Artificial Intelligence for **your** products

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Example products for voice control

Hey Mercedes, I feel cold

LINGUATRONIC,
natural speech recognition

PHILIPS

hue personal wireless lighting

Control a single light

Reading lamp not bright enough? Control any individual light in your home using its name and a simple command.

"Dim the table light"

Control one or more rooms

Set a color, brightness, or scene in a room instantly — simply by using your voice.

"Set bedroom to Ruby Glow"

Control your entire home

With voice-controlled lights, you'll never have to get out of bed again to flip a light switch.

"Turn off all the lights"

Voice is a very natural user interface for us humans

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Example products for image & video processing

Photo by David von Diemar on Unsplash

Tesla autopilot,
„look ma, no hands"

Google diabetic retinopathy detection

Lung cancer detection
(Google, Northwestern University, et al.)

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

LESIONS LEARNT

Artificial intelligence powers detection
of skin cancer from images PAGES 36 & 115

NATURE.COM/NATURE
2 February 2017   £10
Vol. 542, No. 7639

Dermatologist-level classification
of skin cancer

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Artificial Intelligence vs. Machine Learning vs Deep Learning

Artificial intelligence: ways to build intelligent programs and machines that can solve problems

Machine learning: have systems learn automatically and improve from experience without the need for explicit programming

Deep learning: ... using neural networks

Photo by Possessed Photography on Unsplash

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Deep Learning & Artificial Neural Networks

a system of multiple neuron layers is called a deep network
this helps extract & process complex information

we are training weights - multipliers which are applied to the data coming from each particular neuron

... lots of math on the input data ...
training is often done on clusters of GPUs!

Training ▶

gradient descent:
find the minimum by adjusting the weights & computing a loss function
(an example training method)

Photo by Jordan Whitt on Unsplash

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Deep Learning Technology for speech recognition

signal processing
we chop the data into time segments & then run a Fourier transformation to get frequency domain data

further filtering could be applied to model human hearing (speaking range)

LSTM

feature extraction
reduce amount of data which needs to be processed

acoustic model (phonemes)
basic building blocks of words

language model
how are words used by humans to form sentences and carry meaning?

hypothesis score
what does the user intend to tell us?

speaker & microphone

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And stay away from rumors.

Social media rumor identification
a paper showed that the LSTM (long short-term memory) networks can be used to identify rumors spreading through social networks quickly.

Deep Learning can be applied to many fields, recognizing many different patterns!

https://www.sciencedirect.com/science/article/abs/pii/S0306457318305235

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Deep Learning Technology for image processing

feature extraction
successive deep layers can extract more complex features
we can often use pre-trained models to recognize basic geometric shapes, etc. - and just retrain the last few layers (saving a lot of computing time)

Photo by Akshar Dave on Unsplash

background picture:
deep dream by Google sees dogs every-where. The algorithm started out with random noise

pre-trained models example names
Inception
MobileNet
ResNet
EfficientNet

these models can recognize objects

Photos by MagicPattern & Richard Brutyo on Unsplash

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Hardware to run the networks on

... also called „inferencing"

Raspberry Pi Compute Module 4
high performance, good connectivity
allows for custom base board designs

Raspberry Pi RP2040
Dual Core microcontroller
Can run simple neural networks

Google Coral AI Platform
EdgeTPU for embedded high-performance inferencing, for video content

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Our services

You're in good hands with us ❤

Consulting
We can support you in bringing new AI-enabled products to market

Hardware design
We offer custom hardware enginee-ring services to add AI accelerators.

Software Development
We can build AI-enabled applica-tions for you.

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Get in touch to discuss your needs

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Speak with our team

Start building AI-enabled products today, ahead of your competition!