KNIGHTEC

# A new breed in the **art of engineering**.

" We accelerate transformation of product portfolios through a holistic approach to design and development. "

*- Dimitris Gioulekas, CEO*

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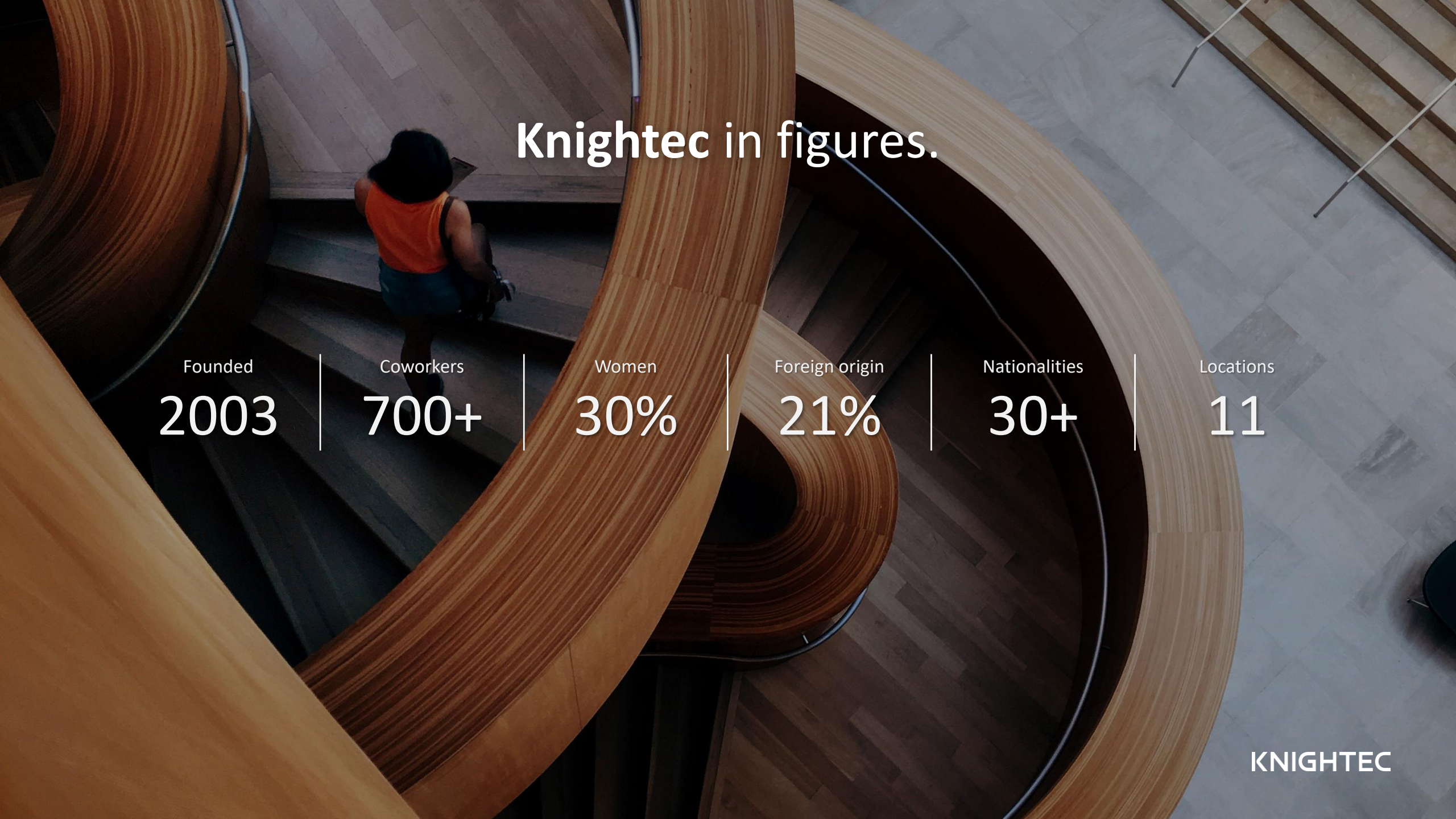

# **Knightec** in figures.

| Founded | Coworkers | Women | Foreign origin | Nationalities | Locations |
|---|---|---|---|---|---|
| 2003 | 700+ | 30% | 21% | 30+ | 11 |

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Digitalization with new technology is
changing our way of life.
Cloud meets Industry
Digital meets Mechanics
Internet meets Things
Products become Services
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# A holistic approach is required to make your products succeed in this new environment.


