





Multimodal System Input
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Text Recognition

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Multimodal System Input: Text recognition
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The mechanisms which are used to recognize text from handwriting or from printout

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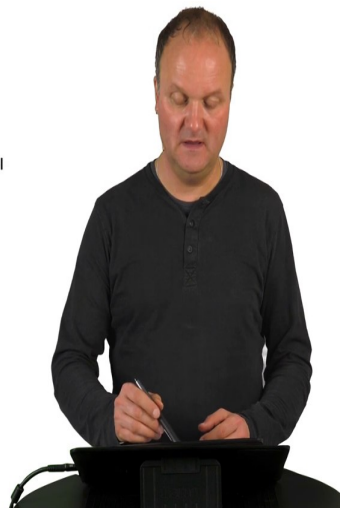
Text and handwriting recognition. Text recognition:

Classes:

- **Offline recognition** of fixed shapes
- **On-line recognition** of shapes in progress

Task:

- Recognition of **machine-readable symbols** from pixel
- Classical **pattern recognition task**



displays of text are very similar to the ones which are used for speech recognition. In principle there are two fundamentally different classes of text recognition. One is called the offline recognition and the other one is called the online recognition.

The offline recognition happens if you have for example, printed piece of paper with text on it which you need to recognize for the computer.

The second one, the online recognition recognizes shapes which are in progress of being made. For example if you move the stylus on a tactile interface, on a tactile screen or if you move with your finger on such a touch screen.

So in that case in addition to the shapes which are being produced, you also have the temporal information how a shape is produced, for example if I produce an /a/ I would always use a certain type of movement. I would always start at one particular point and then end at a particular point. This temporal information of course facilitates the recognition process.

Other than that, textual recognition approaches are very similar to other recognition approaches. We need to recognize machine readable symbols from pixel information; from location information on the screen and this is a classical pattern recognition task.

So

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Text and handwriting recognition. Similar to ASR:

- Feature extraction
- Classification
- Vocabulary and language models



we can follow in principle, the steps we have performed in the speech recognition task. We need the feature extraction of the location features of the pencil on the touch screen, on the piece of paper, we need a classifier and we need models which define how the vocabulary of

the text to be recognized can be and how the words can follow each other in terms of language model.

However there are some additional tasks

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Text and handwriting recognition. Additional steps:

Formatting and error correction

- Identification of **pages** and **layout sections**
- Correction of **pixel errors**
- Pattern comparison
- **Error correction** on the **character level**
- **Error correction** on the **word level**
- **Manual error correction** option



in text recognition which are important. For example text is usually organized in terms of pages with certain layout sections and these pages and layout sections first have to be recognized in order to find the text in them. Then we might have pixel errors in case of over or under exposures which need to be corrected.

And then after the pattern recognition approach we might provide certain correction mechanisms, correction on the character level to find the correct characters, correction on the word level and then even a manual correction possibility for the user to interact with the device which has recognized the text.