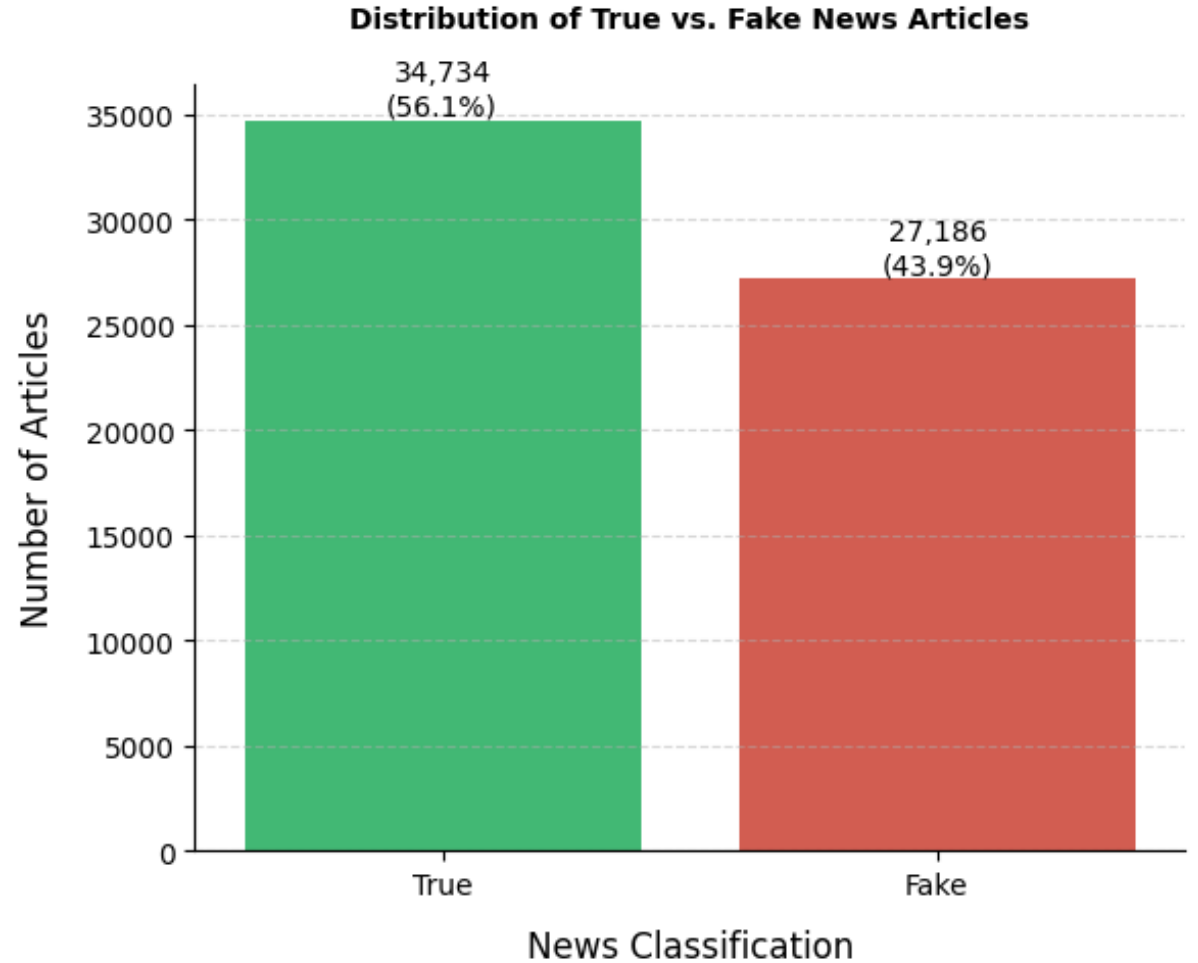
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Related work

- Fake news impacts public trust, democracy, and decision-making.

- Traditional fact-checking is slow; machine learning offers a scalable alternative.

- This project leverages LSTM networks, enhanced with an attention mechanism, for automatic fake news detection
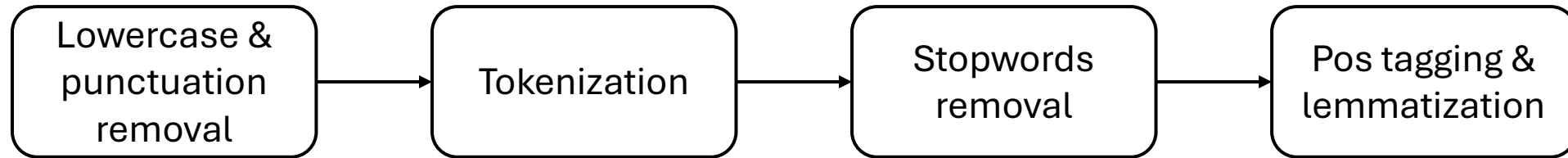
Dataset

- **Initial dataset:** 71,406 articles, balanced labels: 51% true, 49% fake

- **Removal of non-English news:** total of 1,355

- **Elimination of duplicate news:** total of 8,132

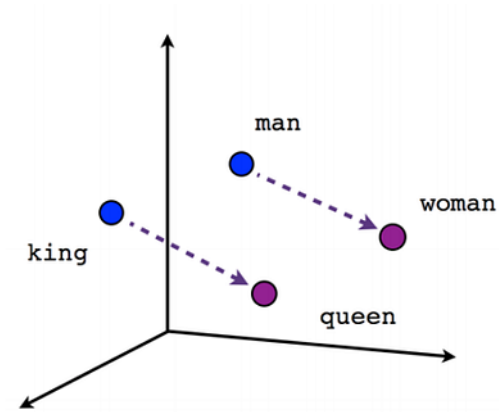- **Final dataset:** 61,919 articles, with 56% true and 44% fake

