SCHOOL OF ENGINEERING

DAYANANDA SAGAR UNIVERSITY
SCHOOL OF ENGINEERING
KUDLU GATE, HOSUR MAIN ROAD, BENGALURU – 560068

Department of Computer Science Engineering
(Artificial Intelligence & Machine Learning)
&
DEPARTMENT OF INTERNATIONAL AFFAIRS

Report on

THREE DAYS WORKSHOP ON MACHINE VISION INSTRUMENTATION

Speaker :

Dr. PAVEL ŠKRABÁNEK
ASSOCIATE PROFESSOR,
MENDEL UNIVERSITY IN BRNO,
CZECHIA REPUBLIC

TARGET AUDIENCE : 3RD YEAR STUDENTS
VENUE : GALLERY HALL 1, CAMPUS-3
25th March to 27th March 2024

Convenors,
Dr. Amit Bhatt, Incharge Vice Chancellor, DSU
Dr. Puttamadappa C, Registrar, DSU
Dr. Udaya Kumar Reddy K R, Dean, SOE, DSU
Dr. Ramesh R Galigekere, Dean (Acad), SOE, DSU
Ms. Supriya Mathew, Vice President of International Affairs, DSU
Dr. Jayavrinda vrindavanam, Chairperson, AIML, SOE, DSU

Student Coordinators,
Mr. Vinay R, 6th Sem, AIML, SOE, DSU
Ms. Shrusti Goudar, 6th Sem, AIML,SOE,DSU

Staff Coordinators,
Dr. Vinutha N, AIML, SOE, DSU
Dr. Monika G. AIML, SOE, DSU
Prof. Uday Bhaskar, AIML, SOE,DSU

SCHOOL OF ENGINEERING

RESOURCE PERSON INTRO.

Dr. Pavel is an Associate Professor at the Institute of Automation and Computer Science at Brno University of Technology in the Czech Republic. With a distinguished academic background, including a Ph.D. in Chemical and Process Engineering/Technical Cybernetics, he has made significant contributions to research and teaching throughout his career. He brings a wealth of expertise in the fields of Computer Vision, Machine Learning, and Fuzzy Set theory.

He has taught a wide range of courses, from undergraduate to graduate levels, covering topics such as Machine Vision, Automatic Control Instrumentation, and fuzzy logic control. His dedication to excellence is evident in his numerous publications and invited lectures in esteemed institutions across Europe, including Spain, Norway, and Slovakia.

In addition to his academic pursuits, Dr. Pavel has been actively involved in numerous projects and grants, addressing critical challenges in areas such as air quality monitoring, artificial intelligence for Industry 4.0, and radar system development. His interdisciplinary approach and innovative solutions have earned him recognition and support from funding agencies and industry partners.

His proficiency in software tools like MATLAB, Python, and LaTeX further enhances his capabilities as a researcher and educator.

SCHOOL OF ENGINEERING

DAY-1, 25th MARCH 2024

OVERVIEW

The day begins at 8:45 AM with registration and a welcoming ceremony, followed by a session from 9:00 AM to 12:00 PM focusing on radiation-matter interaction, image formation, and industrial computer vision. After a break, the program continued from 01:15 PM to 04:15 PM, delving into the concepts of lighting geometry, radiation sources, and various lighting types.

ACTIVITIES - QUIZ

During the workshop, an engaging interactive quiz was organized to test the participants' comprehension of the workshop content. This quiz was conducted in between sessions, allowing all students to participate simultaneously. Each question had a one-minute timeframe, with scores awarded based on the speed of the correct answers given by each participant. After an intense competition, three winners emerged from the quiz participants, who demonstrated both knowledge and quick thinking, adding an element of excitement and fun to the learning experience.

KEY TAKEAWAYS

Day-1 of the workshop provided comprehensive insights into machine vision systems and lighting geometry for industrial applications. Participants learned about the intricate interaction of radiation with matter, crucial for understanding image formation and color perception. Machine vision systems, comprising cameras and sophisticated processing units, were highlighted for their role in tasks ranging from object detection to robot guidance. Lighting geometry discussions emphasized the importance of strategic placement and types of illumination for optimizing contrast and surface inspection. Overall, the day's sessions equipped attendees with essential knowledge to design effective machine vision solutions and employ appropriate lighting techniques for various industrial scenarios.

SNAPS:

DAY-2, 26th MARCH 2024

OVERVIEW

Day 2 of the workshop delved deeply into the intricacies of camera lenses and image acquisition processes. The morning sessions provided participants with a comprehensive understanding of fundamental lens concepts such as focal length, aperture, and field-of-view, while also exploring advanced topics like extension tubes and lens aberrations. Afternoon sessions were dedicated to exploring image acquisition technologies such as photodiodes, CCD, and CMOS image sensors, as well as electronic shutters and quantum efficiency. These sessions aimed to equip attendees with the knowledge necessary for effective image acquisition and processing in industrial applications.

