DEPARTMENT OF MECHANICAL ENGINEERING

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MEMS - Devices

MEMS refers to technology that allows mechanical structures to be miniaturized and thoroughly integrated with electrical circuitry, resulting in a single physical device that is actually more like a *system*, where "system" indicates that mechanical components and electrical components are working together to implement the desired functionality. Thus, it's a micro (i.e., very small) electrical and mechanical system.
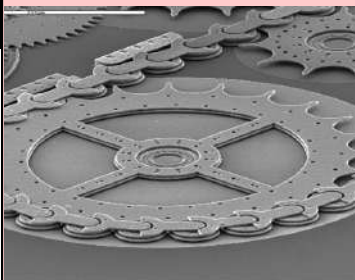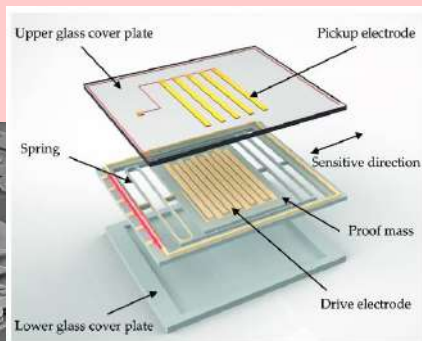

This is a physical gear and chain. However, the links in the chain are about 50 µm long—i.e., less than the diameter of a human

hair. Block diagram of MEMS device

MEMS Accelerometer

MEMS accelerometer is a micro-electromechanical device which is used to measure acceleration and force. There are many types of accelerometer present in the

market; they can be divided according to force that is to be measured.

One of the most commonly used is the piezoelectric accelerometer. They are bulky and cannot be used in every kind of operation, that is why small and highly functional device like MEMS accelerometer was developed.

MEMS Pressure Sensors

Pressure sensors is a piezo-resistive pressure sensing die processed by MEMS technology. There are different types of applications for pressure sensors are available; a person has to select the right sensor from the wide variety of applications according to the use.
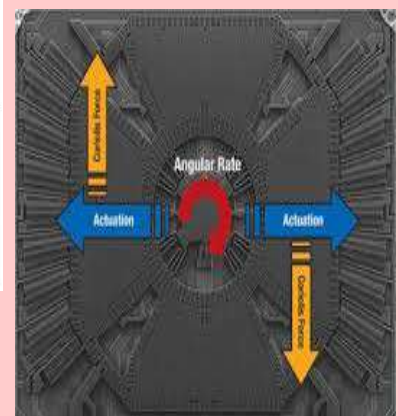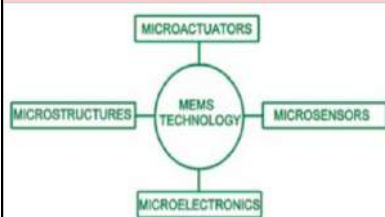
MEMS gyroscopes or MEMS angular rate sensors

is a micro-electromechanical device which is small, with inexpensive sensors which are used to measure angular velocity or rotational motion or displacement.

K. Lakshmi Sai– 13BF1A0323-IV M.E, R.A.Roop Kumar– 13BF1A033-IV M.E

Design of Tesla

Tesla is best known for its electric cars. The company is also known for specialising in solar panels and Lithium-ion battery energy storage.

Tesla Model S is the world's first premium sedan built from the ground up as an electric vehicle. It has been engineered to deliver unprecedented range and a thrilling drive experience. Model S is the world's fastest four-door vehicle ever built .

Tesla Model 3 interiors are now completely free of leather.The company began by offering leather -free seats as an option. Two years ago, Tesla made the synthetic material standard in its Model 3, Model X and Model S vehicles.

Tesla Model 3 has standard automatic emergency braking it pocess eight air bags & Wi-Fi and LTE Internet connectivity, voice-activated controls, keyless entry, dual-zone climate control, and a centre console with two USB ports.

The newest ambitious project from Tesla is the all-electric Model Y compact crossover. Tesla model Y has a driving range of up to 300 miles and a zero-to-60-mph time of as low as 3.5 seconds .

The Model Y's fuel-economy ratings haven't been released, nor have we had the chance to test one on our 200-mile highway fuel-economy test route. The Model 3 sedan hasn't lived up to its claimed range during highway driving, and we have even lower expectations for the Model Y SUV.

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In the Model Y, almost every function is managed through the large, slim infotainment display that's in the middle of the dashboard. Everything from climate control to the speedometer is shown on this display, which takes some getting used to.

We expect the Model Y to offer the same entertainment functions as the Model 3, which should include embedded Netflix, Hulu, and YouTube apps as well as video games that are perfect for killing time while waiting for the battery to charge at the public charging station. even more advanced features such as a self-parking feature and a Summon feature will be optional.

Key safety features include:

- Standard automated emergency braking with pedestrian detection.

- Standard lane-departure warning with lane-keeping assist.

- Standard adaptive cruise control with semi-autonomous driving mode.

Model Y will ship with an EPA range of 315 miles. Earlier estimates had set the range at 280 miles. A 35-mile range bump is impressive. During the quarterly call, Musk announced that the car has an efficiency of 4.1 miles per kilowatt-hour

Tesla model X steering

K. Sai Krishna & V.Thejasri

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III M.E

Machine Learning

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human

intervention or assistance and adjust actions accordingly.

Requirements of good machine learning

- Data preparation capabilities
- Algorithms – basic and advanced.
- Automation and iterative processes.
- Scalability.Ensemble modeling.

Supervised learning describes a class of problem that involves using a model to learn a mapping between input examples and the target variable.

Unsupervised learning describes a class of problems that involves using a model to describe or extract relationships in data.

Reinforcement learning describes a class of problems where an agent operates in an environment and must learn to operate using feedback.

Semi Supervised learning is supervised learning where the training data contains very few labeled examples and a large number of unlabeled examples.
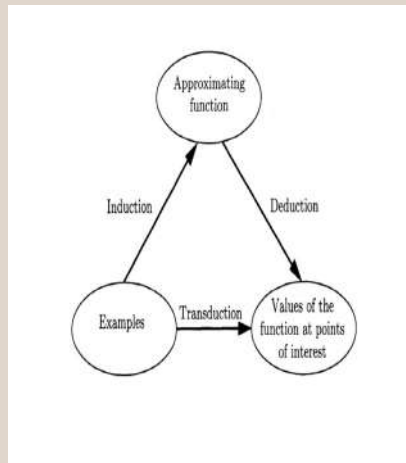
Relationship Between Induction, Deduction, and Transduction.

Multi –task learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Active learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Online –learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Transfer learning is a type of learning where a model is first

trained on one task, then some or all of the model is used as the starting point for a related task.

Ensemble learning is an approach where two or more modes are fit on the same data and the predictions from each model are combined.

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15BF1A0335,15BF1A0531-

II M.E