Conclusions

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CLA models have several advantages over manual batteries and tests:

1. They are continuously improving and evolving through learning becoming better at detecting language biomarkers of dementia.

2. They can provide ecological speech, language, and communication measures by encapsulating rich information about speech and language from real-world conversations and discourses more prone to be affected due to dementia.

3. They can detect speech patterns and characteristics that are not visible to listeners by accessing gradient features and comparing them to healthy controls or other groups.

4. They can inform about cognitive domains such as memory, planning, reasoning, and theory of mind, that single domain tests cannot provide.

5. They can offer unbiased and objective measures of language functioning that do not depend on researchers, expertise, the theoretical paradigms they adhere to, time constraints, and other factors and limitations, such as fatigue.

6. They can become easily accessible to patients as apps in their phones or through dedicated websites which can allow the several patients to access neurocognitive assessments that would have been extremely difficult otherwise.

7. They can be easily adapted to other language varieties and dialects, unlike manual batteries, by training these models to data from the targeted populations, which makes.

Way Forward

Figure 1Examples of image-text alignment from Karpathy and Fei-Fei (2015).

- **Multimodal Data:** Consider variable modalities of speech communication, vision, sound, etc. Data from wearable devices, biomarkers in addition to data from speech conversation.

- **Flagship data generation:** We need more data for predicting patient outcomes from longitudinal studies, elicit data from different populations.

- **Open Data Policies** and flexible data access policy, reasonable data access process.

- **Scale to large and diverse populations:** Multilingualism and social aspects of communication.