

Patents

Method for determining control data for a mixing unit of a feed mixing appliance → a computer-implemented method for determining feed mixing unit control data for a mixing unit of a feed mixing appliance is proposed. The determination is based on a net energy model for animal nutrition and considers additional animal health status data as well as environmental conditions data of a livestock for a more precise calculation of an actual energy demand of the animals. The feed mixing unit control data comprises data regarding volumes and ratios of raw materials and additives as well as mixing process control data and is calculated such that a net energy of a produced feed mix is equal to an actual net energy demand of a livestock. In addition, a feed mixing appliance and service platform model is proposed wherein the control unit along with a feed formula database is centrally located at a cloud computing site.
<https://worldwide.espacenet.com/patent/search/family/082492564/publication/EP4295675A1?f=lang%3Ain%3Den%7Cpd%3Ain%3D20231101-20241231&q=precision%20livestock%20farming>

Method and system for detecting sow estrus utilizing machine vision → accurate estrus detection of sows is critical to achieving a high farrowing rate and maintaining good reproductive performance. However, the conventional method of estrus detection uses a back pressure test by farmers, which is time-consuming and labor-intensive with a significant degree of error. This disclosure is of an automated estrus detection method by monitoring the change in vulva swelling around the estrus using a three-dimensional measurement device, e.g., LiDAR camera, which includes an RGB camera and a depth camera. This sow estrus detection improves accuracy and efficiency, reduces labor and cost, and improves the sustainability of swine production using a data-driven decision-making system based on a robotic cyber-physical system (CPS) that can utilize deep learning detection based on a deep learning model.

<https://worldwide.espacenet.com/patent/search/family/089025761/publication/WO2023235735A2?f=lang%3Ain%3Den%7Cpd%3Ain%3D20231101-20241231&q=precision%20livestock%20farming>

Cow face detection method for complex scene and detection system thereof → the invention provides a cattle face detection method and system for a complex scene, and the method comprises the following steps: designing an ambiguity evaluation index, a backlight evaluation index and a shielding rate evaluation index, carrying out the normalization of the three evaluation indexes through a fuzzy membership function, and determining a self-adaptive weight coefficient; an attention mechanism CDAA is introduced into the trunk

feature extraction network based on YOLOV7-tiny, a channel and space attention parallel structure is designed, and the adaptive weight coefficients are fused; and optimizing the YOLOV7-tiny loss function by adopting the self-adaptive weight coefficient. The cattle face detection method for the complex scene can effectively aim at common interferences such as backlight, shielding and blurring.
<https://worldwide.espacenet.com/patent/search/family/088899453/publication/CN117152790A?f=lang%3Ain%3Den%7Cpd%3Ain%3D20231101-20241231&q=precision%20livestock%20farming>

Special energy-saving heating and precise ventilation system for pig farm → The invention provides an energy-saving heating and precise ventilation system special for a pig farm. The energy-saving heating and precise ventilation system comprises the following steps of seed selection, conveying, disinfection, energy-saving heating and precise ventilation. The system further comprises a conveying device, a soaking disinfection device, an energy-saving heating device and a precise ventilation device. The conveying equipment can improve the conveying efficiency and reduce the pressure and damage in the conveying process; the soaking disinfection equipment can effectively kill germs; the energy-saving heating equipment enables the hog house to be warm in winter and cool in summer, uses a water curtain to absorb heat and cool in summer and uses a heat exchange pipeline to recover heat in winter, time is sufficient, efficiency is high, and heating cost is greatly reduced. The precise ventilation equipment uniformly and efficiently blows fresh air to each fence of the pig house, the air cooling effect is obvious, harmful wind does not exist, the phenomenon that local ammonia gas exceeds the standard is overcome, fresh air waste and airflow turbulence are avoided, a comfortable and healthy growth environment is provided for pigs, and growth and development of the pigs are promoted.

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Chicken feather condition scoring method based on dense feature fusion network → the invention discloses a chicken feather condition scoring method based on a dense feature fusion network. The method comprises the following steps: establishing a three-score chicken feather condition scoring standard for the back area of a chicken; collecting a visible light initial image and a thermal infrared initial image of the chicken at the same time; performing image registration on the thermal infrared initial image and the visible light initial image to obtain a registered thermal infrared image; constructing a chicken feather condition scoring model FCS-Net

which comprises a feature extractor, a feature fusion layer and a feature classifier, and adding a dense feature fusion module between a visible light branch and a thermal infrared branch; inputting the training set into an FCS-Net model for training; and inputting a to-be-detected chicken image into the trained FCS-Net model to obtain a feather condition scoring result of the to-be-detected chicken. According to the method, the feature mapping relation between different data sources can be effectively learned, and the scoring precision of the chicken feather condition is improved.

