



# Computer Science Department



Faculty of  
Automation  
and  
Computer  
Science





We build the  
future, not just  
imagine it!



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Engineering means real solutions  
that change people's lives!



# Educational offer

## **Bachelor, 4 years (Romanian and English)**

Computer Science

## **Master, 2 years (Romanian and English)**

### **Computer Science in English**

Artificial Intelligence and Vision

Data Science

Cybersecurity Engineering

## **PhD, 4 years**

Research

## Research groups

1. Knowledge Engineering Group
2. Intelligent Systems Group
3. Image Processing and Pattern Recognition Research Center
4. Security Laboratory for Defense and Cyberattack Resilience
5. Distributed Systems Research Laboratory
6. Computer Graphics and Interactive Systems Laboratory
7. Research Laboratory in Networks and Communication Protocols
8. Dedicated and Embedded Computing Systems Laboratory
9. Fundamentals of Software Technologies



# Cybersecurity Engineering

## *Master Programme*

University & industry cooperation

UTCN / Computer Science

and

Bitdefender – Romanian security  
company

**Bitdefender®**



### **Hands-on approach**

- labs assignments and projects

### **Targets students with CS/IT BSc**

- requires a solid technical background

### **Aims to provide a general perspective and knowledge of the cybersecurity field**

- hardware, OS, application level
- Web, mobile, virtualization
- audit, risk management
- malware analysis, cryptography, forensic, pentesting
- machine learning, big data

Cybersecurity

# Vision & Contents

### **Curricula is based on**

- ACM/IEEE cybersecurity curricula
- industry certifications: CISSP, OSCP, CSSLP, CISA



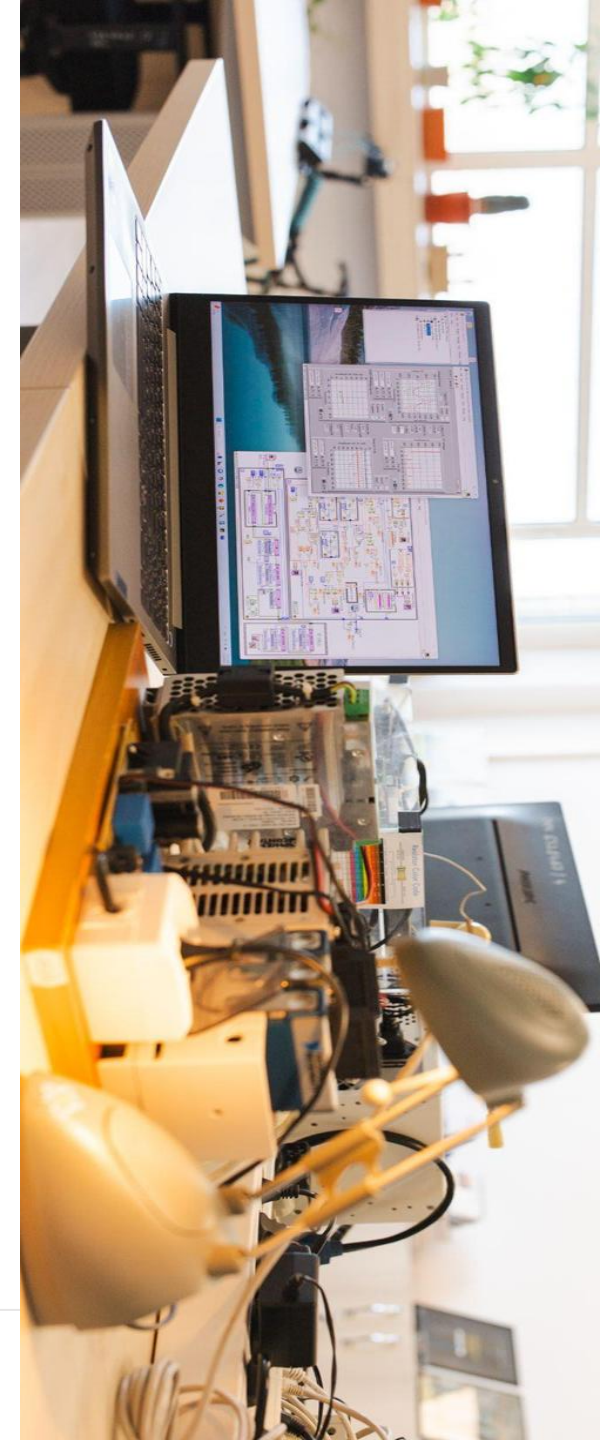
# Effort & Infrastructure

Estimated effort (on a 1 - 5 scale)

