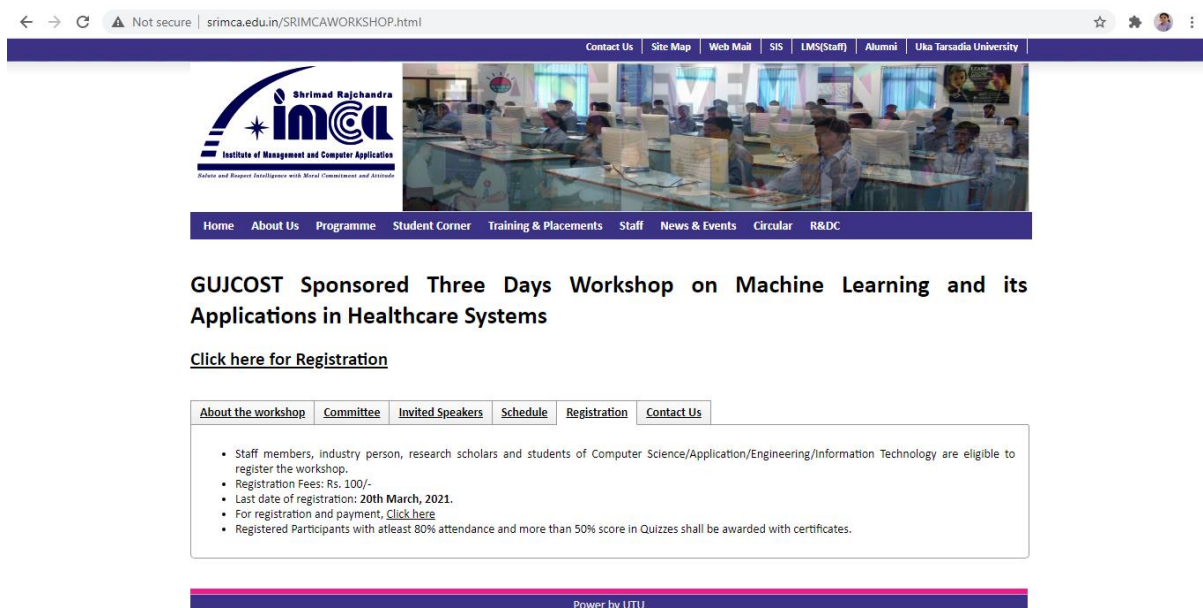


## GUJCOST Sponsored 3 Days Online Workshop on Machine Learning and its applications in Healthcare Systems organized and hosted by SRIMCA from 25th to 27th March'2021

The alliance of healthcare services with human health being crucial and of high importance revived globally with the fall of the recent pandemic. Swift digital transformations have compelled the healthcare sector to be the early adopters of modern technology. This sector have been benefited significantly from remote health related technological advances. Machine learning and its applications have always been a protagonist for healthcare systems that encompasses patient data handling, health syndrome analytics, and development of new medical procedures with tailor made treatment of chronic diseases. The horizons of health care applications have outreach to educate patients on probable symptoms, and take proactive measures of precautions and treatments that have significantly reduced the cost of these services in recent times.

To cater these needs SRIMCA organized 3 Days online workshop with objectives to pace the demand of incubating and disseminating native healthcare technology solutions in the wave of Atmanirbhar Bharat. The workshop was aligned to cover cores of Machine Learning, its applications for Healthcare Domain and Software Development Avenues to orient aspiring participants seeking their career in this field of digital transformation.

The registration of the workshop was done Online through in-house registration and payment platform.



The screenshot shows a web browser window with the URL [srimca.edu.in/SRIMCAWORKSHOP.html](http://srimca.edu.in/SRIMCAWORKSHOP.html). The page header includes navigation links: Contact Us, Site Map, Web Mail, SIS, LMS(Staff), Alumni, and Uka Tarsadia University. The main content area features the SRIMCA logo (Shrimad Rajchandra Institute of Management and Computer Application) and a navigation menu: Home, About Us, Programme, Student Corner, Training & Placements, Staff, News & Events, Circular, and R&DC. The main heading is "GUJCOST Sponsored Three Days Workshop on Machine Learning and its Applications in Healthcare Systems". Below this is a link: "Click here for Registration". A table of navigation tabs is present: About the workshop, Committee, Invited Speakers, Schedule, Registration, and Contact Us. The "Registration" tab is active, displaying the following details:

- Staff members, industry person, research scholars and students of Computer Science/Application/Engineering/Information Technology are eligible to register the workshop.
- Registration Fees: Rs. 100/-
- Last date of registration: 20th March, 2021.
- For registration and payment, [Click here](#)
- Registered Participants with atleast 80% attendance and more than 50% score in Quizzes shall be awarded with certificates.

The footer of the page states "Power by UTU".

Figure 1 Web Page for Registration Details

For smooth communication Telegram group was created and all the sessions were held through Google Meet Platform. Feedback and Quiz were procured through Google Form on daily basis. The registration diversity of the participants ranged consisted a blend of students, academicians, research scholars and industry personnel. Participants' diversity comprised of state of Uttar Pradesh, Haryana, Gujarat, Maharashtra, Telanga and Andhra Pradesh making is a National event in true sense.