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# We are the **Soul** of Digitalization.

The **Heart**

Human-centered approach

The **Body**

Industrial know-how

The **Mind**

Expertise in digitalization

Combining these qualities can add more soul and humanity to the digitalization of the world, to really make people's lives easier and more rewarding.

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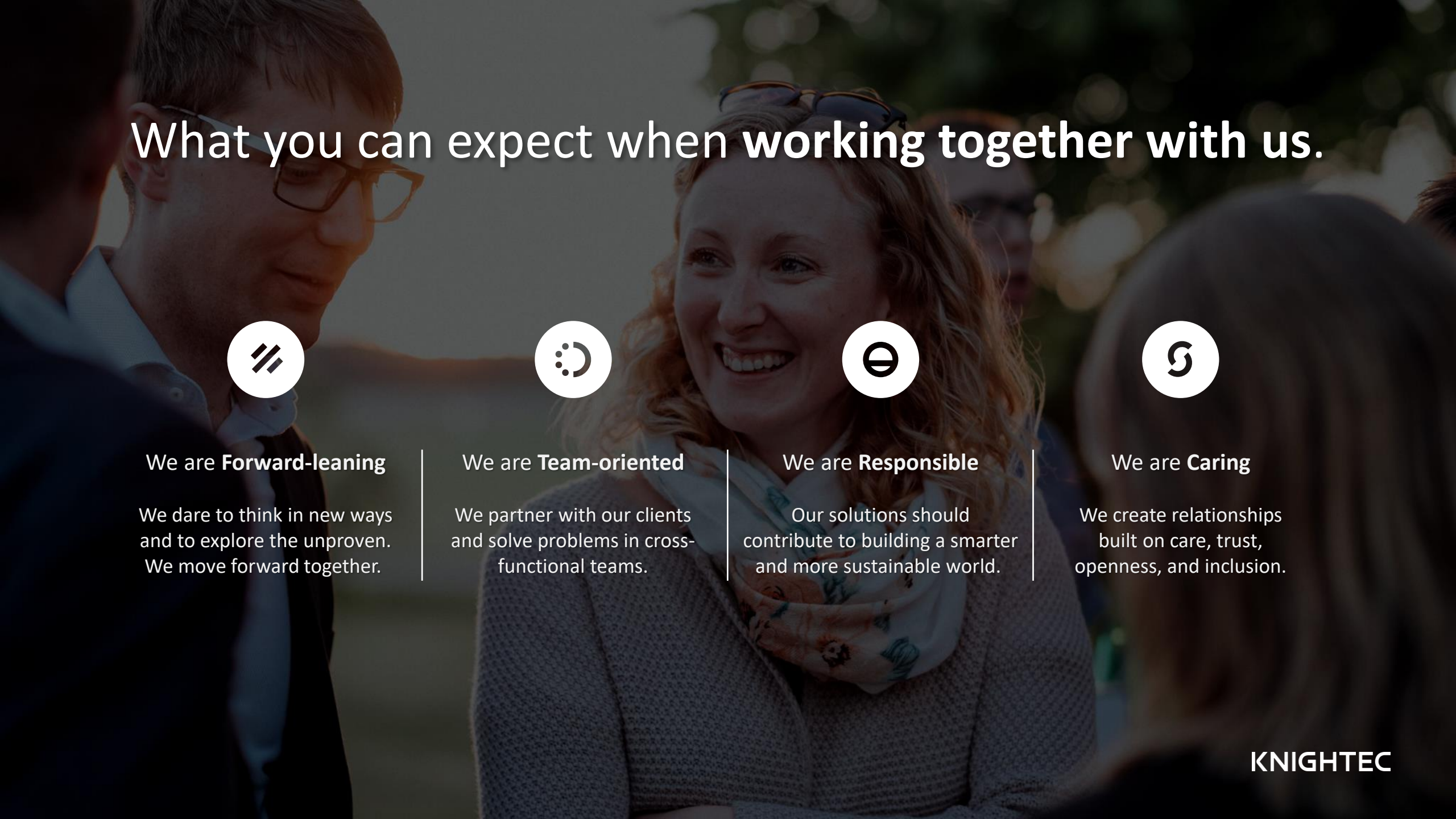

# What you can expect when **working together with us.**

We are **Forward-leaning**

We dare to think in new ways and to explore the unproven. We move forward together.