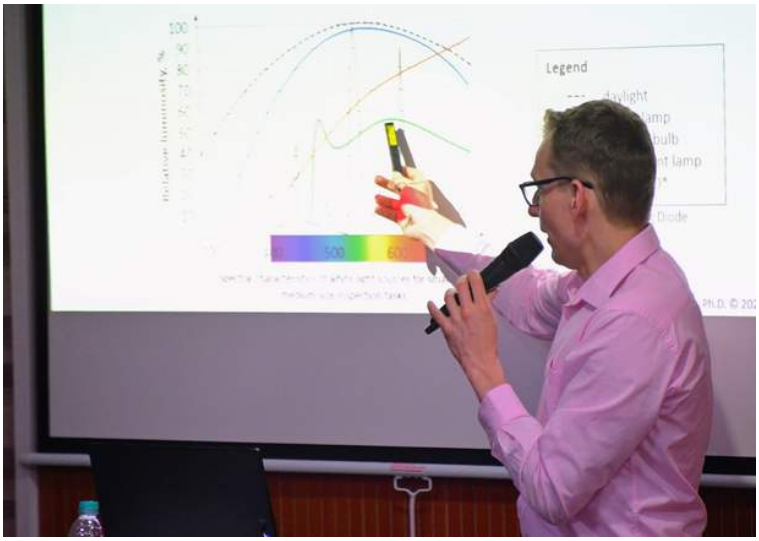
ACTIVITIES - REAL TIME PROBLEMS

During Day 2, an interactive activity took place featuring Dr. Pavel showcasing scopes of his research work in the field of Computer Vision, highlighting career benefits. Attendees gained insights into practical applications and career opportunities, enhancing their understanding of the workshop's subject matter and its real-world implications.

KEY TAKEAWAYS

Day 2 focused on essential aspects of industrial imaging, covering diffused incident illumination, radiation sources, and camera lens fundamentals. Participants learned about effective lighting techniques, including coaxial and dome-shaped lights, and the characteristics of different radiation sources such as LEDs and xenon lamps. Discussions on visible spectrum, infrared, and ultraviolet lighting provided insights into their unique applications. Additionally, attendees gained a thorough understanding of camera lens basics, including aperture control and magnification. Overall, Day 2 provided valuable insights for optimizing imaging processes in industrial settings.

SNAPS:



DAY-3, 27th MARCH 2024

OVERVIEW

Day 3 of the workshop promises an immersive exploration of essential topics in machine vision and industrial imaging. Participants will delve into the principles and applications of optical filters, multi-bands image acquisition, and the construction of industrial digital cameras, gaining insights into electronics and noise reduction in images. Furthermore, discussions focused on the industrial camera lenses and lighting strategies tailored for small and medium-sized inspection tasks. Attendees learnt about the formation and representation of digital images. Further more, the hands-on training sessions, provided practical experience in enhancing participants' skills in machine vision technologies.

ACTIVITIES - HANDS ON SESSION

ASSIGNMENT - 1 :

Participants were given a hands-on assignment to develop a machine vision system for automating the conversion of damaged printed documents into digital format with 98% character recognition accuracy. They were asked to select appropriate hardware and to design an algorithm for image inspection without using deep learning techniques. This practical exercise offered valuable experience in implementing machine vision solutions for real-world tasks.

ASSIGNMENT - 2 :

Assignment 2 - To develop a machine vision system to automate the cleanliness check on the hand cream tubes. The objective was to identify tubes with cream present on the surface and discard them. Participants were required to select suitable hardware instrumentation for image acquisition and to design an algorithm for inspection without employing deep learning techniques. This assignment provided participants with practical experience in designing and implementing machine vision solutions for quality control applications in manufacturing sectors.

KEY TAKEAWAYS

Day 3 of the workshop provided insights into UV fluorescent imaging and camera lens functionalities. Attendees learned about the application of UV light for detecting organic materials and explored topics such as adjustable aperture, angles of view, magnification, and depth of field in camera lenses. Discussions on spectral transmittance and lens aberrations offered valuable knowledge for assessing lens performance. Additionally, attendees gained understanding of machine vision instrumentation, including photodiodes and CCD image sensors, essential for image acquisition and processing. This session equipped participants with practical skills for implementing machine vision systems effectively.

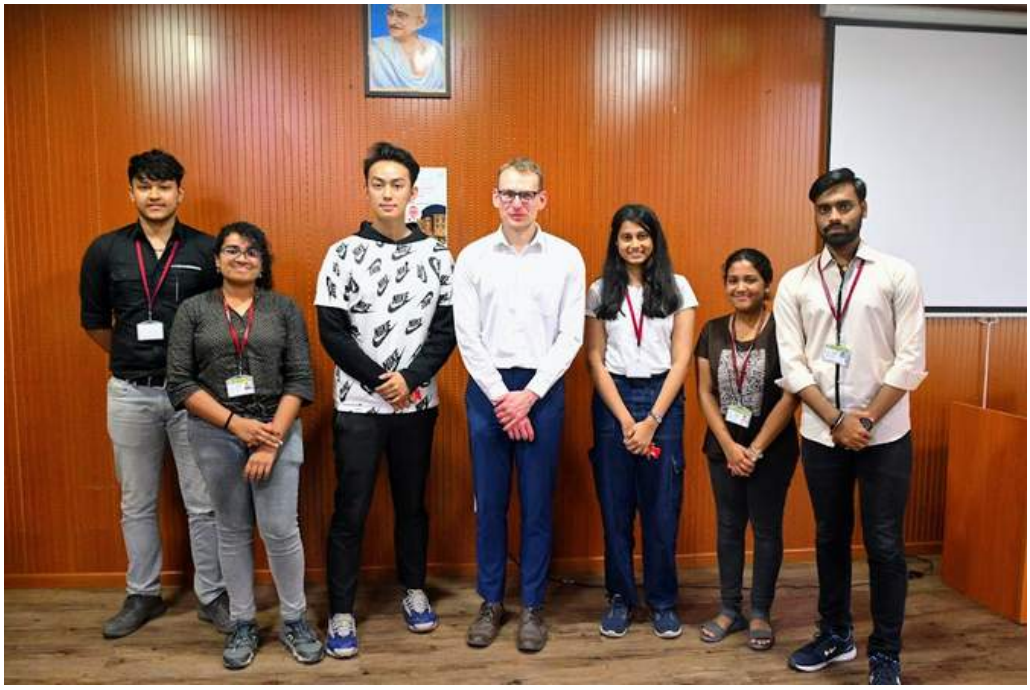
QUIZ WINNERS:

1ST PLACE - JEEVIKA M

2ND PLACE - SAI BHAVYA SREE N

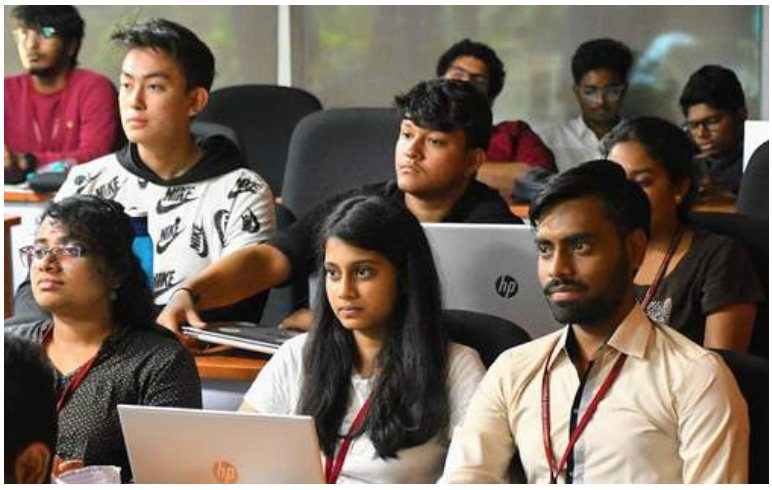
3RD PLACE - SAYLI PANKAJ BANDE

BEST ASSIGNMENT SOLUTION:



Team - 4

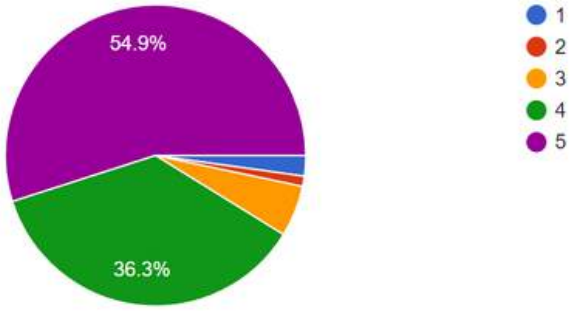
TENZIN LHUDUP BHUTIA
KUNJAN KUMAR SINGH
RITUL BHOJ
SAI BHAVYA SREE N
JEEVIKA M
AMRIDASRI MADHANRAJ



FEEDBACK

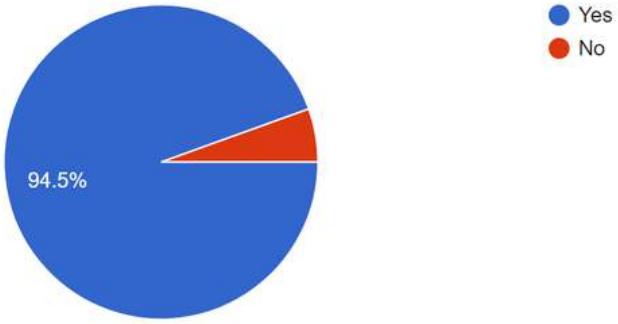
Please rate your overall experience participating in the workshop on a scale of 1 to 5, with 5 being the highest.

91 responses



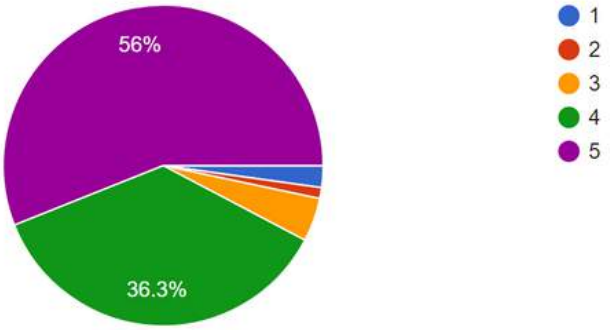
Did the insights shared by resource person prove beneficial for your understanding?

91 responses



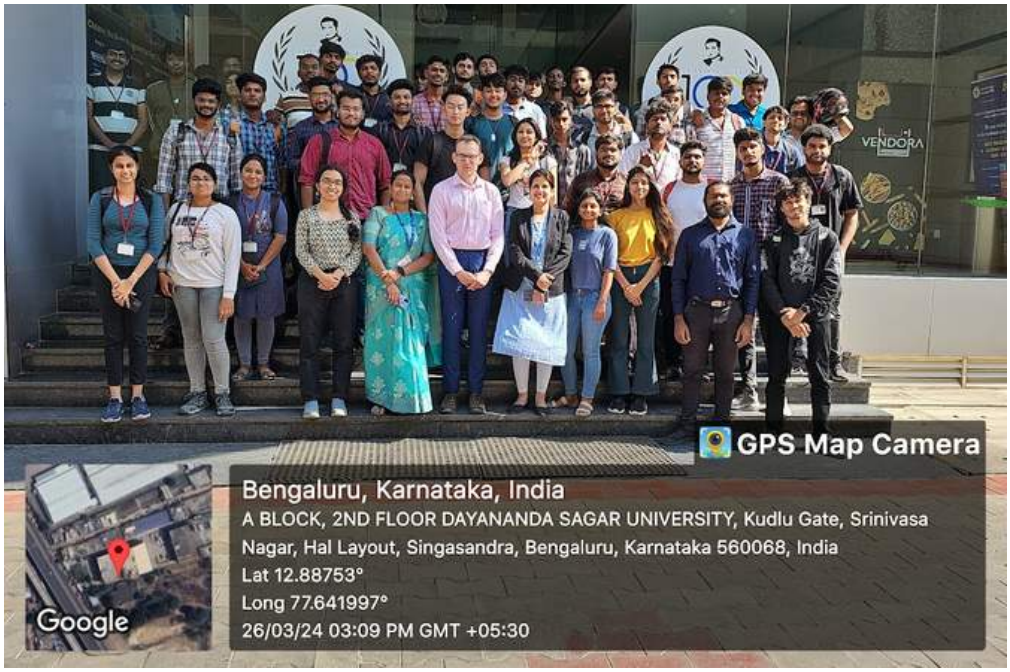
Please rate the workshop organization on a scale of 1 to 5, with 5 being the highest.

