Exploiting the Logits

Joint Sign Language Recognition and Spell-Correction

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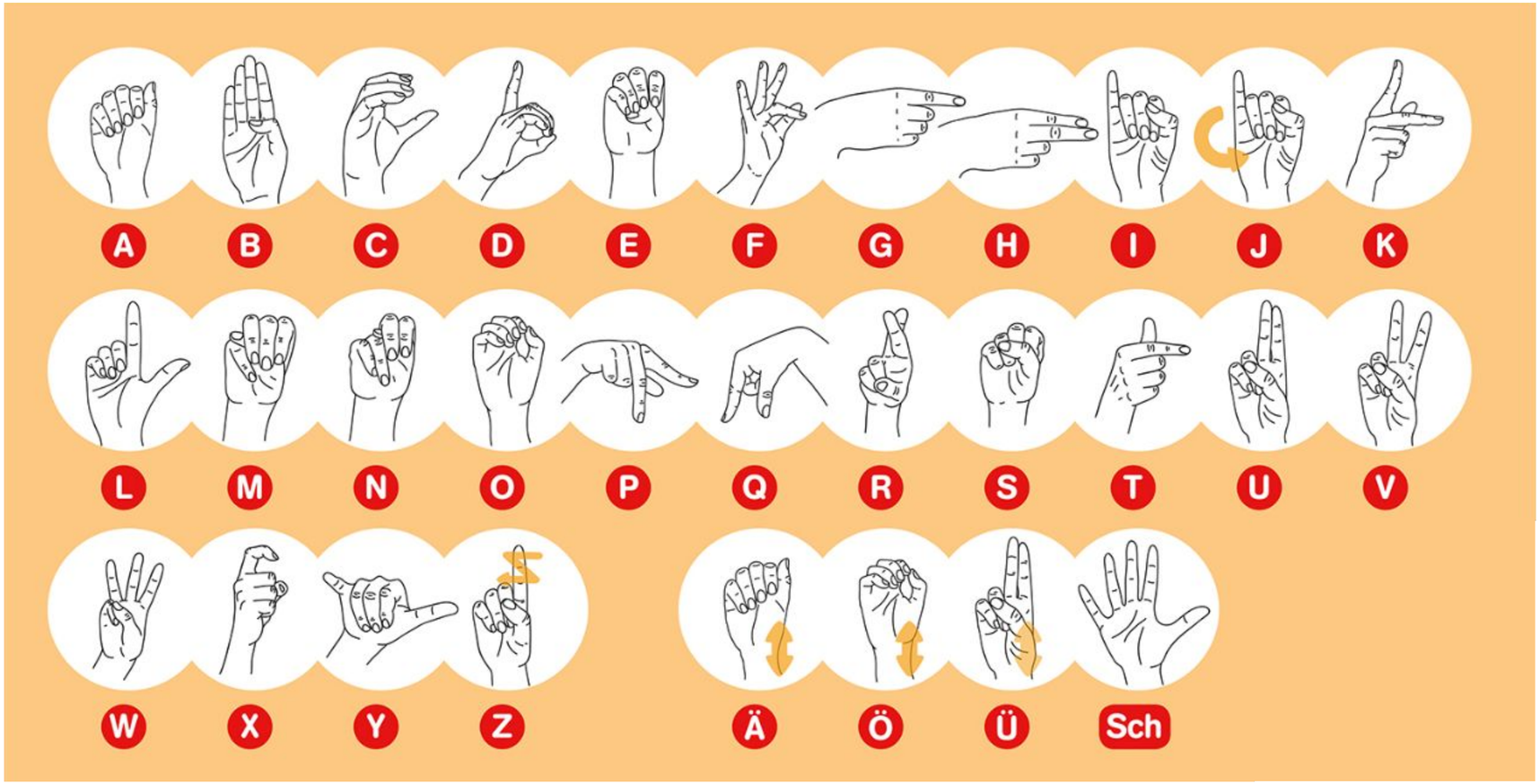
Sign Language Recognition

German Finger Alphabet

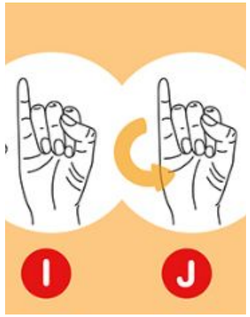


[1]