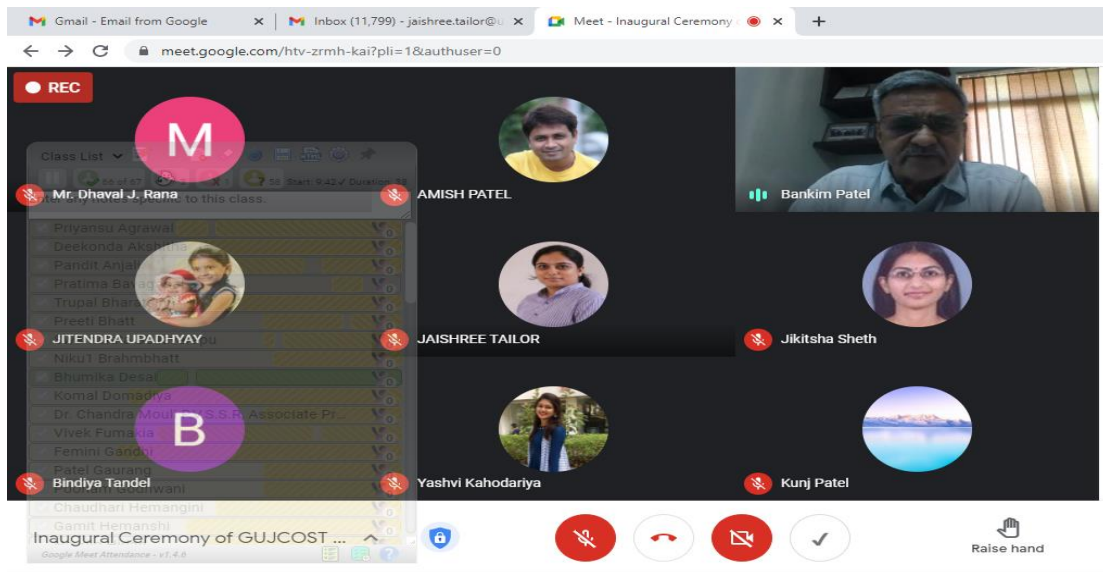


Figure 2 Screen shot of Inaugural Address by Convenor

On 25th March'2021 being the first day of the workshop, all the registered participants, Convenor Dr. Bankim Patel, Organising Secretaries Dr. Jikitsha Sheth and Dr. Kalpesh Lad and the first speaker of the even Dr. P.V.S.S.R. Chandramouli marked their presence in the inaugural function. The formal function was hosted by Dr. Jaishree Tailor which was initiated with the University anthem recitation followed by introduction to Uka Tarsadia University and the hosting institute Shrimad Rajchandra Institute of Management and Computer Application. Dr. Jikitsha Sheth the coordinator of this event addressed the audience by giving awareness about the 3 days online workshop wherein she mentioned the growing needs of Machine Learning in Healthcare sector. Dr. Bankim Patel the convenor of the workshop conveyed his best wishes for the 3 days and that the workshop turns adds value to their thought process and give momentum to their research.

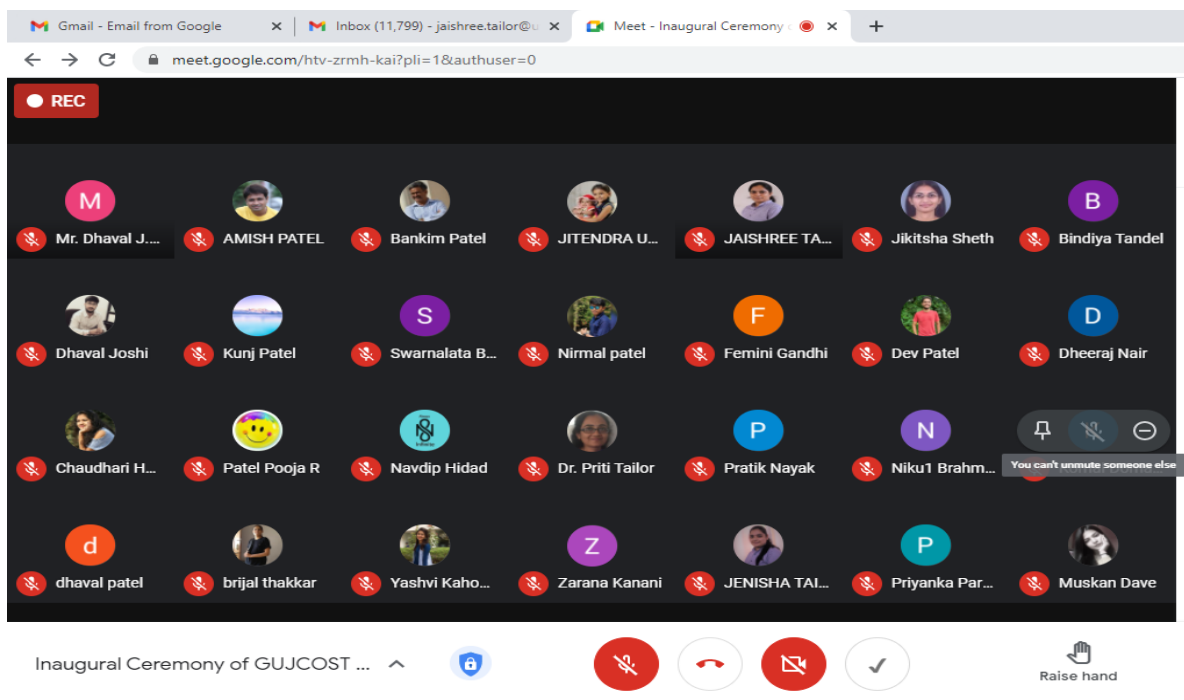


Figure 3 Participants tuned online on Google Meet for Inaugural Ceremony

The slide content is as follows:

- MACHINE LEARNING**
  - SUPERVISED LEARNING**
    - CONTINUOUS TARGET VARIABLE: REGRESSION, CLASSIFICATION
    - CATEGORICAL TARGET VARIABLE: CLUSTERING, ASSOCIATION
  - UNSUPERVISED LEARNING**
    - CATEGORICAL TARGET VARIABLE: CLASSIFICATION, CLUSTERING
    - NO TARGET AVAILABLE: ASSOCIATION
  - SEMI-SUPERVISED LEARNING**
  - REINFORCEMENT LEARNING**
    - CATEGORICAL TARGET VARIABLE: CLASSIFICATION
    - NO TARGET VARIABLE: CONTROL

Chandra Mouli, CUTN 16

Figure 4 Day 1 Session 1 by Dr. Chandra Mouli

The first and the second session of the workshop were on the themes “Introduction to Machine Learning” and “Image processing using Machine learning techniques for healthcare systems” by Dr. P.V.S.S.R Chandramouli, the renowned speaker from Department of Computer Science at Central University Tamil Nadu Thiruvavur. His session was exemplary balancing the participant diversity from conceptual understanding to satisfying the research thrust in the domain of Machine Learning. His session touched the essentials and applications of Machine Learning, Classification Techniques, Associations and Linear Regressions. He also illustrated the hypothesis formulations for health care applications related to dental, skin etc. and modelling of same.

The slide content is as follows:

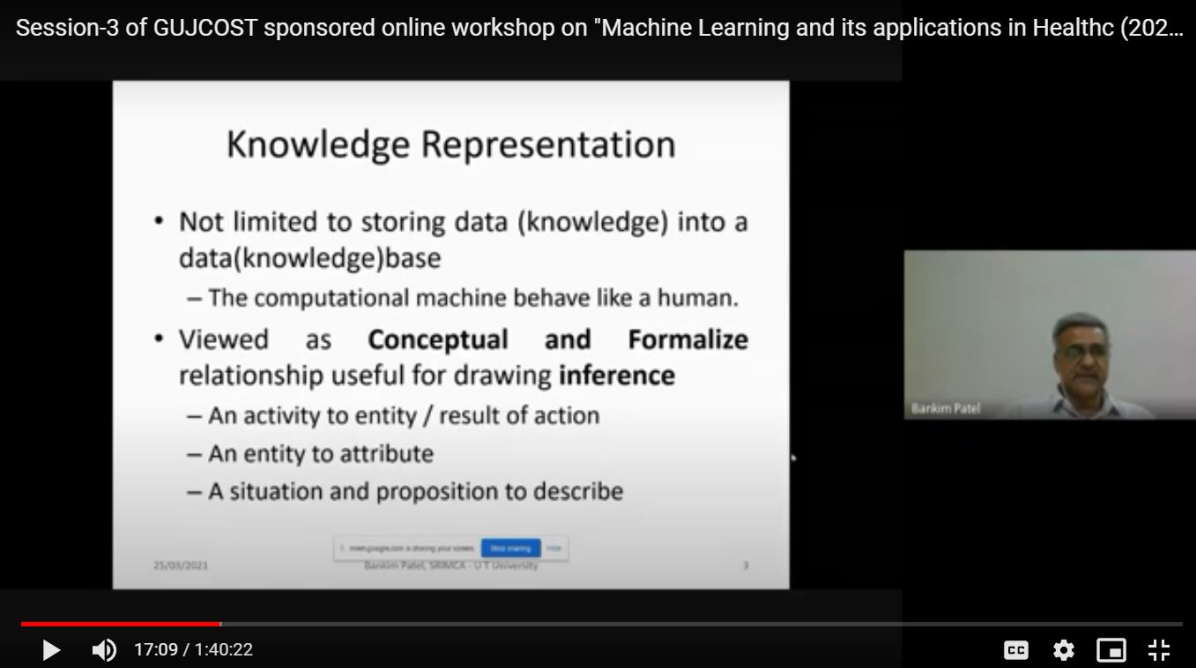
- Types of images**
  - Binary Images
  - Gray scale images (Handwritten diagram: B A W, 0 - 255, Blue, Cross, White)
  - Indexed color images
  - RGB color images
  - Multispectral images

35

Figure 5 Day 1 Session 2 by Dr. Chandra Mouli

The day one of the workshop concluded with the session on Knowledge Representation in healthcare systems through Ontology Dr. Bankim Patel the Convenor of the workshop who is eminent in the domain of Intelligent Systems and Natural Language Processing. He initiated his talk as how the age of data processing has been replaced by knowledge processing in almost all the domains. Thus for intelligence and smart applications to foster knowledge representation mechanics plays an important role. He exemplified the knowledge representation of Electronic Health Records through ontology and also gave an idea to the participants about the tools available that can aid in preparing such schematic representation. The session followed through Feedback and Quiz by the participants to reflect on their first days learning.