91 responses



SCHOOL OF ENGINEERING

SNAPS:



Special thanks to all the student Volunteers:

Y Chaitanya Shiva Srinivas

Mohith N

Pulya Satya Sri Rama Asrith

Keshav Sairam

Sayli Pankaj Bande

Photography by, Harsh Manalel

https://photos.app.goo.gl/gZqLUAhR3MxtMwh27

REPORT BY,
VINAY R
(ENG21AM0121)

SCHOOL OF ENGINEERING

Dayananda Sagar University

Devarakaggalahalli, Harohalli Kanakapura Road, Ramanagara, Karnataka 562112

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence & Machine Learning)

REPORT ON

"WORKSHOP ON FUZZY SETS, FUZZY LOGIC AND THEIR APPLICATIONS"

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

AND

DEPARTMENT OF INTERNATIONAL AFFAIRS
Dayananda Sagar University

18TH , 19TH AND 20TH MARCH 2024

Resource person:

Dr PAVEL SKRABÁNEK, Associate professor, Mendel University in Brno, Czechia Republic

SCHOOL OF ENGINEERING

SCHOOL OF ENGINEERING

Dayananda Sagar University

Devarakaggalahalli, Harohalli Kanakapura Road,
Dt, Ramanagara, Karnataka 562112

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)
&
DEPARTMENT OF INTERNATIONAL AFFAIRS

THREE DAYS WORKSHOP ON FUZZY SETS, FUZZY LOGIC AND THEIR APPLICATIONS

TARGET AUDIENCE : 2ND YEAR STUDENTS
VENUE : HAROHALLI CAMPUS - LECTURE HALL

Resource Person

Dr. PAVEL ŠKRABÁNEK

Associate professor
Mendel University in Brno,
Czechia Republic

Fuzzy logic which is based on the observation that people make decisions based on imprecise and non-numerical information. It has been used to solve complex problems where the parameters may be unclear or imprecise.

18th March to 20th March 2024

09:00 AM - 04:15 PM

Convenors
Dr. Amit Bhatt, Incharge Vice Chancellor, DSU
Dr. Puttamadappa C, Registrar, DSU
Dr. Udaya Kumar Reddy K R, Dean, SOE, DSU
Dr. Ramesh R Galigekere, Dean (Acad), SOE, DSU
Ms. Supriya Mathew, Vice President of International Affairs, DSU
Dr. Jayavrinda Vrindavanam, Chairperson, AIML, SOE, DSU

Student Coordinators:

Ms. GaanaShree .S, 4th Sem AIML, SOE, DSU
Mr. Yogesh N, 4th Sem AIML, SOE, DSU

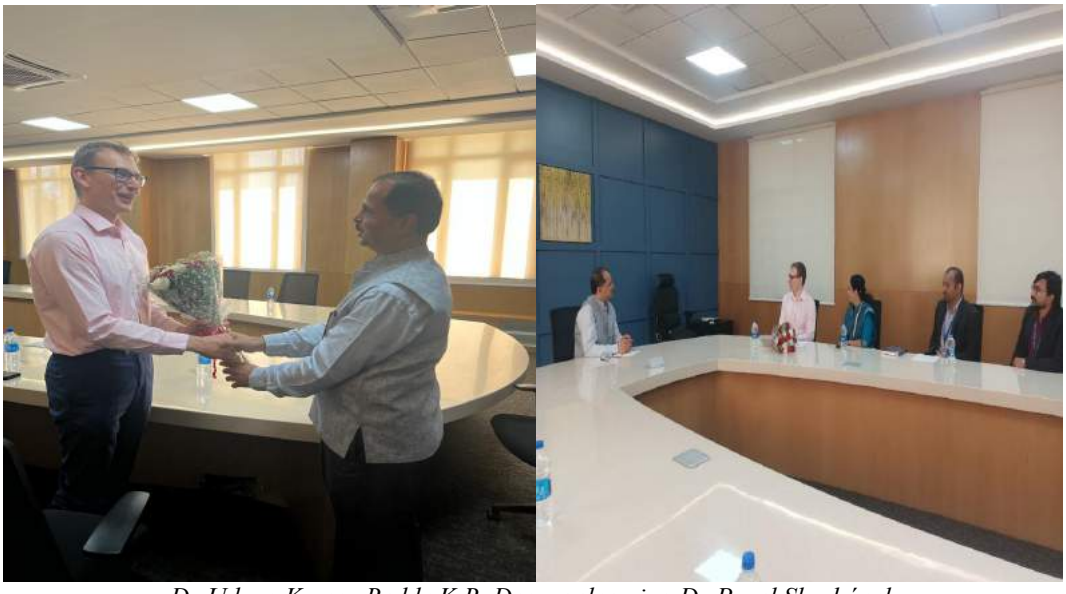
Contact:
Dr. Vegi fernando A
Associate Professor, AIML
+91 95667 41638
vegi.fernando-aiml@dsu.edu.in