We are **Team-oriented**

We partner with our clients and solve problems in cross-functional teams.

We are **Responsible**

Our solutions should contribute to building a smarter and more sustainable world.

We are **Caring**

We create relationships built on care, trust, openness, and inclusion.

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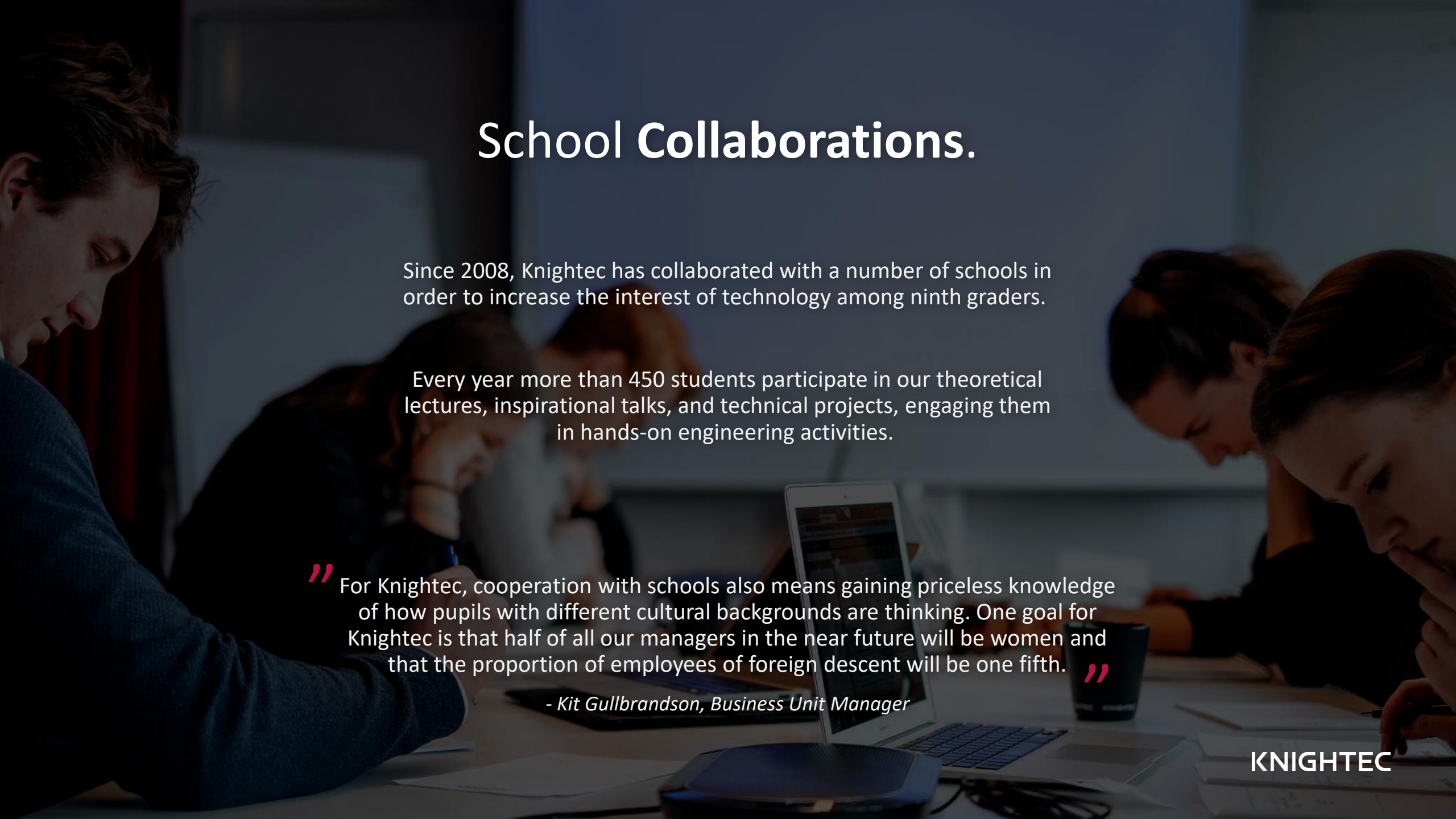

# School **Collaborations.**

Since 2008, Knightec has collaborated with a number of schools in order to increase the interest of technology among ninth graders.

