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**Efficient Estimation of Word Representations in Vector Space – Summary**

**Overview:**  
This influential paper from Google proposes fast, effective methods to convert words into vectors that capture their meaning.

**Key Techniques:**

* **CBOW (Continuous Bag-of-Words):** Predicts a word using its surrounding context. Fast and effective for frequent terms.
* **Skip-gram:** Predicts surrounding words from a single word. Excels at capturing subtle word relationships.

**Significance:**

* **Speed:** Trains on billions of words in days (not weeks or months).
* **Insight:** Uncovers patterns like *“King - Man + Woman = Queen”*.
* **Versatility:** Captures grammar (e.g., “run” → “ran”) and real-world facts (e.g., “Paris:France :: Tokyo:Japan”).

**Applications:**

* Improves **translation**, **search**, and **NLP benchmarks**
* Scales to large datasets via Google’s **DistBelief** system