Staff Coordinators
Dr. Vegi Fernando A, AIML, SOE, DSU
Dr. Mude Nagarjuna Naik. AIML, SOE, DSU
Prof. Pradeep Kumar K, AIML, SOE, DSU

Day 1, 18th March 2024

OVERVIEW

The "Workshop on Fuzzy Sets, Fuzzy Logic, and their Applications," orchestrated by Dr. Pavel at Dayananda Sagar University, marked a significant milestone in the academic journey of the second-year students. This enlightening event, specifically tailored for the curious minds of undergraduates, aimed to demystify the complex yet fascinating world of fuzzy logic and its myriad applications across diverse fields. Dr. Pavel, a renowned expert in the realm of fuzzy systems, led the workshop with a blend of profound knowledge and practical insights, turning abstract concepts into tangible learning experiences. From intelligent control systems to advanced decision-making algorithms, students were given a comprehensive overview of how fuzzy logic can be harnessed to tackle ambiguity and imprecision, mirroring the complexity of human reasoning. This report aims to encapsulate the essence of the workshop, highlighting the key learning, discussions, and the palpable enthusiasm that Dr. Pavel ignited among the students, promising to pave new pathways in their academic and future professional endeavors.



Dr Udaya Kumar Reddy K R, Dean welcoming Dr Pavel Skrabánek

During the forenoon session Dr. Pavel interacted with the faculties regarding his research expertise on computer vision. Through an exploration of fundamental principles, practical applications, and insightful discussions, the interaction provided a platform for faculty members to deepen their understanding of computer vision and its implications for research and education. By delving into topics such as problems related to computer vision, projects developed on computer vision, faculties gained valuable insights into the theoretical underpinnings and real-world applications of this dynamic field. Moreover, the interactive nature of the seminar fostered engaging discussions and knowledge sharing among participants, further enriching their learning experience. As academia continues to evolve and embrace interdisciplinary approaches, the significance of computer vision in advancing research, innovation, and pedagogy remains indisputable. This report endeavors to encapsulate the essence of the interaction, highlighting key takeaways and reflections from both Dr. Pavel's expertise and the collective wisdom of the participating faculty members.

Dr Pavel Skrabánek sharing his experience with the staff.

The students workshop began in the afternoon session and Dr. Jayavrinda Vrindavanam, Chairperson, CSE(AIML) played a crucial role in elucidating the significance of the "Workshop on Fuzzy Sets, Fuzzy Logic, and Their Applications" to the students at Dayananda Sagar University. With a keen understanding of the pivotal shifts in technology and the increasing relevance of fuzzy logic in modern-day problem-solving, Dr.Jayavrinda Vrindavanam provided a compelling introduction to the workshop, setting the stage for a transformative learning experience.

Dr Jayavrinda Vrindavanam V addressing the gathering.

Dr. Vegi Fernando, Associate Professor, took the stage to spotlight Dr. Pavel's remarkable achievements, adding a layer of admiration and anticipation for the workshop at Dayananda Sagar University. Her address served not only as an acknowledgment of Dr. Pavel's contributions to the field of fuzzy logic but also as a beacon of inspiration for the students gathered to learn and explore. Dr Pavel is a profound researcher and academician at the University of Pardubice in the area of Artificial Intelligence (machine learning, fuzzy set theory, genetic algorithms, computer vision), mathematical modeling and simulations of dynamic systems, process control and optimization.

Dr Vegi Fernando sharing Dr Pavel Skrabánek's achievements.

ESSENCE OF DAY-1

- **The essence of fuzzy sets** lies in representing uncertainty by assigning degrees of membership to elements. Unlike traditional binary sets, fuzzy sets allow gradual membership, accommodating imprecise boundaries and facilitating modeling of vague concepts in various fields. Basic fuzzy set operation**s** involve union (combining memberships of corresponding elements), intersection (selecting minimum memberships), complement (inverting memberships), and extension (applying operations to entire sets). These operations enable manipulation of fuzzy sets, facilitating reasoning and decision-making in uncertain environments.

- **Cartesian product:** A set operation combining elements from two sets to form pairs. In fuzzy contexts, it extends to combine degrees of membership from each set, generating fuzzy pairs to represent relationships between elements.

- **Fuzzy relations:** Binary relations allowing gradual degrees of connection between elements, represented by fuzzy sets. They capture uncertain or vague relationships, crucial in modeling imprecise information and decision-making

processes.Intersection and union of fuzzy relations: Operations to combine fuzzy relations. Intersection selects the minimum membership degree for each pair, representing commonality. Union selects the maximum, representing combined relevance or connection between elements.

- **Projection:** Extracting information from a fuzzy relation. It focuses on one set of elements, collapsing the relation to its connection with those elements, aiding in understanding specific relationships within complex data. Cylindrical extension: Expanding a fuzzy relation to include additional dimensions. It broadens the scope of the relation, accommodating more factors or variables, enhancing the representation of complex systems or interactions.

ACTIVITIES

To maintain student engagement and interactivity throughout the session, a quiz was organized across all three days. Professor Pradeep Kumar K led the quiz, which focused on the topic taught by Dr. Pavel. The quiz consisted of five questions aimed at reinforcing key concepts covered during Dr. Pavel's lecture.