[1] *Deutsche Gebärdensprache (DGS) und Fingeralphabet.* https://www. aktion-mensch.de/dafuer-stehen-wir/was-ist-inklusion/deutsche- gebaerdensprache.html. – Accessed: 20.09.2019

Sign Language Recognition

German Finger Alphabet



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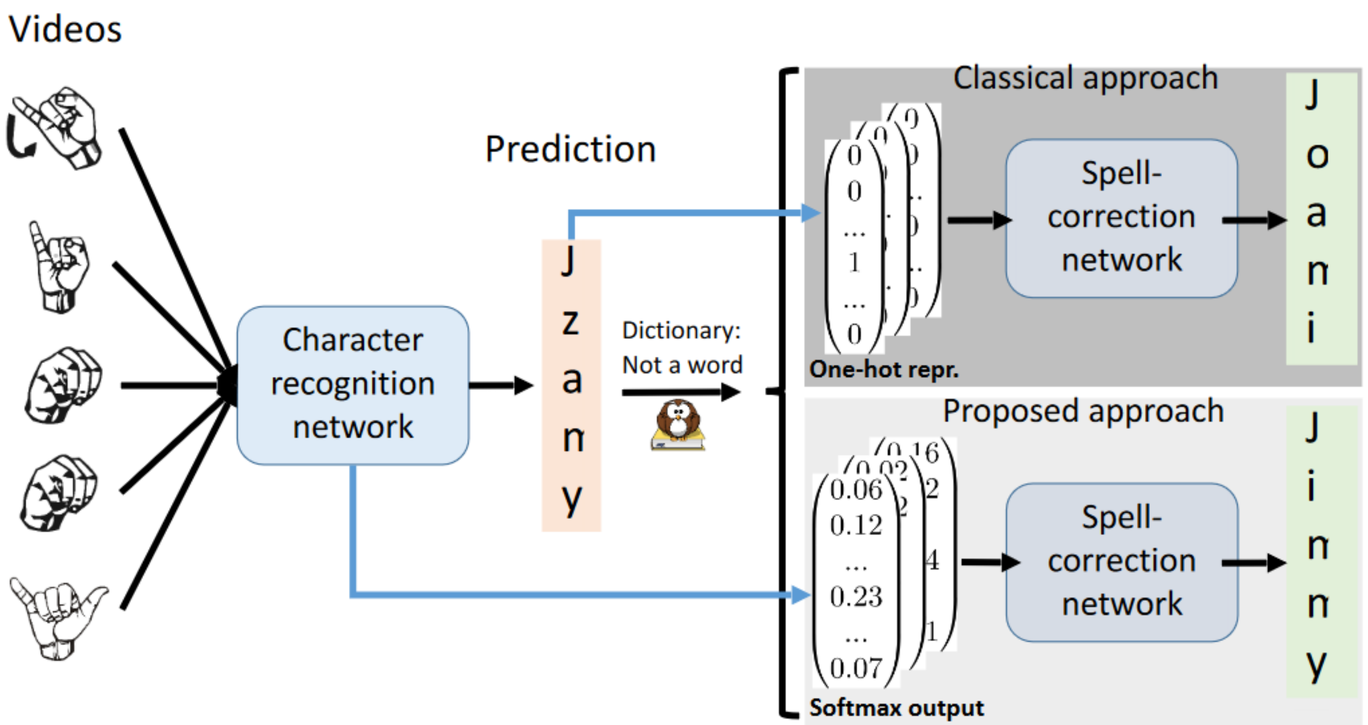
Problem Setting

- Challenges:
  A. Movements in gestures
  B. Scarce dataset
- Observation: Poor top one accuracy but high top five accuracy of character recognition
- Approach: Use logits of character recognition for spell-correction