Every year more than 450 students participate in our theoretical lectures, inspirational talks, and technical projects, engaging them in hands-on engineering activities.

> For Knightec, cooperation with schools also means gaining priceless knowledge of how pupils with different cultural backgrounds are thinking. One goal for Knightec is that half of all our managers in the near future will be women and that the proportion of employees of foreign descent will be one fifth.
>
> *- Kit Gullbrandson, Business Unit Manager*

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# Our **thesis projects**

| Predictive Maintenance with Industrial Controllers | Predictive Maintenance | Minimalistic Black Channel Communication | Embedded HMI-development with QT like GUI libraries | Search engine for CVs based on Natural Language Processing | Video Enhancement of Video Seminars Using Deep Learning |
|---|---|---|---|---|---|
| MECHATRONIC, ELECTRONIC/ELECTRICAL OR SIMILAR | COMPUTER SCIENCE, IT ENGINEERING OR RELATED PROGRAMMING FIELDS | MECHATRONIC, ELECTRONIC, COMPUTER SCIENCE OR SIMILAR | MECHATRONIC, ELECTRONIC, COMPUTER SCIENCE OR SIMILAR | PHYSICS, MATHEMATICS, COMPUTER SCIENCE OR SIMILAR | PHYSICS, MATHEMATICS, COMPUTER SCIENCE OR SIMILAR |

https://knightec.se/thesis-opportunities/

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Our thesis projects

# Predictive Maintenance with Industrial Controllers

> Factories worldwide lose 200 Billion SEK to unplanned downtime every year. Even the most well cared-for machines develop faults eventually. Unplanned downtime is an absolute truth of manufacturing. Our objective here is to increase uptime by deploying real time machine monitoring and predicting machine faults and improve safety by anticipating potential dangers. Industrial Controllers gather data via sensors from different machines which then gets analyzed to predict the next machine failure.

> https://knightec.se/Student/predictive-maintenance-with-industrial-controllers/

**The work will have interface with several technologies such as:**

- Programming of Embedded Devices
- Application of Sensors for Data Acquisition.
- C/C++ Library development
- MQTT etc
- Programming languages such as C/C++/VisualBasic
- Database Management System such as Oracle, MySQL etc.
- Cloud Solutions such as Azure or Amazon AWS

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Our thesis projects

# Predictive Maintenance

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> https://knightec.se/Student/predictive-maintenance/

**The work will have interface with several technologies such as:**

- Mobile Application Development
- Communication Protocols such as Bluetooth, MQTT etc
- Programming languages such as Java/C/C++/JavaScript
- Database Management System such as Oracle, MySQL etc.
- Cloud Solutions such as Azure or Amazon AWS

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Our thesis projects

# Minimalistic Black Channel Communication

> Communication with safety related data, where the communication path is unknown or varies, is an important and non-trivial problem. Often, the solution must be cost effective and use off-the-shelf parts. One concept that has proven its usefulness is “Black Channel”, which is covered within the IEC 61508 safety standard. The goal of this project is to investigate the possibility to use small dedicated microcontrollers as transceivers and receivers and make them communicate over a Black Channel. The solution should be able to adapt to different products without requiring any software adjustment.

> https://knightec.se/Student/minimalistic-black-channel-communication/

**The work will have interface with several technologies such as:**

- Programming of Embedded Devices
- Application of Sensors for Data Acquisition.
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- MQTT etc
- Programming languages such as C/C++/VisualBasic
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Our thesis projects

# Embedded HMI-development with QT like GUI libraries

> GUI or Graphical User Interface is the backbone of all Interaction between Human & Machine also known as HMI. With the availability of cutting-edge technology and a more modern approach to the HMI design which can be adapted and applied to the smallest Embedded device possible. We need to implement the GUI to the microcontroller not only with the smallest footprint but also with the most advanced features. One such GUI is provided by QT. We aim to create a GUI library that can be adapted to most of the HMIs.

