NIRENBERG NEUROSCIENCE LLC (NN) is an artificial intelligence company focused on the development and commercialization of computer vision solutions.

A major stumbling block in this field is that many computer vision algorithms don't generalize – that is, an algorithm that solves a problem in one environment often doesn't work when it's applied to another. For example, an algorithm that provides reliable collision avoidance under one set of conditions starts to show failures when faced with others – as is well known in the field of autonomous driving. Similarly, an algorithm that's able to consistently recognize gestures (like "stop" or "go") in a lab, suddenly starts to fail when asked to perform live in a complex environment like a metropolitan train station or a construction site.

Developing reliable computer vision algorithms that work in a broad range of settings and for a broad range of tasks continues to be a serious challenge, even with massive computer power and even with the availability of deep learning networks.

The technology developed by NN provides a solution. It borrows directly from the one *proven* solution to this problem – real (biological) vision. Biological vision solved the problem by evolving a retina, which preprocesses visual input before it goes to the brain. The preprocessing pulls out key features from the visual input and eliminates everything else. With the key features highlighted, the brain can do what it needs to – recognize faces, objects, gestures, movements, etc, under any conditions, whether or not the lighting or environment stays the same.

NN's founder, Dr. Sheila Nirenberg, unravelled the retina's preprocessing, which, in neuroscience-speak, is called "cracking the retina's neural code". She then used the code as a preprocessor for computer vision algorithms in the same way that the real retina serves as a preprocessor for the brain. The results for computer vision were dramatic: problems that were hard became easy (1000-fold more efficient to solve), and problems that were intractable suddenly became tractable.

FOUNDER: SHEILA NIRENBERG, PHD

Dr. Nirenberg is a professor at Cornell and the founder of two companies – one that develops new kinds of prosthetic devices and one that develops new kinds of smart robots. Her lab at Cornell focuses on basic science and her companies take what's learned in the lab and uses it to develop solutions to real world problems.

The prosthetics company, Bionic Sight LLC, focuses on the development of a device for restoring sight to patients with retinal degenerative diseases. In 2017, the company entered into a collaboration agreement with Applied Genetic Technologies Corporation (NASDAQ:AGTC) and is currently preparing for its first clinical trial.

The AI company, NN LLC, focuses on computer vision applications. In 2016, the Company licensed its technology to Ford Motor Company (NYSE:F) for use in Ford's autonomous driving program and has recently begun work with a second strategic partner on applications in security and surveillance. NN has developed proof-of-concept for multiple applications as it grows its platform technology.

Dr. Nirenberg has won numerous awards for her innovations, including a MacArthur "genius" Award. Her work on cracking the neural code has been featured in several peer-reviewed scientific publications, in TED talks, on BBC "The Genius Behind…", Discovery Channel, Scientific American, National Geographic, Bloomberg, and others.

For a presentation of the data, see the following TED talks (more data is available upon request): https://www.ted.com/talks/sheila_nirenberg_a_prosthetic_eye_to_treat_blindness on cracking the code, and http://www.tedmed.com/speakers/show?id=619717 on the impact on computer vision applications.

NN is an early stage company that has already started licensing its technology: it has a non-exclusive licensing agreement with Ford in the field of autonomous driving and is in negotiations with a second Fortune 100 company in the field of security and surveillance. The technology is protected by a portfolio of issued patents, pending patents, and trade secrets.

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