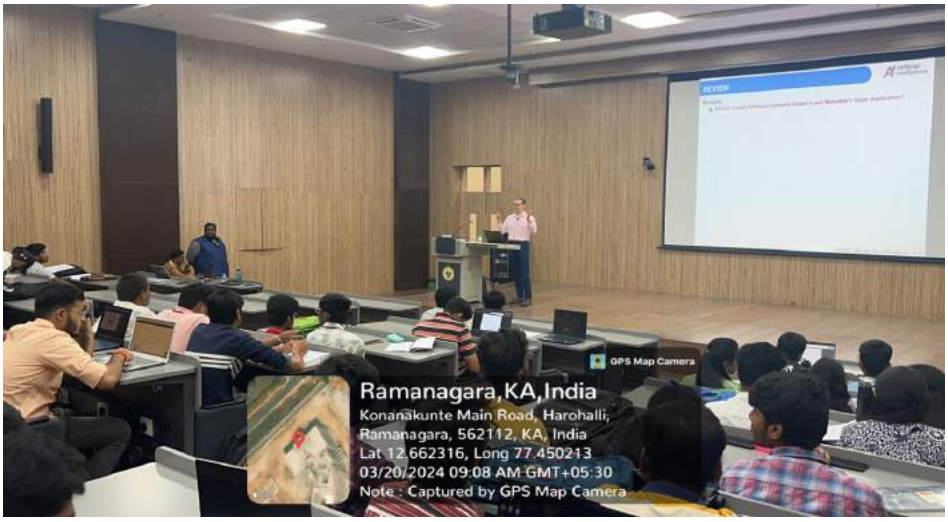
Prof Pradeep Kumar K conducting quiz

Day 1 winner quiz Mr Farha

STUDENT ACHIEVER OF DAY-1

Mr Farha, II AIML

GLIMPSES FROM DAY-1



Day-1 Dr Pavel's Lecture

Students answering Dr Pavel's questions.

Day 2, 19th March 2024

OVERVIEW

Mamdani Type Fuzzy Logic Systems: Mamdani-type systems consist of fuzzification, where crisp inputs are converted into fuzzy sets, rules defining relationships between inputs and outputs, inference using fuzzy logic operators, and defuzzification to obtain crisp outputs.

Fuzzification: This process involves converting crisp inputs into fuzzy sets, allowing for the representation of uncertainty or imprecision in the input variables.Mamdani systems use a set of linguistic rules to define relationships between the fuzzy inputs and outputs. These rules typically take the form of "if-then" statements, where the "if" part corresponds to fuzzy conditions and the "then" part specifies fuzzy conclusions.

Inference: Inference in Mamdani systems involves applying fuzzy logic operators, such as AND, OR, and NOT, to combine the fuzzy sets defined by the input variables according to the rules. This step determines the degree to which each rule contributes to the overall output.

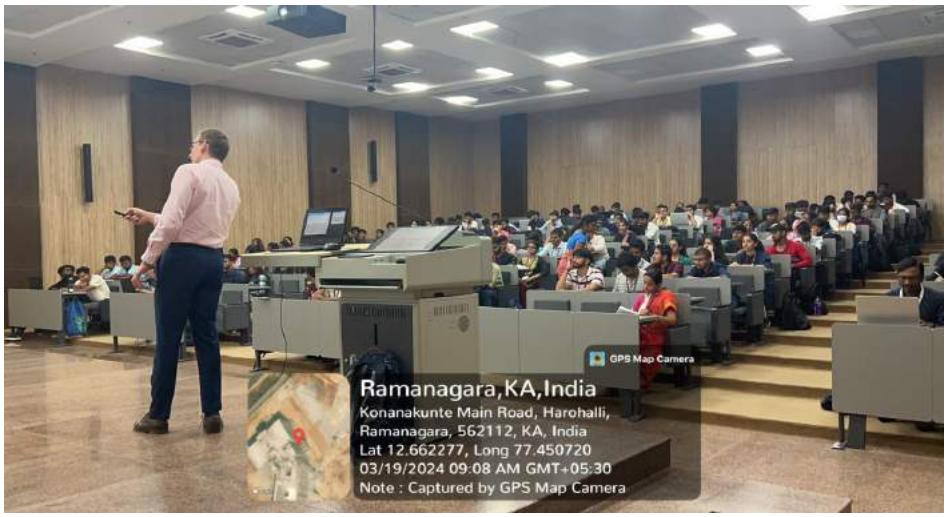
ACTIVITIES

Ms. Gana Sree, II AIML led the quiz, which focused on the topic taught by Dr. Pavel. The quiz consisted of five questions aimed at reinforcing key concepts covered during Dr. Pavel's lecture. This interactive approach not only helped students to actively participate in the learning process but also provided an opportunity for immediate assessment and reinforcement of their understanding. By incorporating quizzes into the session, the organizers ensured that students remained attentive and engaged, enhancing the overall learning experience.

STUDENT ACHIEVER OF DAY-2

Mr Vishnu Vardhan, II AIML

GLIMPSES FROM DAY-2



Day-2 Dr Pavel's lecture

Day-2 winner - Mr. Vishnu Vardan

Ms Gaana Shree S conducting quiz on day 2

Day 3, 20th March 2024

OVERVIEW

Defuzzification: Once the fuzzy inference process is complete, defuzzification is applied to obtain crisp outputs. This involves aggregating the fuzzy outputs and converting them back into a crisp value that corresponds to a specific action or decision.

Takagi–Sugeno Type Fuzzy Logic Systems: Takagi–Sugeno systems use fuzzy sets to model input-output relationships directly, incorporating linguistic variables and hedges to express uncertainty, enabling approximate reasoning in decision-making and control applications.