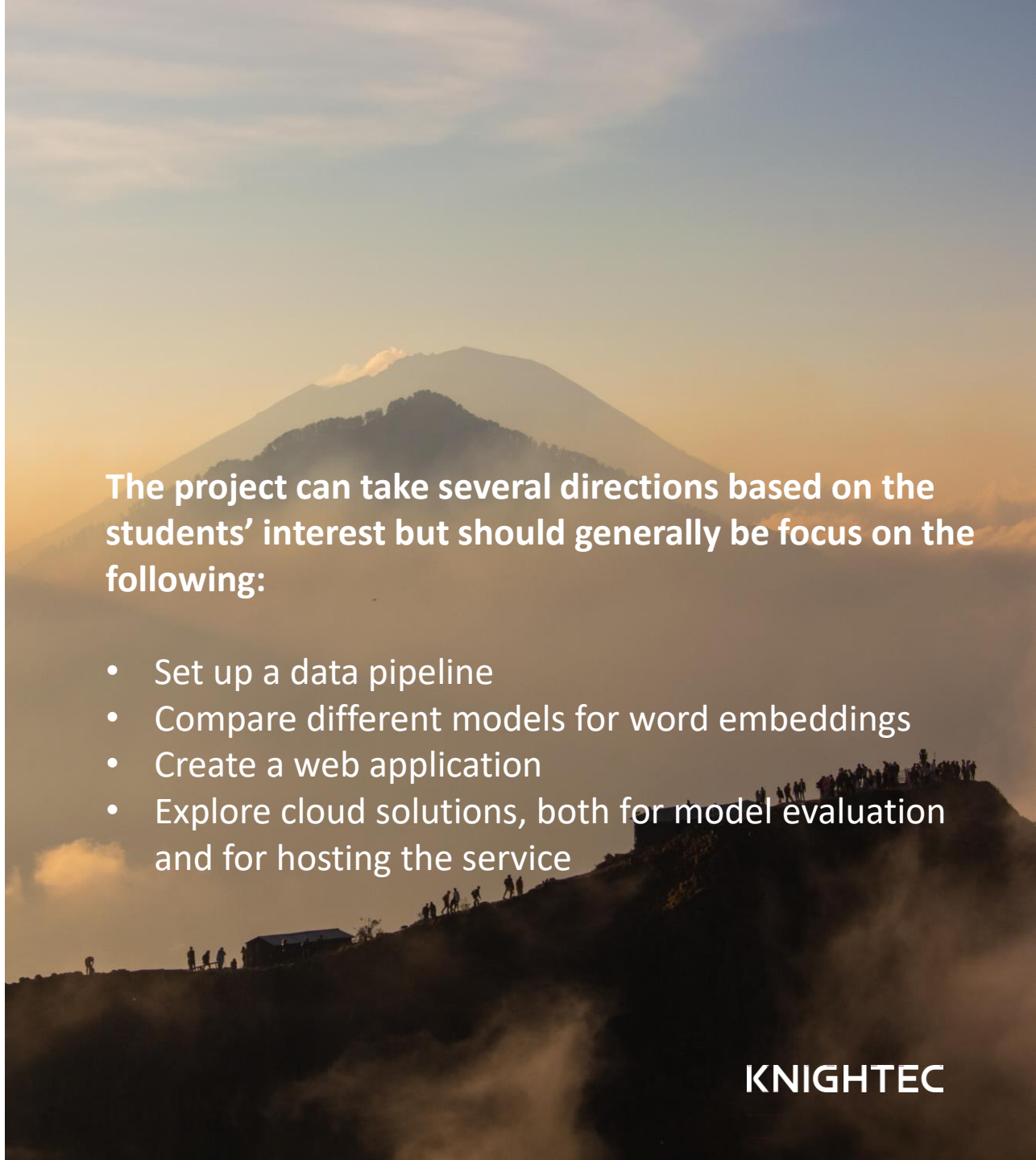
> https://knightec.se/Student/embedded-hmi-development-with-qt-like-gui-libraries/

Our thesis projects

# Search engine for CVs based on Natural Language Processing

> Natural language processing (NLP) has become increasingly more capable since deep learning was adopted to the field. In recent years the models have become more complex and grown exponentially in size. The goal of this project it to use NLP to create a search engine for text data. The text data could be for instance an internal CV database or internal documents.

