Where will tech lead us?

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About me

Pēteris Paikens

Enthusiast of applied machine learning

- Natural language processing at UL IMCS

- Teaching machine learning at University of Latvia
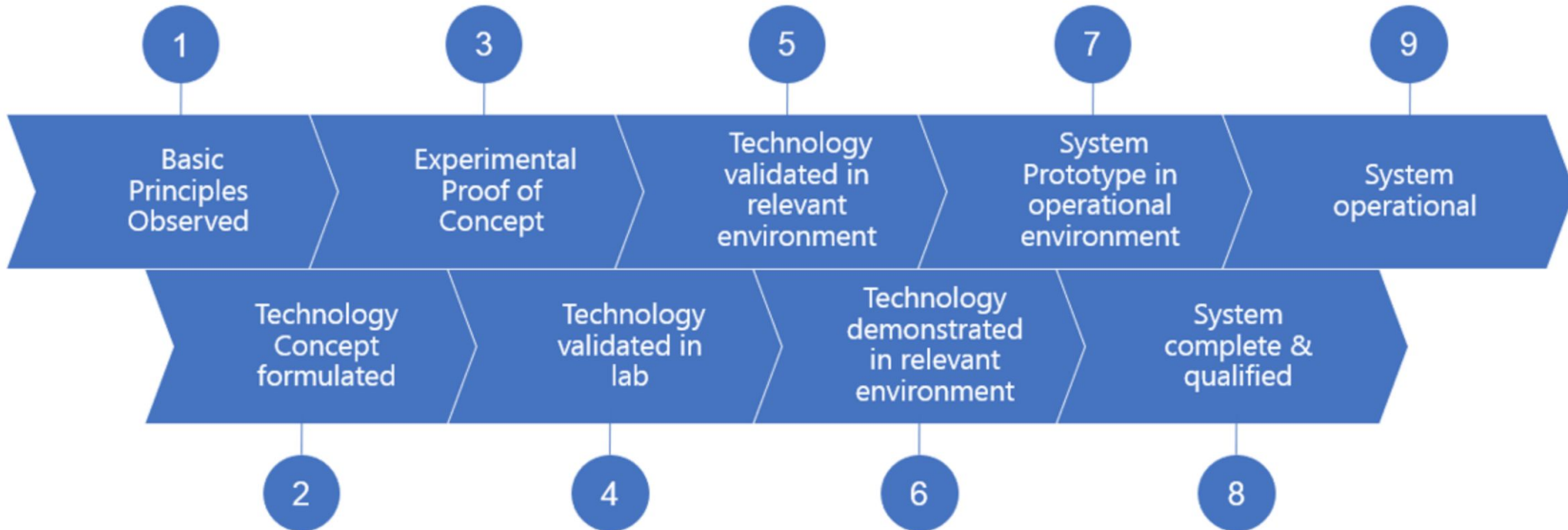
- Consulting on ML applications for business needs

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Agenda

- Some mid-term prospects of ML for audiovisual resources

- Speculation on future possibilities

- Risks of technology adoption

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Technological readiness levels

VISUAL CONTENT RETRIEVAL

Image labeling - people

Large scale face recognition

- Was not reliable, but rapidly improving

- All photo **and video** mentions of some person

- Video timeline – which frames include that person

- "Clustering" of unknown people in photos

  - Transfer of captions for lesser known people

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# Image retrieval by example picture

- Personal connection is a very strong motivation

- It is possible to find people from a sample photo

- It is possible to find **similar** people as well

- What if you try to retrieve photos of people similar to every individual visitor?

- Historical study of "unimportant" people

Descriptions – beyond manual labor

- We can generate reasonable descriptions

    - … not always knowing what's important

    - … not always completely accurate

- Even poor transcripts are usable for searching!

- Not only for English!

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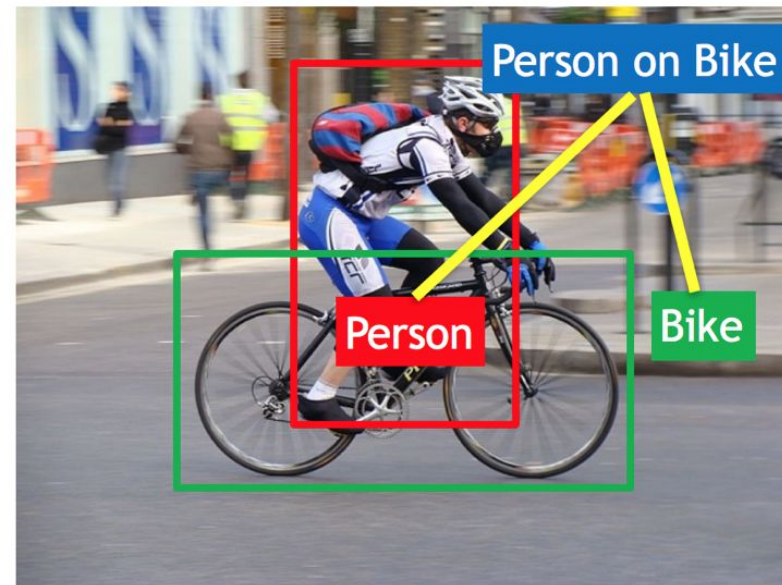
Domain specific image labeling

