Neural Concept is a Swiss-based company that offers the first-ever deep learning-based software solution dedicated to Computer Aided Engineering and Design. It speeds up R&D cycles, enhances product performance, and reduces simulation costs. Neural Concept Shape (NCS) is a unique Deep Learning based-software for enhanced engineering. It leverages on industrial CAE data to efficiently assist engineers during the product design stage.

NCS’s engine cuts simulation times to milliseconds. Therefore, it can be used as complements to the traditional numerical simulation and experimental methods so as to alleviate the need for actual simulations or to avoid iterations between design, simulation and measurement teams. This dramatically accelerates and reduces the cost of the design process. NCS’s algorithms can also learn to generate new geometries that engineers may not have previously considered, allowing to reach unprecedented levels of performance and providing an intuitive approach to product design.

The company is active in many different industries such as aerospace, automotive, energy, marine or civil engineering, working with industry leaders across the globe, such as Airbus, Safran or Bosch. Neural Concept has now worked on more than 50 industrial projects, to design high-end product, and beat world records.

Neural Concept helps companies being better in various industries:
Miniswys is a Swiss company developing ultrasonic piezo-electric actuators to achieve precise bidirectional movements, reaching very large strokes with low driving voltage in compact applications. In order to develop such a product, they are performing Finite element analysis simulations, to estimate the dynamic behavior of the design, by performing modal analysis. It is used to estimate the resonance frequencies and structural modes of the geometry under various conditions.

However, each application has its own set of requirements, where small design variations can lead to completely different modal behavior.

In this context, Miniswys and Neural Concept have been successfully collaborating over the past months, to build a 3D Deep Learning based surrogate model. It allows to get an instantaneous and precise estimation of the dynamic behavior of these actuators, based on geometric and/or boundary conditions variations.

Using Neural Concept Shape, Miniswys can explore in a very fast manner many different designs iterations, without the need of going through the full-fledged simulator at every step. Ultimately it allows them to explore extensively the space of designs, to find innovative geometries, outperforming the classic ones, while drastically reducing the costs and time of the research and development phase.

These successful results encouraged Miniswys to continue using Neural Concept Shape to leverage on this surrogate model in shape optimization for piezo actuators.

"Neural Concept Shape enables us to be much more efficient to design products meeting our customers’ requirements. The feedback from our design iterations is so fast that Miniswys’ engineers can see the evolution of the performance quasi instantaneously while changing the design parameters. In other words, slow iterations are replaced by quick predictions which give us the possibility to intuitively improve the performances of our actuators."

Raphaël Hoesli
CTO of Miniswys
# Neural Concept

<table>
<thead>
<tr>
<th>Address</th>
<th>Switzerland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPFL Innovation Park, Batiment C, 1015 Lausanne</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:contact@neuralconcept.com">contact@neuralconcept.com</a></td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.neuralconcept.com">www.neuralconcept.com</a></td>
</tr>
</tbody>
</table>