Session-3 of GUJCOST sponsored online workshop on "Machine Learning and its applications in Healthc (202...



### Knowledge Representation

- Not limited to storing data (knowledge) into a data(knowledge)base
  - The computational machine behave like a human.
- Viewed as **Conceptual and Formalize** relationship useful for drawing **inference**
  - An activity to entity / result of action
  - An entity to attribute
  - A situation and proposition to describe

25/01/2021

Bankim Patel

17:09 / 1:40:22

Figure 6 Day 1 Session 3 by Dr. Bankim Patel

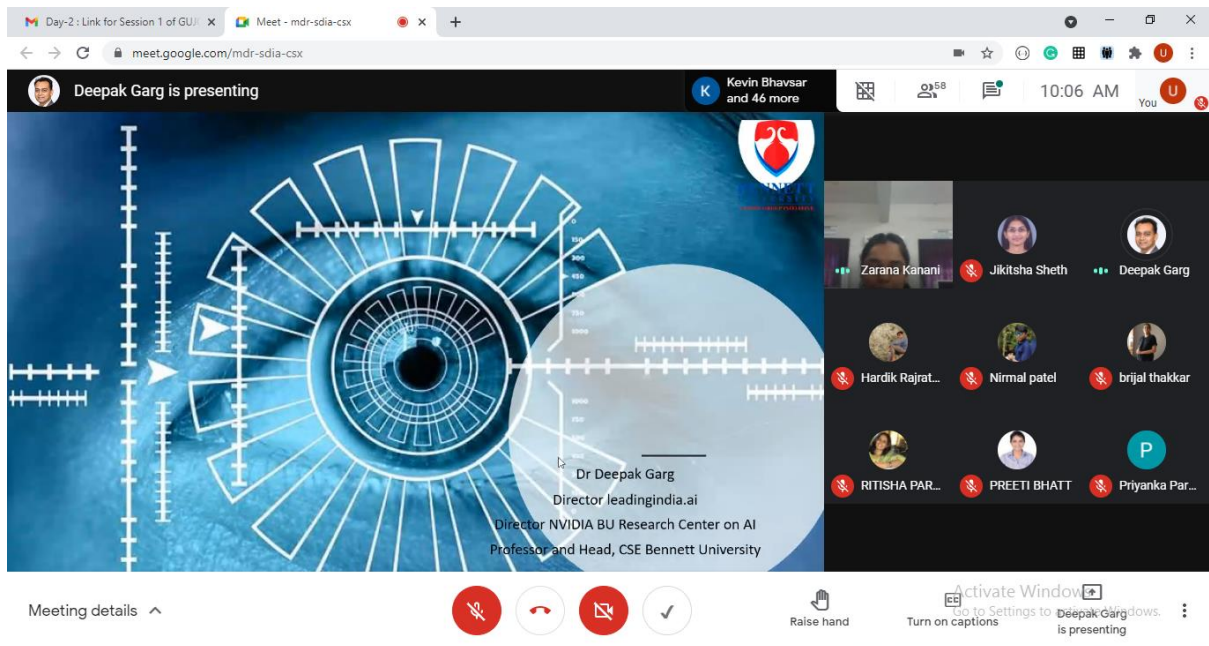


Figure 7 Day 2 Session 1 by Dr. Deepak Garg

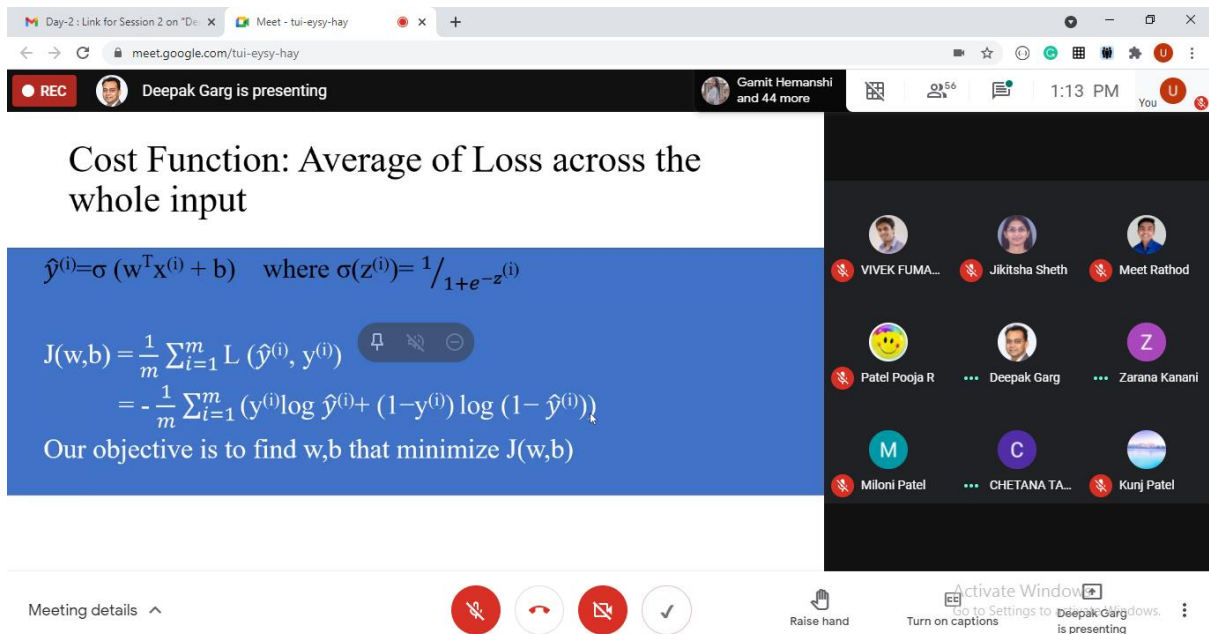


Figure 8 Day 2 Session 2 by Dr. Deepak Garg

The day two of the workshop was coordinated by Ms. Zarana Kanani who introduced the first speaker Dr. Deepak Garg The Chair, Computer Science and Engineering, Bennett University and Director, NVIDIA-Bennett Center of Research on Artificial Intelligence. In his address on the theme shared his rich experience on scientific and engineering goals of Machine Learning, its needs, types and applications. He also enlightened the participants on Deep Learning and further made the audience know about the latest trends in machine learning and its challenges. He quoted several interesting examples along with emerging concepts like RNN, CNN and research opportunities there on to the participants.

The second day was concluded with the session of Dr. Jikitsha Sheth who delivered her talk on “Clinical Entity Recognition: Issues and Challenges”. During her talk Dr. Jikitsha Sheth discussed

on Ambiguity, Named Entity Recognition, Pattern Matching, and Challenges in Corpus availability. She also motivated participants towards research activity and gave glimpse regarding future research trends in Natural Language Processing. The participants had attended this session with enthusiasm of learning. Their queries resembled the joy of learning and resource person's appreciable knowledge satisfied their curiosity. Participants appeared for the quiz and also gave their feedbacks.