ACTIVITIES

Ms. Gana Sree and Mr. Vishnu Vardan, II AIML led the quiz, which focused on the topic taught by Dr. Pavel. The quiz consisted of five questions aimed at reinforcing key concepts covered during Dr. Pavel's lecture.

STUDENT ACHIEVER OF DAY-3

Mr Jithin Murthy, II AIML

GLIMPSES FROM DAY-3

Dr. Pavel's Lecture-Day 3

Ms Gaana Shree S and Mr C Vishnu Vardhan conducting quiz on day 3.

SPECIAL EVENT OF DAY-3

During the workshop, Mr. Utpal Kumar, a student, shared insights on implementing fuzzy logic using Python. He demonstrated practical techniques and coding examples to illustrate how fuzzy logic concepts could be applied in real-world scenarios. By leveraging Python's rich ecosystem of libraries and tools, Mr. Kumar showcased how to develop fuzzy logic systems for various applications such as control systems, decision-making processes, and pattern recognition tasks.

Mr Utpal Kumar teaching python code for Fuzzy sets.

Dr. Pavel with Faculties-CSE(AIML)

Dr. Pavel with Students Section 'A'-CSE(AIML)

Dr. Pavel with Students Section 'B'-CSE(AIML)

Dr. Pavel with Students Section 'C'-CSE(AIML)

SCHOOL OF ENGINEERING

Dayananda Sagar University

Devarakaggalahalli, Harohalli Kanakapura Road, Ramanagara, Karnataka 562112

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence & Machine Learning)

REPORT ON

"FACULTY INTERACTION ON MACHINE VISION INSTRUMENTATION AND DEEP CONVOLUTIONAL NETWORKS"

by Dr PAVEL SKRABÁNEK

18th (FN) & 21st MARCH 2024

SCHOOL OF ENGINEERING

SCHOOL OF ENGINEERING

Dayananda Sagar University

Devarakaggalahalli, Harohalli Kanakapura Road,
Dt, Ramanagara, Karnataka 562112

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)
&
DEPARTMENT OF INTERNATIONAL AFFAIRS

FACULTY INTERACTION

Campus 4: A510(limited Seats)
Expert consultation for the students and researchers of the DSU in machine vision instrumentation and in deep Convolutional Networks.

18th March 2024 9.00AM to 12.00PM

21st March 2024, 9.00AM to 10.15AM

Campus 3: B Block
Expert consultation for the students and researchers of the DSU in machine vision instrumentation and deep Convolutional Networks.

22nd March 2024, 02.00PM to 04.30PM

RESOURCE PERSON

DR. PAVEL ŠKRABÁNEK

Associate professor
Mendel University in Brno,
Czechia Republic

TARGET AUDIENCE:
SOE, FACULTY FATERNITY
RESEARCH SCHOLARS

REGISTRATION
https://forms.gle/tvEZuCNPU4t9HydNA

Convenors
Dr. Amit Bhatt, Incharge Vice Chancellor, DSU
Dr. Puttamadappa C, Register, DSU
Dr. Udaya Kumar Reddy K R, Dean, SOE, DSU
Dr. Ramesh R Galigekere, Dean (Acad),SOE, DSU
Ms. Supriya Mathew, Vice President of International Affairs, DSU
Dr. Jayavrinda vrindavanam, Chairperson, AIML,SOE, DSU

CONTACT PERSON
DR. VEGI FERNANDO - C4
DR. VINUTHA N - C3

Staff Coordinators
Dr. Vinutha N, AIML, SOE, DSU
Dr. Vegi Fernando A, AIML, SOE, DSU
Dr. Monika G. AIML, SOE, DSU
Dr. Mude Nagarjuna Naik. AIML, SOE, DSU
Prof. Pradeep Kumar K, SOE, DSU

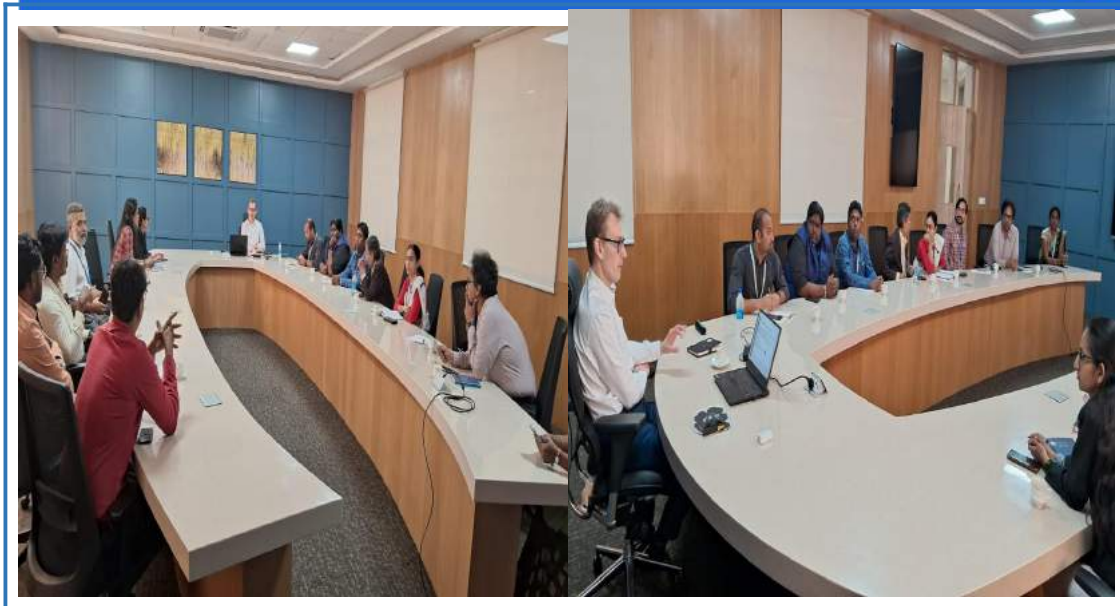
Day 4, 21st March 2024

OVERVIEW

Dr. Pavel gave a brief talk on his research expertise with the professors. Many projects built by him and his research students in the area of Fuzzy logic and sets and Machine Vision was explained by him. Professors from their end also interacted with him regarding various research areas. Overall, it was an interactive session and served as an eye opener to many.