- technical difficulty level: 4
- allocated time: 4
  - classes: 4 hour / day (4 days / week)
  - homework: about 8-10 hours

## Infrastructure

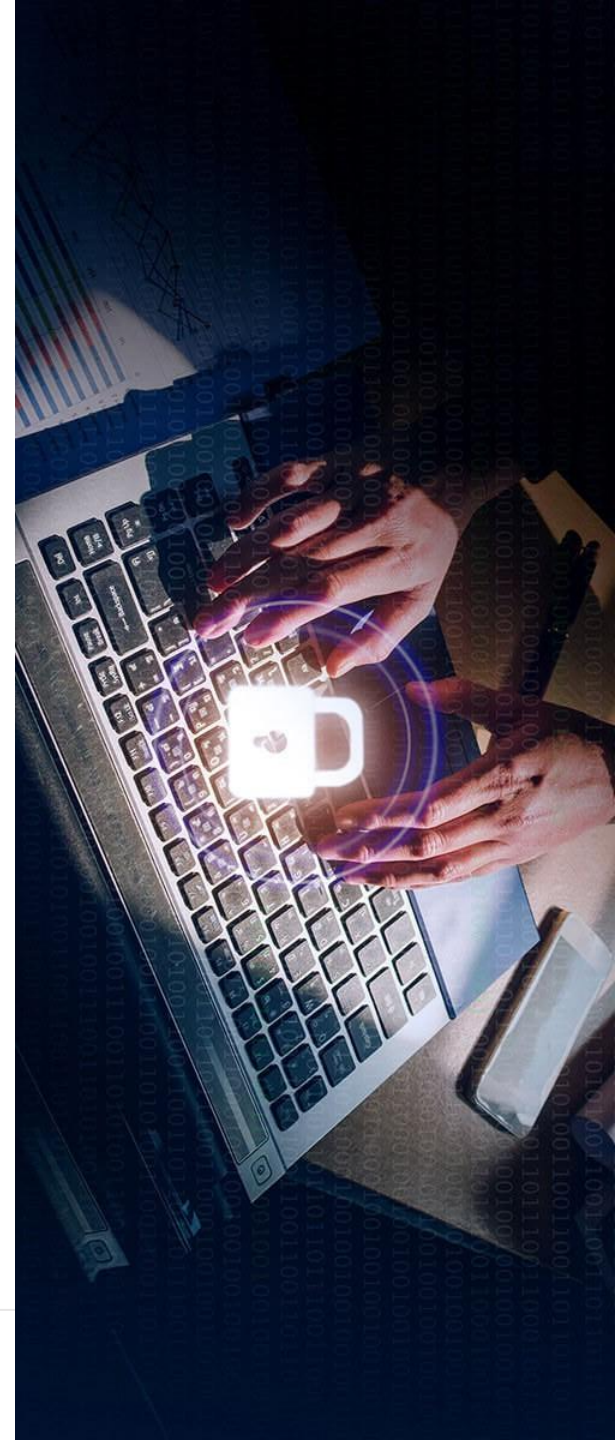
- Laboratory rooms: computers, simulators
- Virtual Machines Pentesting Range („Hacknet”)
- Industrial Control System (ICS) Pentesting Range





