



Learn Beyond

**KPR Institute of Engineering and Technology**

(Autonomous, NAAC "A")

Avinashi Road, Arasur, Coimbatore.

Phone: 0422-2635600

Web: kpriet.ac.in

Social: kpriet.ac.in/social

**BM027****NBA Accredited**

(CSE, ECE, EEE, MECH, CIVIL)

**PATTERN RECOGNITION BASED ON PRINCIPAL COMPONENT ANALYSIS AND DECISION THEORY**

Event No	BM027
Organizing Department	Biomedical Engineering
Associate Dept.   NSC	Industry Institute Partnership Cell
Date	01/11/2022
Time	03:00 PM to 04:00 PM
Event Type	Webinar
Event Level	Dept. Level
Meeting Medium	
Meeting Link	<a href="http://meet.google.com/tnm-rhfd-tna">http://meet.google.com/tnm-rhfd-tna</a>
Total Participants	55
Faculty - Internal	2
Students - Internal	53

**Related SDG****Resource Persons**

Sl	Type	Name	Designation	Company	Email	Phone
1	Resource Person	Raghul	Computer Vision Engineer	TartanSense Pvt., Ltd., Bengaluru	raghul.rgr@gmail.com	xxxxxxxxxx

**Involved Staffs**

Sl	Name	Role
1	Priya Darshini B	Coordinator
2	Krishna Kumar R	Coordinator
3	Ganeshkumar D	Convenor

**Outcome**

1. The Students have understood the basic concepts of pattern recognition
2. The students learned how to apply Principal component analysis and decision theory algorithms for image classification
3. The Students have been trained to analyze real-time images for feature extraction and image

**Event Summary**

Department of Biomedical Engineering, KPRIET in association with Industry Institute Partnership Cell (IIPC) is conducting a webinar with the Industry person Mr. R. Raghul as the Resource person for III & IV year Biomedical Engineering students on 01.09.2022 between 3.00 pm to 4.00 pm through Online mode using Google meet platform. The webinar delivered the topic of Pattern recognition and its necessities. Mr. R. Krishna Kumar, AP/BME delivered Introduction to the Resource Person and explained his achievements and contributions in Academics and also as a professional. The Resource person delivered his speech on Principal Component Analysis (PCA) and Decision theory and how it is used to analyze Patterns. The Resource person has introduced Pattern recognition and explained PCA and Decision theory for analyzing patterns on Images and extracting the necessary information using suitable techniques. The Students have understood the basic concepts of pattern recognition. The students learned how to apply Principal component analysis and decision theory algorithms for image classification. The Students have been trained to analyze real-time images for feature extraction and image. Mr. R. Raghul delivered the content to students and the questionnaire session was conducted. The concept of Principal Component Analysis was understood by the Students. The concept of Computer Vision topic was explained. The PCA reconstruction was explained in PCA as an important mechanism in the PCA analysis. He explained the image processing techniques and image restoration, segmentation, and finding regions of interest. The Students have asked about their doubts regarding Pattern Recognition and Decision theory. Finally, the session ended with a vote of thanks by a Final year student.



DEPARTMENT OF BIOMEDICAL ENGINEERING  
In association with Industry Institute Partnership Cell (IIPC)  
organizes a webinar on

**Pattern Recognition based on Principal Component Analysis and Decision Theory**

**Resource Person**

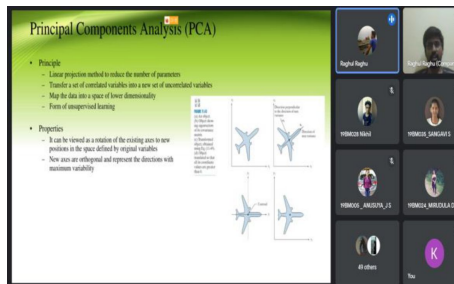
Mr.R. RAGHUL  
Computer Vision Engineer,  
TartanSense Pvt.Ltd,  
Bengaluru.

**01<sup>ST</sup> NOVEMBER '22**  
03.00 PM - 04.00 PM

Google Meet : <https://meet.google.com/tmm-rhfi-tna>

Convener	Faculty Coordinators	Student Coordinators
Dr. D. Ganesh Kumar HOD/ BME	Ms. B. Priya Darshini, AP/BME Mr. R. Kiranra Kumar, AP/BME	Mr. Deepan Chakkaravarthy N, IV BME Ms. Soniya N, IV BME

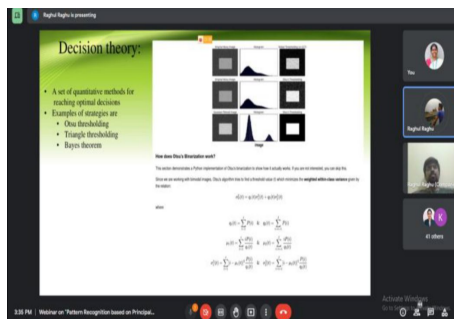
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**Principal Components Analysis (PCA)**

- Principle**
  - Linear projection method to reduce the number of parameters
  - Transform a set of correlated variables into a set of uncorrelated variables
  - Map the data into a space of lower dimensionality
  - Form of unsupervised learning
- Properties**
  - It can be viewed as a rotation of the existing axes to new positions in the space defined by original variables
  - New axes are orthogonal and represent the directions with maximum variability

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**Decision theory:**

- A set of quantitative methods for reaching optimal decisions
- Examples of strategies are
  - One Branching
  - Triangle branching
  - Bayes theorem

How does Bayes Theorem work?

Bayes theorem states: the probability of the event occurring in the first trial, with the given information, is the probability of the event occurring in the second trial, given that the event occurred in the first trial.

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$P(A|B) = \frac{P(A) \cdot P(B|A)}{P(B)}$$

$$P(A|B) = \frac{P(A) \cdot P(B|A)}{P(B|A) \cdot P(A) + P(B|A^c) \cdot P(A^c)}$$

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