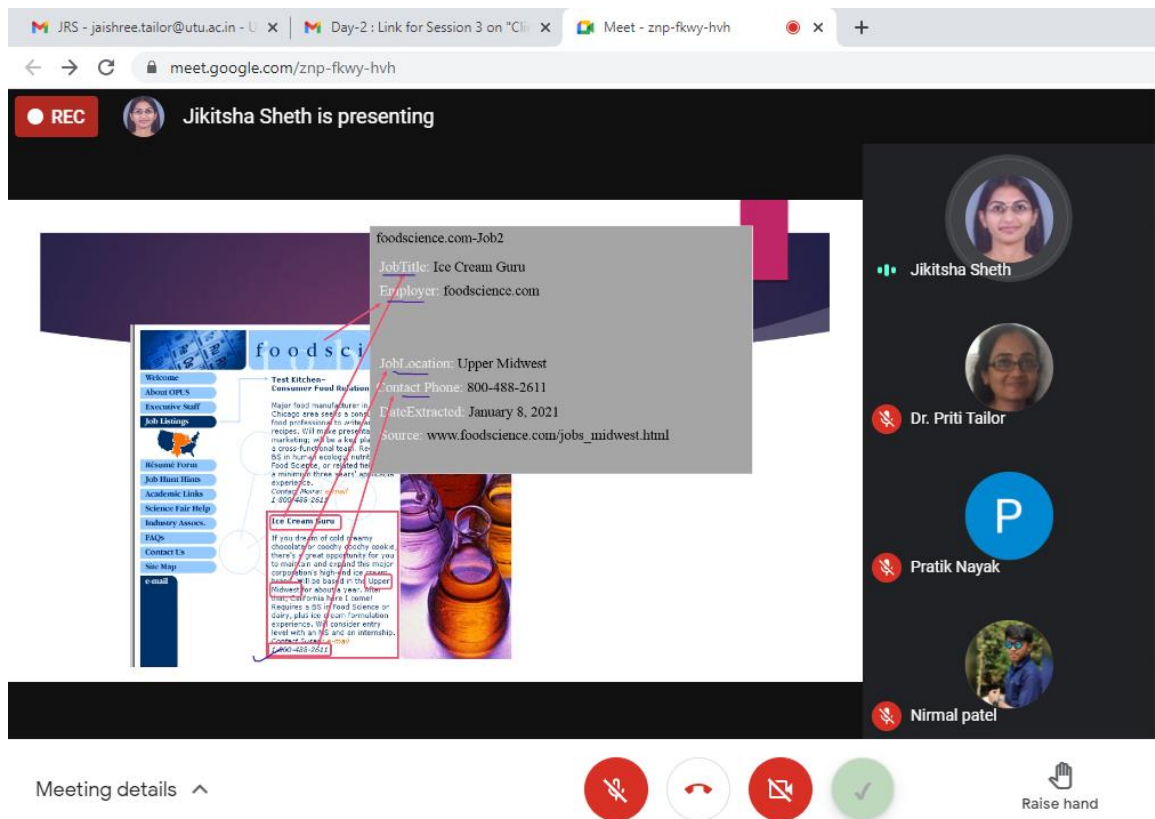


Figure 9 Day 2 Session 3 by Dr. Jikitsha Sheth

The 3<sup>rd</sup> day of the workshop was also a knowledge endeavour. Dr. T. S. Senthil Kumar Associate Professor at the Department of Computer Science and Engineering at Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore, augmented the participants on both technical and practical aspects on “Health care data quality concerns and Risk Prediction with LSTM(Long Short Term Memory)” prior to lunch followed by post lunch session on “Health care Risk prediction with GAN(Generative Adversarial Network)” that led the participants to newer aspects of Deep Learning Techniques in Healthcare Systems. The participants truly got involved that invoked healthy discussion and query solving. He enriched upon statistical cores to advanced concepts encompassing LSTM, RNN, and usage of GAN. He also tactfully and satisfactorily responded to the participants query not limited to health care domain but also text processing, image processing and many other. He gave quality information about several organizations boosting up research in these domains. His session was thought provoking and ice broke the theme of the workshop making participants embrace the domain. He invoked interaction with healthy question answering on the domain.