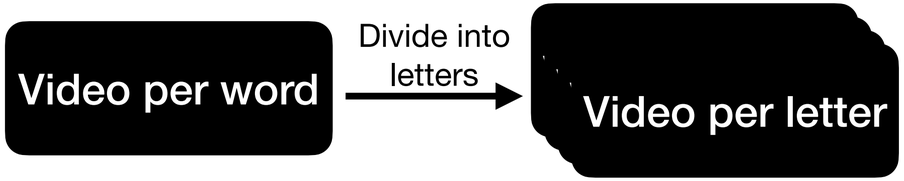
Proposed Approach



Workflow

Video per word

Workflow



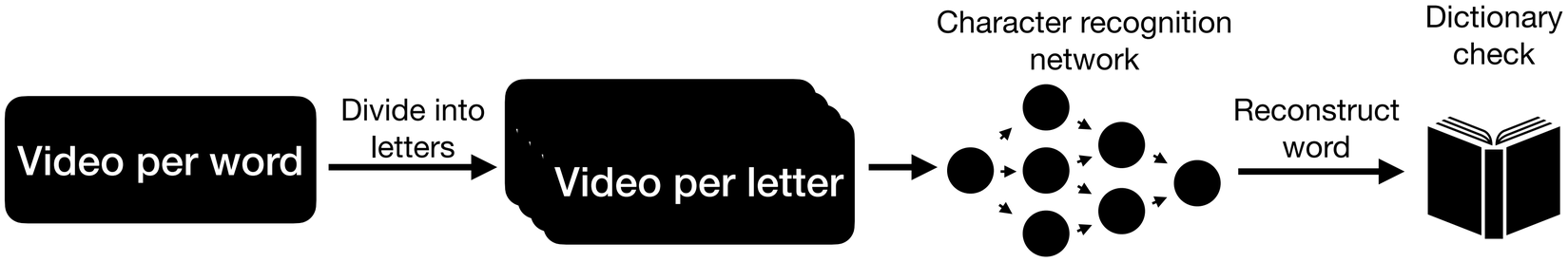
Workflow


Video per word
Divide into letters
Video per letter
Character recognition network

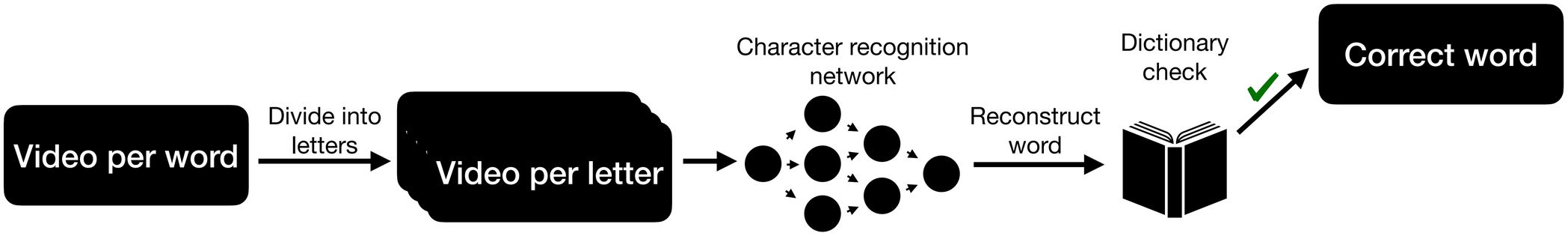
Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word

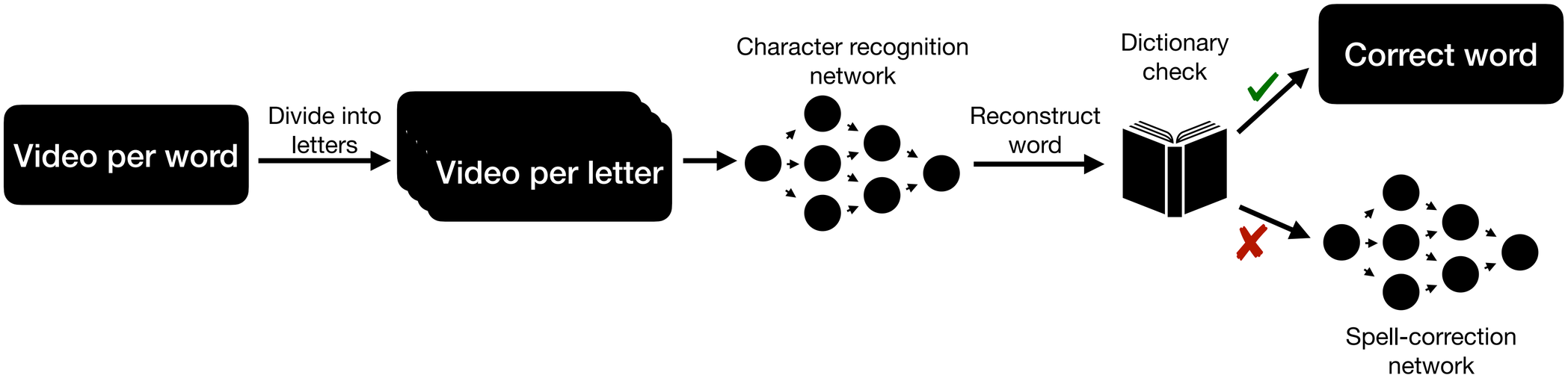
Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word
Dictionary check