- Image labeling systems can be tuned!
  - Generic systems don't work on historical items
  - ... because of training on contemporary images
- Detection of specific uniforms
- Search of particular artifacts or landmarks

AUDIO DATA ANALYSIS

Transcripts and diarization

- Making audio and video data effectively accessible requires transcripts

- Transcript (speech to text) quality is improving for less resourced languages

- It's possible to identify people by voice, and transcribe who said what

- It's possible to do **topic** clustering of transcript segments, not just search for keywords

Speech synthesis for accessibility

- Lots of content has only textual descriptions

- Limited audio coverage due to cost issues

- Automation can scale audio descriptions cheaply!

  - Combined with translation – if quality allows that

Interactive agents for QA

- Many visitors have the same simple questions

- Chatbot technology is slowly maturing

- Siri or Google might talk about your content
  - Standardized data formats would enable that

CONTENT GENERATION

Automated translations

- At some point, you can start **trusting** them

- 'Augmented reality' or customized screens

Fake video generation
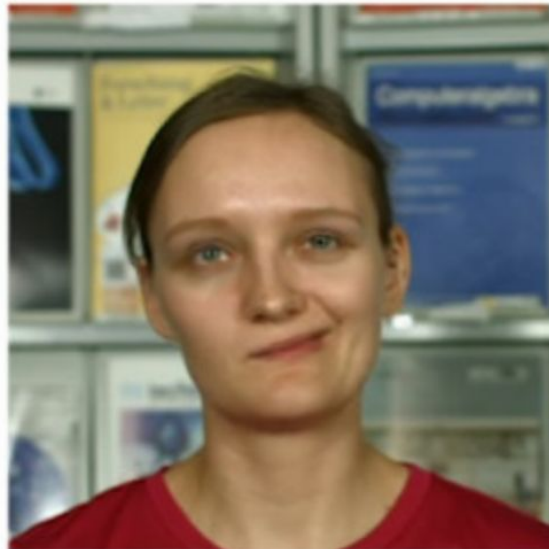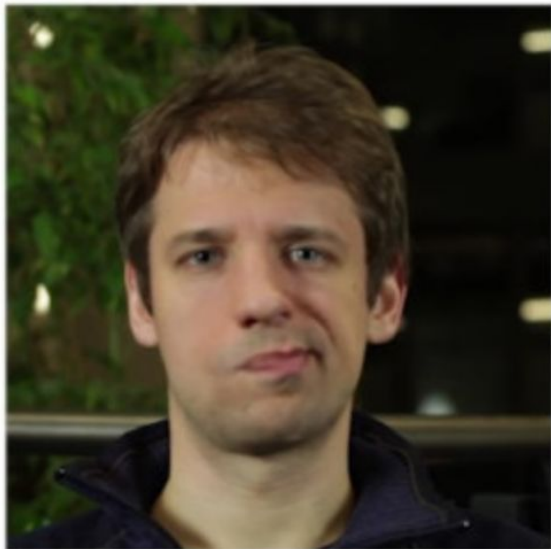
Positive use of DeepFakes

- Video 'face swapping' technology is here

  - Requires some video data of target person

- Content delivered by historical figures ?

  - Fake "talking heads" matching real people

  - Translated historical speeches, with an illusion of presence and reality

RISKS OF TECHNOLOGY ADOPTION

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Expect tech to be unfair

- Data and research is not fairly balanced

- *Bleeding edge* technology will work unevenly

- Features will fail for underrepresented minorities

- ML is a mirror that reveals ugly stereotypes

What can you do?

- Be aware of the limitations and risks

- Wait for technology to mature

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Accessibility and convenience

Inconvenient resources get ignored

- If you digitize **some** data… the rest 'disappears'

- People will use only the annotated subsets

- Automation is the key to have **all** data searchable

How does automation look like?

Almost never fully replacing humans

- Helping employees to do more, faster

- Taking over *part* of a job with human supervision

- Allowing customers to serve themselves

  - Crowd recommendations vs expert curation

Quality often gets sacrificed in the process!

Automation of human labor

Will be automated

- Many employees doing the same task
- Decisions with structured, uniform guidelines
- Repeated similar cases
- Still requires qualified, highly paid people

Less likely to be automated

- A single employee doing many different tasks
- Individual opinion, empathy, '*human touch*'
- Each case is unique
- Can be done by anyone

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Thank you for your attention!

Questions?
Comments?

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