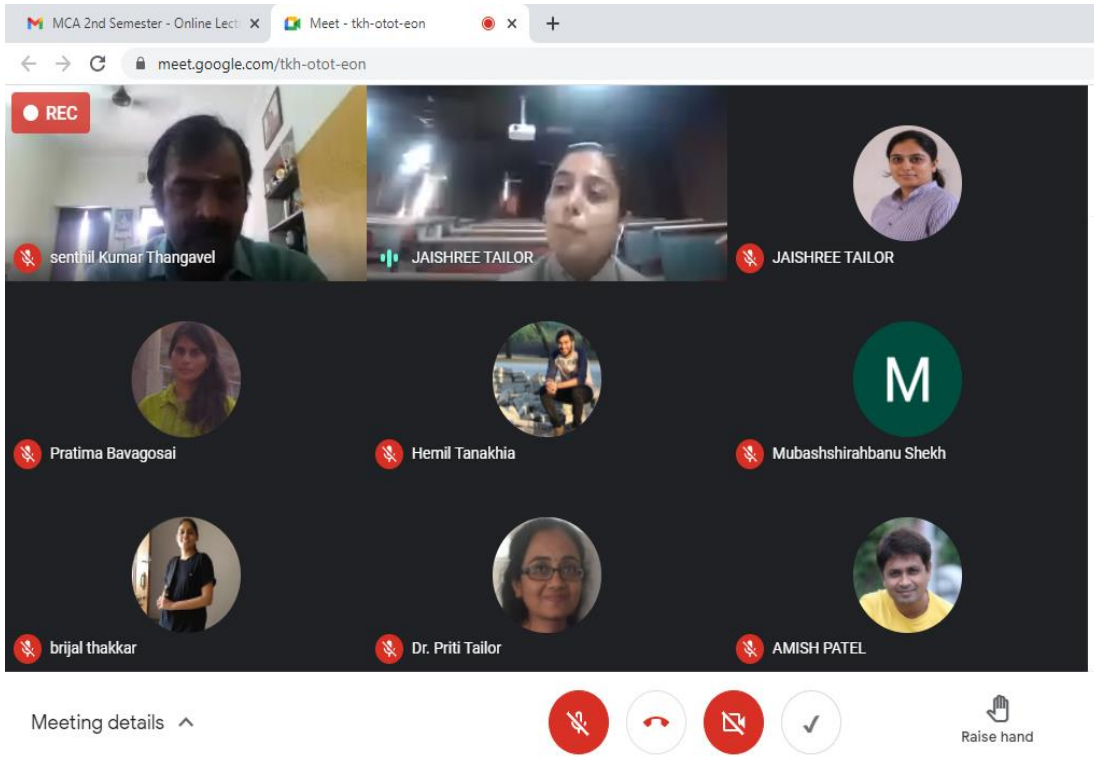


Figure 10 Day 3 Session1 by Dr. T. S. Senthilkumar

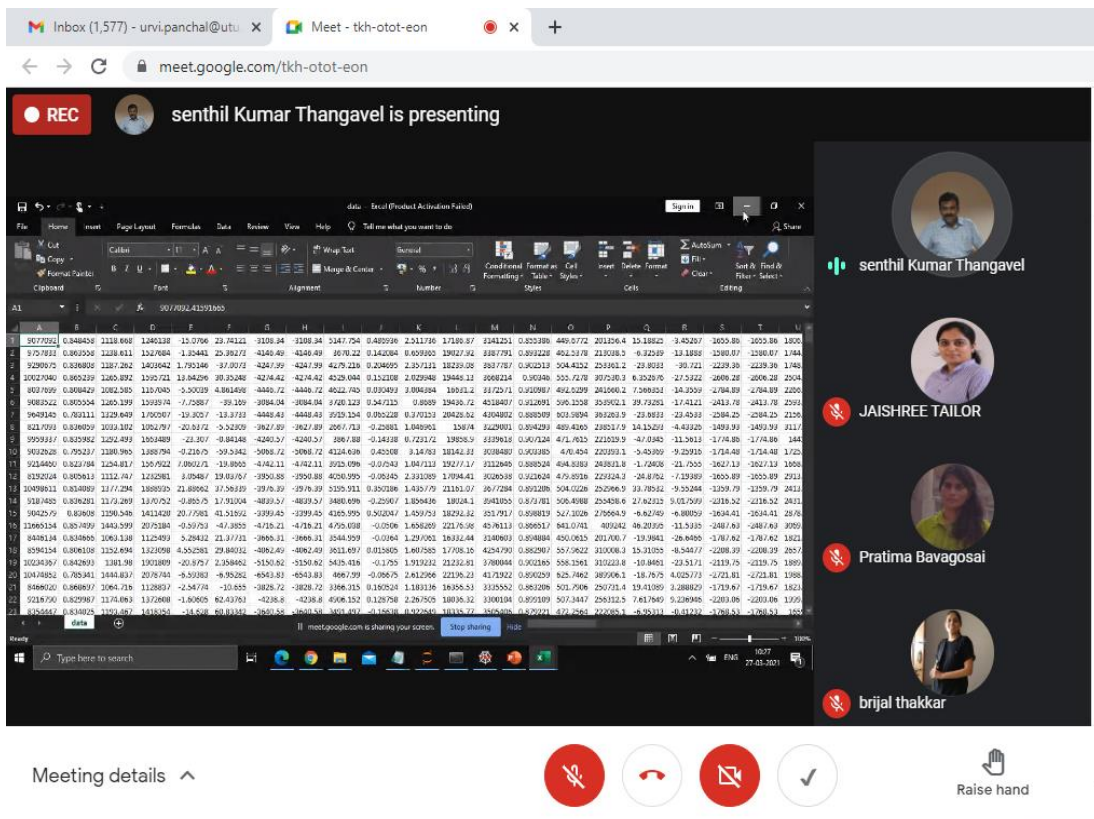


Figure 11 Day 3 Session 1 by Dr. T. S. Senthilkumar

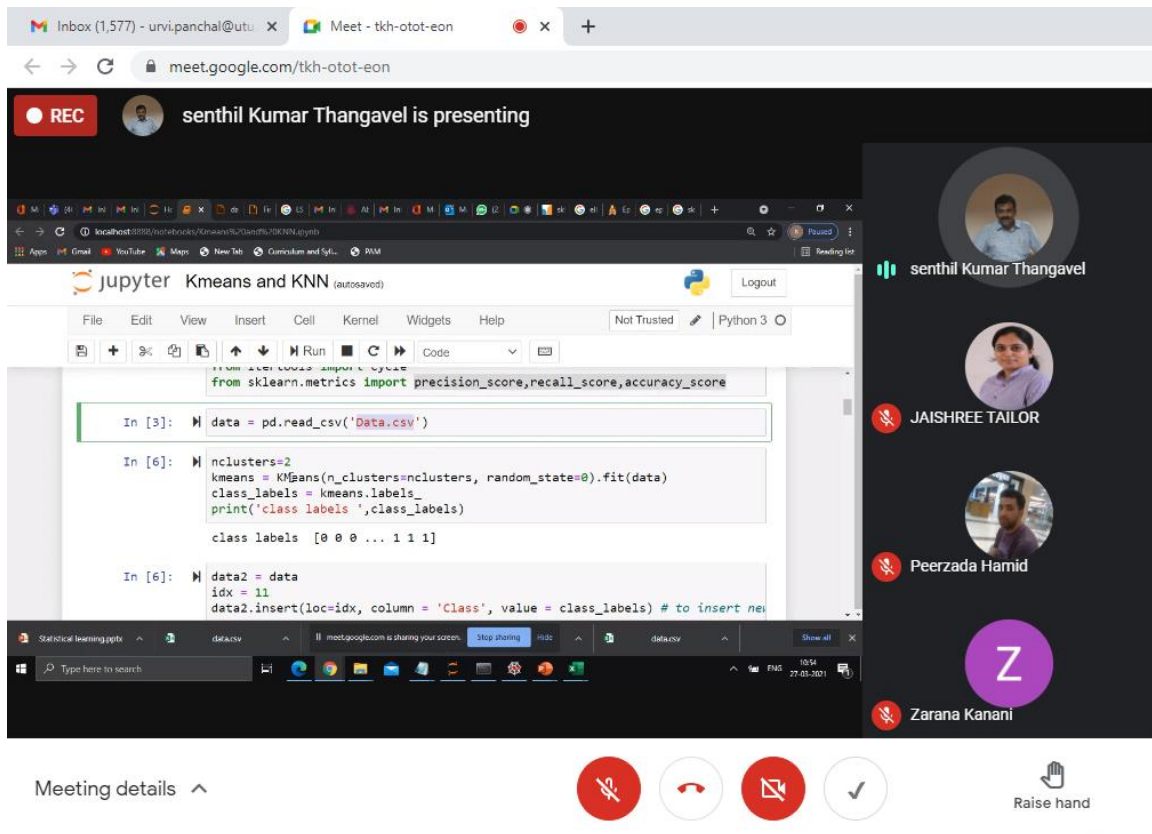


Figure 12 Day 3 Demonstration by Dr. T. S. Senthilkumar

Dr. Jikitsha Sheth extended the Clinical Entity Recognition on day 3 of the seminar where she enriched the knowledge of participants in fundamentals as well as practical approach of Named Entity Recognition as well as tools and libraries to aid the same. The examples discussed by her were very helpful in solving real world challenges faced by the participants in Electronic Health Record management.