GLIMPSES

Faculty interaction on 18-03-2024



Discussion about research collaboration on 21-03-2024

Coordinators

Dr. A. Vegi Fernando

Dr. Mude Nagarjuna Naik

Prof. Pradeep Kumar K

Chairperson

Dr. Jayavrinda Vrindavanam

DAYANANDA SAGAR UNIVERSITY

SCHOOL OF ENGINEERING

Department of Computer Science and Engineering

(Artificial Intelligence and Machine Learning)

REPORT ON

"Faculty Interaction with Dr. Pavel Skrabanek - 2024"

Conducted by

22nd March 2024

Time: 2:00 PM – 4:30 PM

Convener:

Dr. Jayavrinda Vrindavanam, Professor and Chairperson, Department of CSE (AI & ML)

Faculty Coordinator:

Dr. Vinutha N, Associate Professor, Department of CSE (AI & ML)
Dr. Monika Goyal, Assistant Professor, Department of CSE (AI & ML)

Student Coordinators:

Mr. Vinay R Student, Department of CSE (AI & ML)
Ms. Shrusti Goudar Student, Department of CSE (AI & ML)

Image 1: Faculty Interaction Poster

Faculty Interaction Session with Dr. Pavel Skrabanek

Date: March 22, 2024
Time: 2:00 PM to 4:30 PM
Venue: 'B' Block, Room G0036

Event Overview:

The AI & ML department organized a Faculty Interaction Session with Dr. Pavel Skrabanek on March 22, 2024, from 2:00 PM to 4:30 PM. The event took place at G0036 'B' Block. The event started by welcoming the resource person and faculties from the School of Engineering by Dr. Vinutha N and Dr. Monika Goyal introduced the guest speaker, Dr. Pavel Skrabanek.

Dr. Pavel commenced the session by providing insights into Fuzzy Regression and Machine Vision Instrumentation. He elaborated on ongoing funded projects, including Monitoring the condition of plants in the greenhouse and Development of smart light for machine vision.

Image 1: Welcoming Dr. Pavel for Faculty Interaction

1. **Research Directions in Computer Vision:**
    - **Previously Solved Problems:**
        - Recognition of defective welds (2017).
        - Recognition of developmental stages of cardiomyocytes (2018).
        - Detection of drones (2019-2021).
    - **Ongoing Research:**
        - Automatic assessment of cardiomyocyte development stages from confocal microscopy images.
        - Automatic evaluation of fermentation degree of cocoa beans.
        - Automatic Identification of Tree Pests.
        - Automatic Classification of Ayurvedic herbs.
        - Training of Regression Models on imbalanced datasets.
        - European Network for assuring food integrity using non-destructive spectral sensors.
        - InsectAI – Using Image-based AI for Insect Monitoring and Conservation.
        - Development of Time-efficient Computer Vision Systems.
2. **Development of Time-efficient Methods:**
    - Dr. Pavel proposed an unconventional approach to express object positions using gradient maps.

- Mentioned that Yolo SqueezeNet yields better results in terms of relative inference time and localization error.
- Presented a paper on the adaptation of a centroid-based object detector on multiclass tasks.

3. **Development of Methods for Processing Hyperspectral Images:**
    - Discussed ongoing work in processing hyperspectral images.

The session concluded with an interactive discussion and Q&A session.

Images of Faculty Interaction session

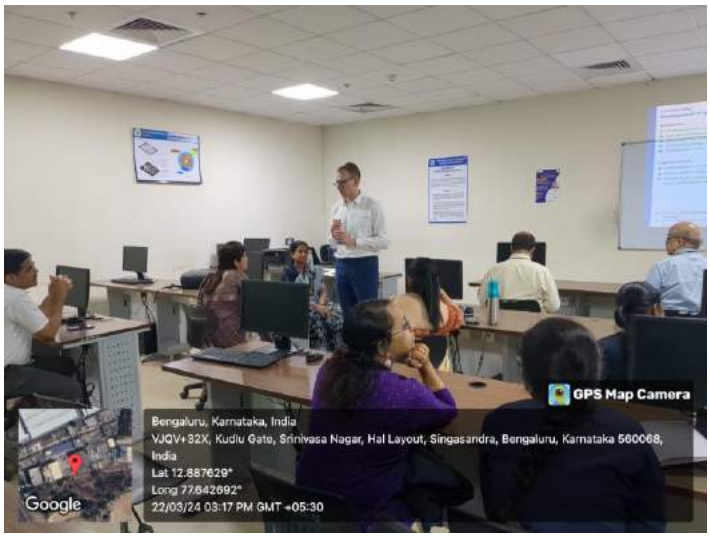


Image 2: Dr. Pavel discussion on Funded Projects with Faculties of School of Engineering.

Image 3: Dr. Pavel and Faculties of School of Engineering.