Distribution of True vs. Fake News Articles

Preprocessing

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┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│ Lowercase &  │     │              │     │  Stopwords   │     │ Pos tagging &│
│ punctuation  │ ──> │ Tokenization │ ──> │   removal    │ ──> │ lemmatization│
│   removal    │     │              │     │              │     │              │
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
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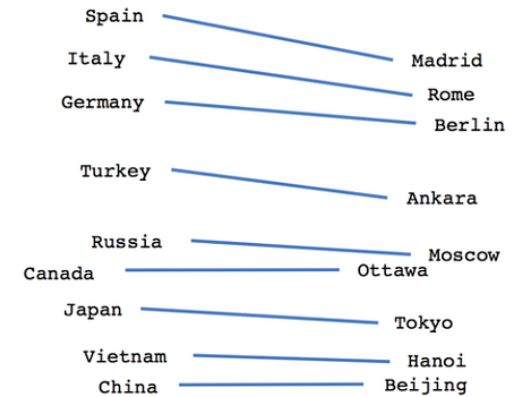Scientists Discover New Species of Dinosaur in Australia! ──────────────> scientist discover new species dinosaur australia

Word embeddings

- Converts words into dense numerical vectors

- Captures semantic and syntactic relationships

- Similar words clustered together in vector space

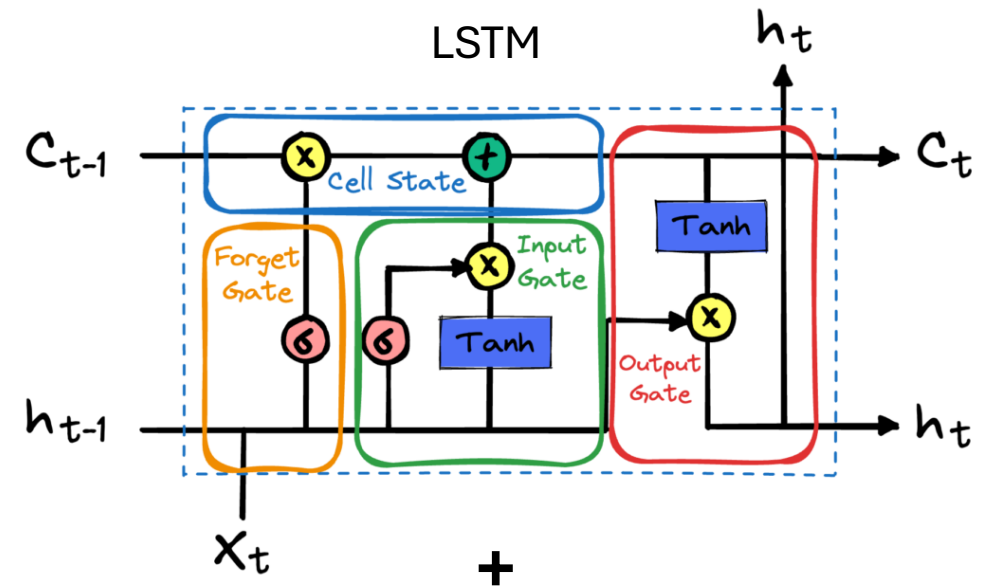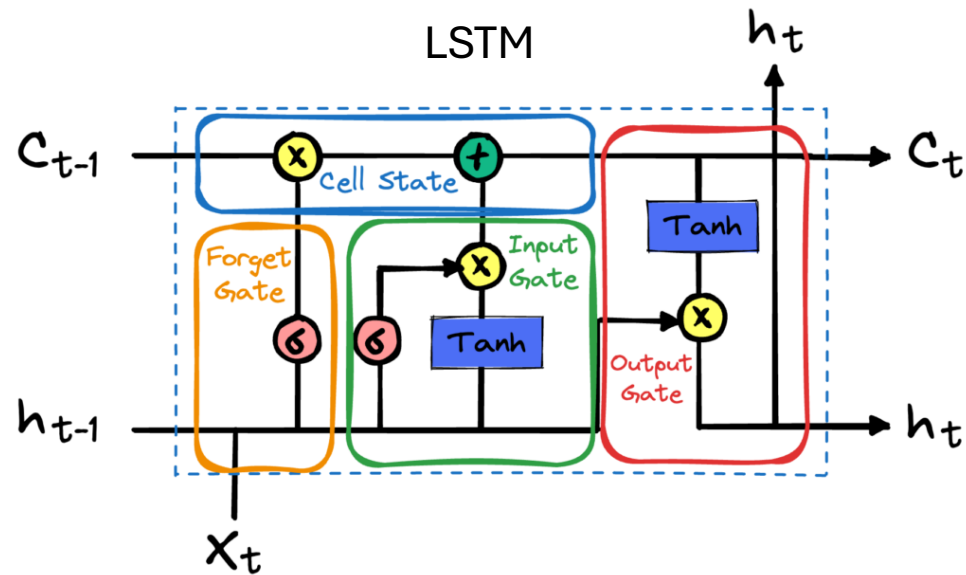- Used a Word2Vec Continuous Bag-of-Words (CBOW) approach

Male-Female

Country-Capital

Models' architecture

Two models were developed

Results