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Unmanned overhead rail type intelligent TMR feeding management system and method → the invention relates to the technical field of livestock breeding, in particular to an unmanned overhead rail type intelligent TMR feeding management system and method. The system comprises a feeding and charging workshop and a cowshed production workshop. The feeding and charging workshop comprises a TMR mixing bin, a TMR conveying belt and a TMR hanger rail vehicle; the cowshed production workshop comprises a cowshed, group transferring channels located on the left side and the right side of the cowshed, and a to-be-squeezed area and a milking area located between the group transferring channels. The bottom of the front end of the TMR hanger rail vehicle is provided with a lifting material pushing device, and the bottom of the TMR hanger rail vehicle is provided with a material sucking device. The group turning channel is arranged on the outer side of the hanger rail channel, turning is completed through the top space of the group turning channel, and space waste is reduced; the TMR hanger rail vehicle is matched with the cowsheds arranged in rows, an existing TMR feeding (scattering) vehicle is replaced, and the feeding efficiency is improved; the biological safety and management efficiency of feeding are improved by improving the shape of the feeding trough in the cowshed and the layout of the large through laying of the ingestion standing channel and the fermentation bed.

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Silo management device (machine-translation by google translate, not legally binding) → device for managing storage silos, the device being intended to be fixed to the interior of a silo that includes an upper area with an entrance hole, closed by a lid and in in which a product is stored, the device comprising: - a support casing, intended to be fixed to an interior and upper area of the silo, close to the entrance opening, - a processing module, arranged in the casing, - a luminosity sensor, attached to one side of the housing and

connected to the processing module, so that it receives the light that enters through the entrance hole of the silo, - a temperature sensor, arranged in the housing and connected to the processing module, - a humidity sensor, connected to the processing module and linked to the housing, - a level sensor silo filling, connected to the processing module, and arranged in a lower area of the housing, so that it is oriented towards the stored product, - a communications module, connected to the processing module and intended for to be connected to an external device to send data captured by the brightness sensor, temperature sensor, humidity sensor and silo filling level sensor, and - a module power supply, arranged in the housing.
<https://worldwide.espacenet.com/patent/search/family/088731221/publication/ES1304189U?f=lang%3Ain%3Den%7Cpd%3Ain%3D20231101-20241231&q=precision%20livestock%20farming>

Feeding device for livestock breeding → the invention relates to the technical field of feeding devices, and provides a livestock breeding feeding device which comprises a base, a conveying mechanism and a smashing mechanism, a rack is fixedly mounted at the top of the base, a smashing box is fixedly mounted at the top of the rack, a feeding hopper is mounted on one side of the smashing box, and a smashing motor is fixedly mounted on the side, away from the rack, of the top of the base; the output end of the crushing motor is rotationally connected with a belt pulley through a belt, the belt pulley is movably assembled on one side of a rotating disc, the rotating disc is fixedly installed on one side of the crushing box, a center shaft of the belt pulley is fixedly connected with a rotating rod, the crushing mechanism is arranged in the crushing box and installed on the outer wall of the rotating rod, and the bottom of the crushing box is connected with a discharging port in a penetrating mode. According to the device, a whole bundle of large materials can be cut into fine fibers, meanwhile, the fine materials are crushed under the action of a stirring block, livestock can eat the materials more conveniently, residues are few and easy to digest after the livestock eat the materials, better growth of the livestock is facilitated, and the feeding efficiency and the feeding precision are greatly improved.

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Weighing device for cow breeding → the utility model discloses a weighing device for dairy cow breeding, both sides of the upper surface of a weighing platform are provided with placing grooves, a fixing assembly comprises two driving motors arranged on one side of the weighing platform, an output shaft of each driving motor is connected with a driving wheel, the driving wheel is connected with a driven wheel through a belt, and the driven wheel is connected with the weighing platform through a belt. A driving shaft is arranged in

each driven wheel, one end of each driving shaft extends into the corresponding placing groove, two moving blocks are movably arranged on the surface of each driving shaft in the corresponding placing groove, moving plates are fixed to the upper end faces of the moving blocks, a fixing plate is detachably installed between the two moving plates on the same side, and dairy cows are fixed through fixing assemblies; the bottom of the weighing platform is provided with a fixed block, a connecting plate, a moving wheel, a sliding groove, a threaded rod, a sliding block, a connecting rod, a limiting block and a limiting groove, so that the weighing equipment can move and can be fixed during weighing, and then the weighing efficiency and accuracy are ensured.

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Pig limp detection method and system based on deep learning → the invention discloses a pig limp detection method and system based on deep learning, and relates to the technical field of computer vision, and the method comprises the steps: obtaining a walking video of a pig in a region; extracting feature points of each key part of the pig in the walking video; calculating feature information of each key part according to the feature points of each key part of the pig; and inputting the feature information of each key part into a limping degree detection model for classification, and calculating a pig limping degree score to obtain the pig limping degree. The method solves the problems that a traditional manual observation and judgment method is large in labor workload, high in labor intensity, low in efficiency, high in subjectivity and prone to generating errors, and the severity degree of limp of pigs can be efficiently and accurately detected.

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