> https://knightec.se/Student/search-engine-for-cvs-based-on-natural-language-processing/



**The project can take several directions based on the students' interest but should generally be focus on the following:**

- Set up a data pipeline
- Compare different models for word embeddings
- Create a web application
- Explore cloud solutions, both for model evaluation and for hosting the service

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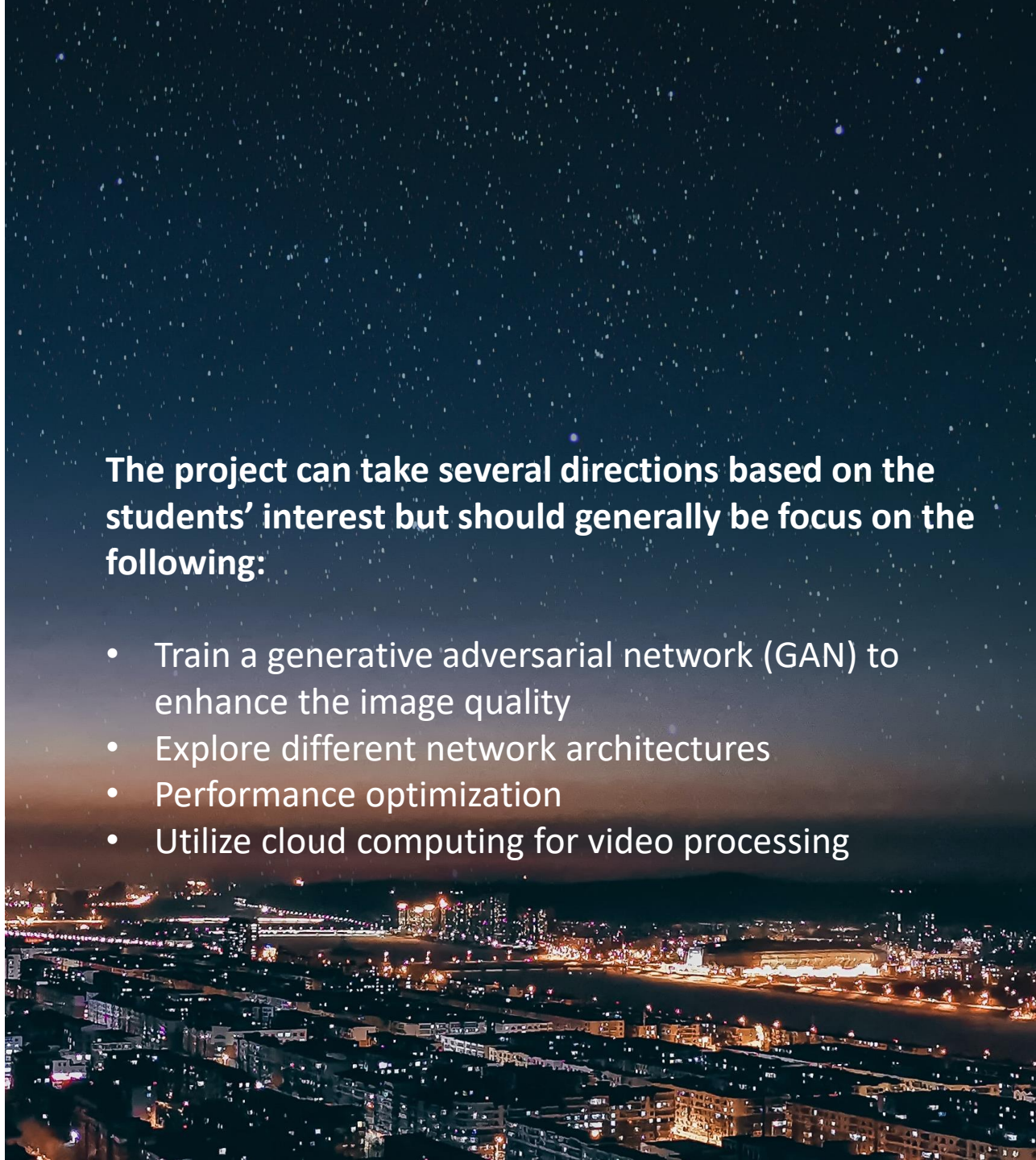
Our thesis projects

# Video Enhancement of Video Seminars Using Deep Learning

> Video conferencing has become a part of many people's everyday life and with that more and more lectures and seminars are steamed. Often people work from home in suboptimal lighting situations which combined with the lacklustre video quality from integrated web cameras yields a grainy and often red-ish image. The goal of this project is to use deep learning, more specifically GANs, to enhance the image quality of webinars and pre-recorded lectures.

> https://knightec.se/Student/video-enhancement-of-video-seminars-using-deep-learning/



**The project can take several directions based on the students' interest but should generally be focus on the following:**

- Train a generative adversarial network (GAN) to enhance the image quality
- Explore different network architectures
- Performance optimization
- Utilize cloud computing for video processing

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