meet.google.com/ujq-ekpy-unp

REC senthil Kumar Thangavel is presenting

Classic GAN Framework

Real world images

Sample

Real  $D(x)$

Differentiable module

Discriminator

Loss

Fake  $D(G(z))$

Generator

Latent random variable  $z$

$G(z)$

Differentiable module

$Z = \text{random Noise (latent representation of data)}$

$Z_d \leq X_d$

Meeting details

Raise hand

Figure 13 Day 3 Session 2 on GAN by Dr. T. S. Senthilkumar

meet.google.com/cm-v-kdxt-yze

REC Jikitsha Sheth is presenting

Pre-Processing Text

Tokenization

Feature Engineering

Model Building

Model Evaluation

Removing Stop-word

POS Tagging

Bag of Word

TF-IDF

Word Embedding

Meeting details

Raise hand

Figure 14 Day Session 3 by Dr. Jikitsha Sheth

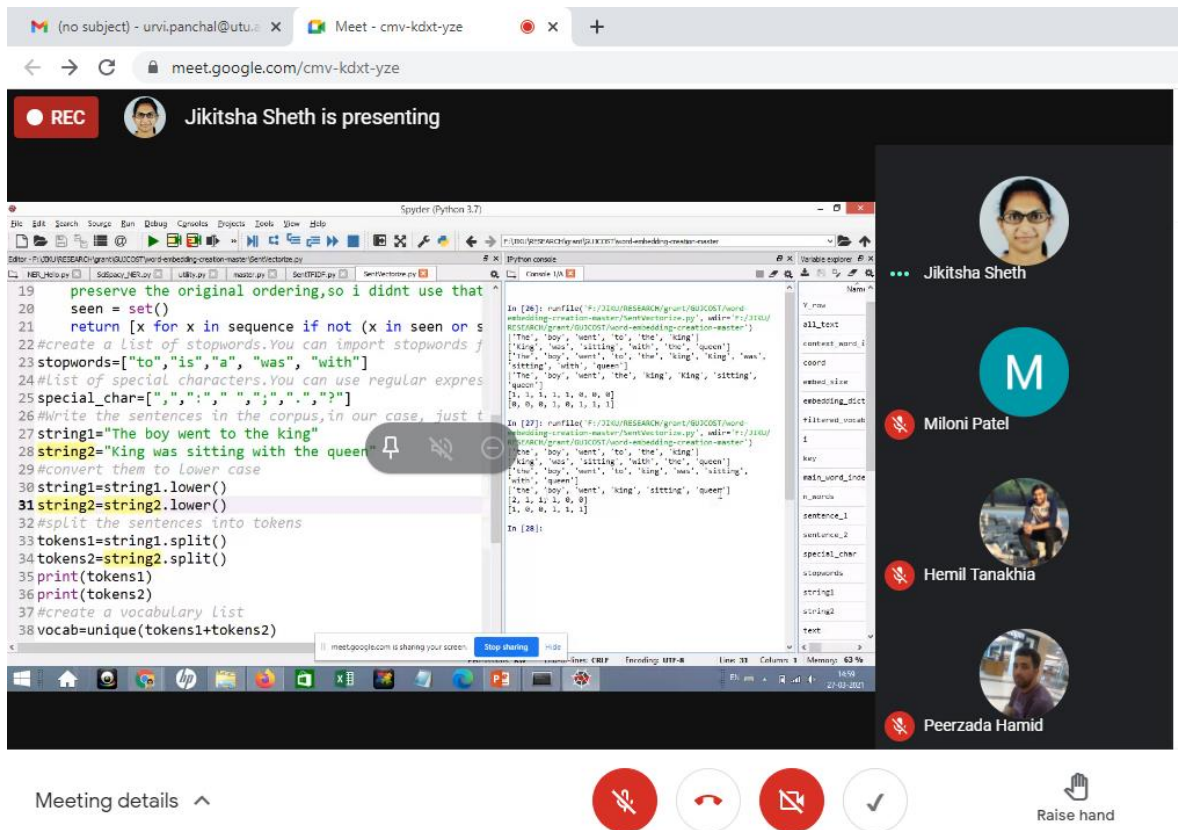


Figure 15 Day 3 Session 3 Demonstration by Dr. Jikitsha Sheth

Valedictory function was graced with the presence of Dr. Kalpesh Lad and Dr. Jikitsha Sheth. Participants expressed their feedbacks as to their learnings from the workshop. Students were satisfied as to applicability of the workshop in their project work. Research scholars found it very relevant to plan their pathways for their research work where they found the workshop had cleared lot of their misconceptions as to machine learning. Participants found the workshop very knowledge gaining for their future endeavour and were highly motivated with all the technical sessions that best justified the need and the theme of the workshop Machine Learning and its applications in Healthcare Systems.

The details related to the workshop are available on:

<http://srimca.edu.in/SRIMCAWORKSHOP.html>