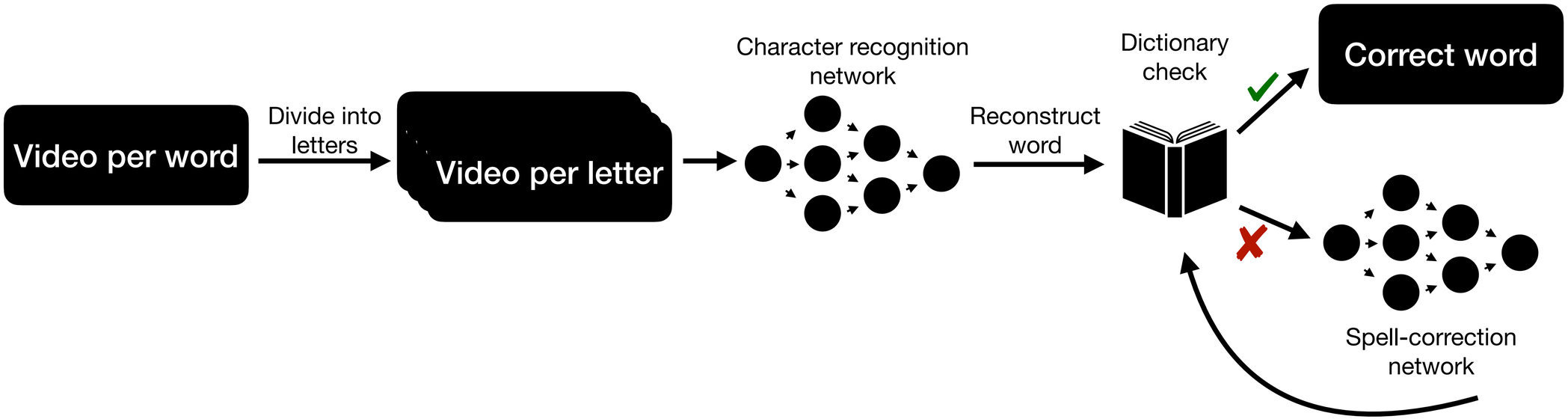
Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word
Dictionary check
Correct word

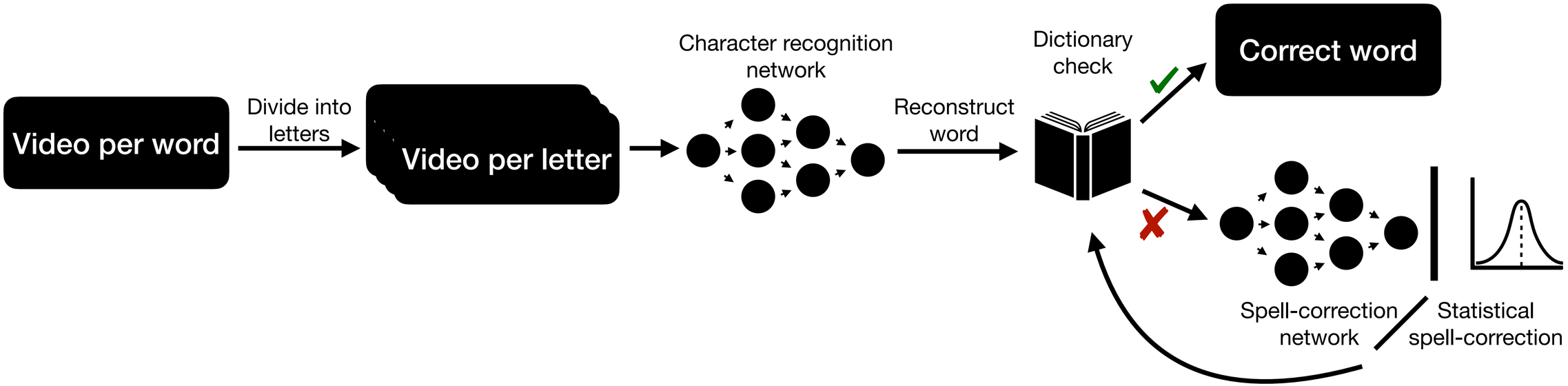
Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word
Dictionary check
Correct word
Spell-correction network

Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word
Dictionary check
Correct word
Spell-correction network

Workflow


Video per word
Divide into letters
Video per letter
Character recognition network
Reconstruct word
Dictionary check
Correct word
Spell-correction network
Statistical spell-correction

Evaluation

- Hardmax vs. Softmax inputs to spell-correction network
- Classical statistical approach vs. Spell-correction network with softmax inputs vs. Our approach

Experiments

Quantitative Results I

	Inputs	Character Accuracy	Word Accuracy
Spell-correction network	**Hardmax**	0.81	0.36
	Softmax	**0.85**	**0.44**
Spell-correction network + statistical spell-correction	**Hardmax**	0.81	0.63
	Softmax	**0.89**	**0.75**

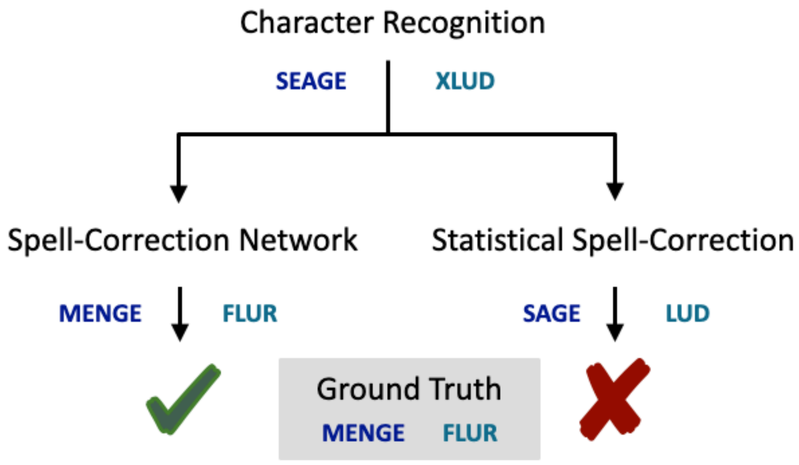
Experiments

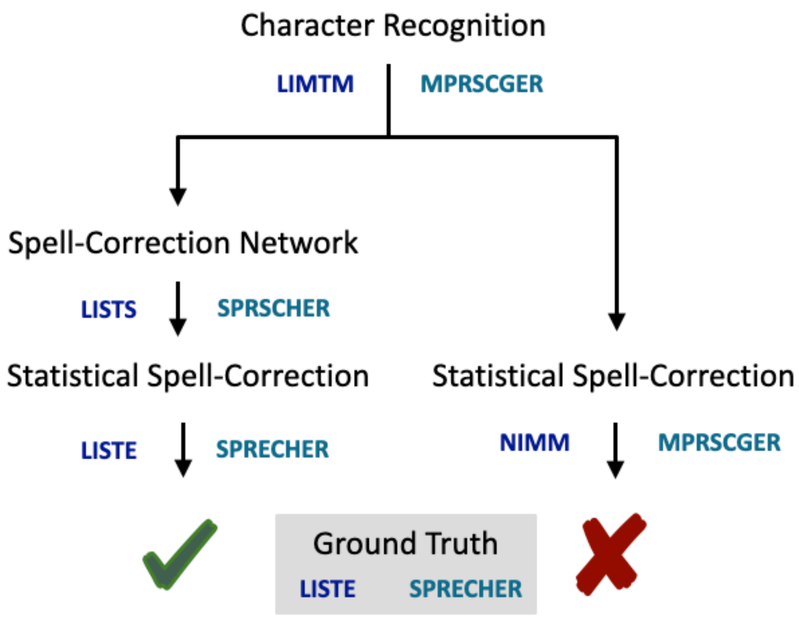
Quantitative Results II

	Character Accuracy	Word Accuracy
Statistical spell-correction	0.77	0.61
Spell-correction network	0.85	0.44
Spell-correction network + statistical spell-correction	**0.89**	**0.75**

Experiments

Qualitative Results





Thanks for your attention!

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