Invention Title: Proprioceptive Positional Pressure Sensor
Author: Andrii Tsybin
Email: orstech@outlook.com
Date: 2025-05-25
Description:
This invention relates to the field of robotics, biomimetics, and sensor systems designed to determine the spatial position and mechanical load on robot joints.
The sensor consists of a cylindrical tube with an internally fixed hinged rod ending in a spherical head. Segmental pressure or deformation sensors are placed evenly along the inner perimeter of the tube.
When the rod deviates under force, the spherical head presses on one or more segments, creating local pressure. The sensor system interprets the active segments and calculates the vector direction and relative force.
A key design feature is the use of a polygonal (e.g., octahedral) inner shape that allows flat strain sensors to be mounted without pre-tension, improving sensitivity and simplifying production.
This sensor concept may also be extended to pneumatic-based elements, piezoelectric stacks, capacitive layers, and similar components, including gas-cushioned tactile sensors, fluidic elastomers, and the like.