# Student Competences & Skills

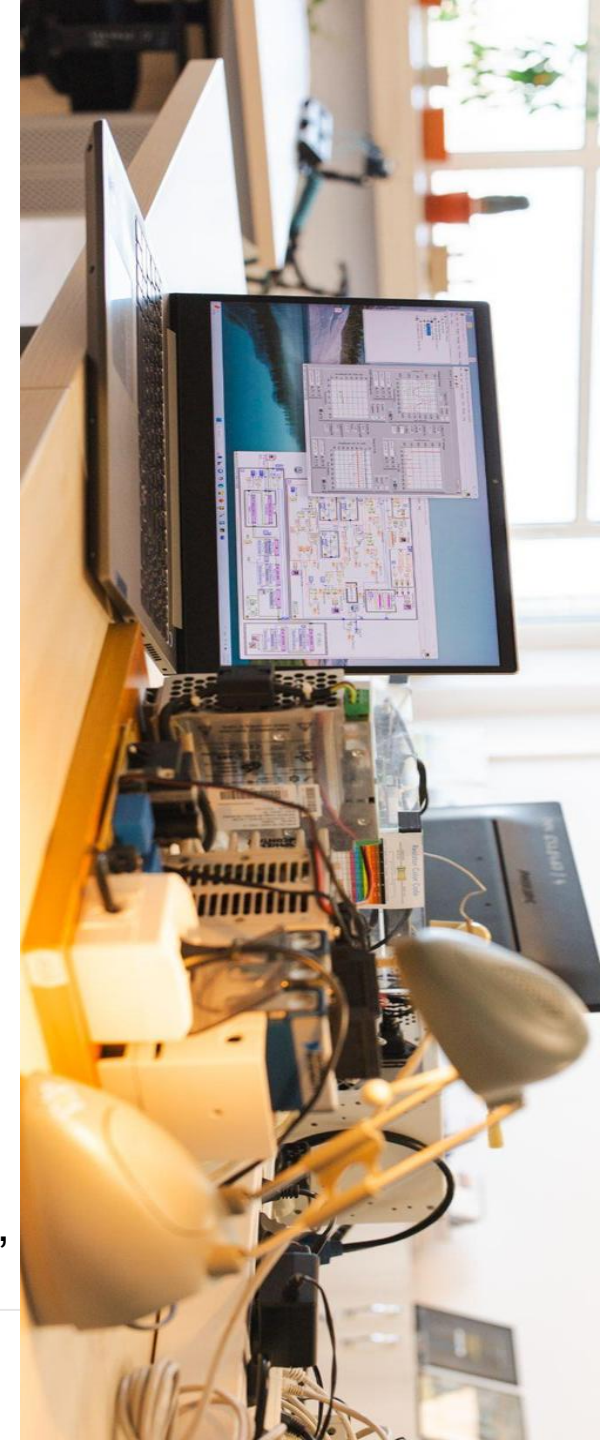
- **Ability to**
  - develop highly secure software applications
  - analyze and investigate software applications, computer systems, networks, and large-scale data from a cybersecurity perspective to identify cyberattacks and malware.
  - perform penetration testing on information systems.
  - investigate and interpret digital artifacts.
  - understand and apply cryptographic techniques and algorithms.
  - assess and manage cybersecurity risks at the organizational level or within a software product/service.





# Results

- In 2015, the program started with around 25 students, reaching approximately **40 students per year** in recent years
- The **completion rate is over 90%** of those admitted
- More than 75% of students entering the second year successfully complete their dissertation
- Over 12% of graduates continued with doctoral studies in the field
- **30+ scientific papers** published or presented at **international conferences** by students
- **Most graduates** have built a **career** in cybersecurity at major companies:
  - Bitdefender, CrowdStrike, Amazon, Garmin, Cisco, KPMG, Transilvania Bank, Betfair, Mayhem, Cyberhaven, CyberOps Network, Bolttech, OffensAI etc.





# Achievements

- **International CTF Achievements (2020–2024)**
  - Consistent **Top 35 Worldwide** in *Hack The Box University CTF*
  - Highlights:
    - #18 globally (2020, 200+ teams)
    - #14 globally (2021, 500+ teams, 72 countries)
    - #23 globally (2022, 900+ teams, 92 countries)
    - #4 globally (2023, 950+ teams, 94 countries)
    - #32 globally (2024, 1100+ teams, 101 countries)
- **National Cybersecurity Engagement**
  - Annual participation in **CYDEX**, the national cybersecurity exercise organized by SRI–Cyberint
  - Mixed teams of **students + faculty**
  - Focus: improving national cyber incident response through public–private collaboration



2020

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# Artificial Intelligence and Vision

*Master Programme*

**University & industry cooperation**

Research oriented

- PhD
- Industry (R&D)



### Focuses on cutting-edge fields

- artificial intelligence
- computer vision
- intelligent agents
- deep learning
- natural language processing
  - and more

### Prepares students both for

- **research** careers (e.g., PhD)
- high-level roles in **industry** (R&D, AI engineering)

AIV

# Vision & Contents

### Curricula is based on

- ACM/IEEE curricula
- Industry requirements



# Curriculum

- Intelligent Agent Systems
- Deep Learning Based Computer Vision
- Natural Language Processing
- Interactive Systems
- Algorithms and Computability
- Statistics and Probability
- Semantics Web & Agents
- Virtual Reality
- Computer Networks and Infrastructures

## Highly relevant in modern technology:

- autonomous vehicles, robotics, augmented reality, medical imaging, and intelligent systems





# Infrastructure

- **AI Research Institute (AIRi)**
- High-Performance Computing & Cloud
- Research Labs



Advancing research, innovation, and exploration in the field of artificial intelligence at the Technical University of Cluj-Napoca

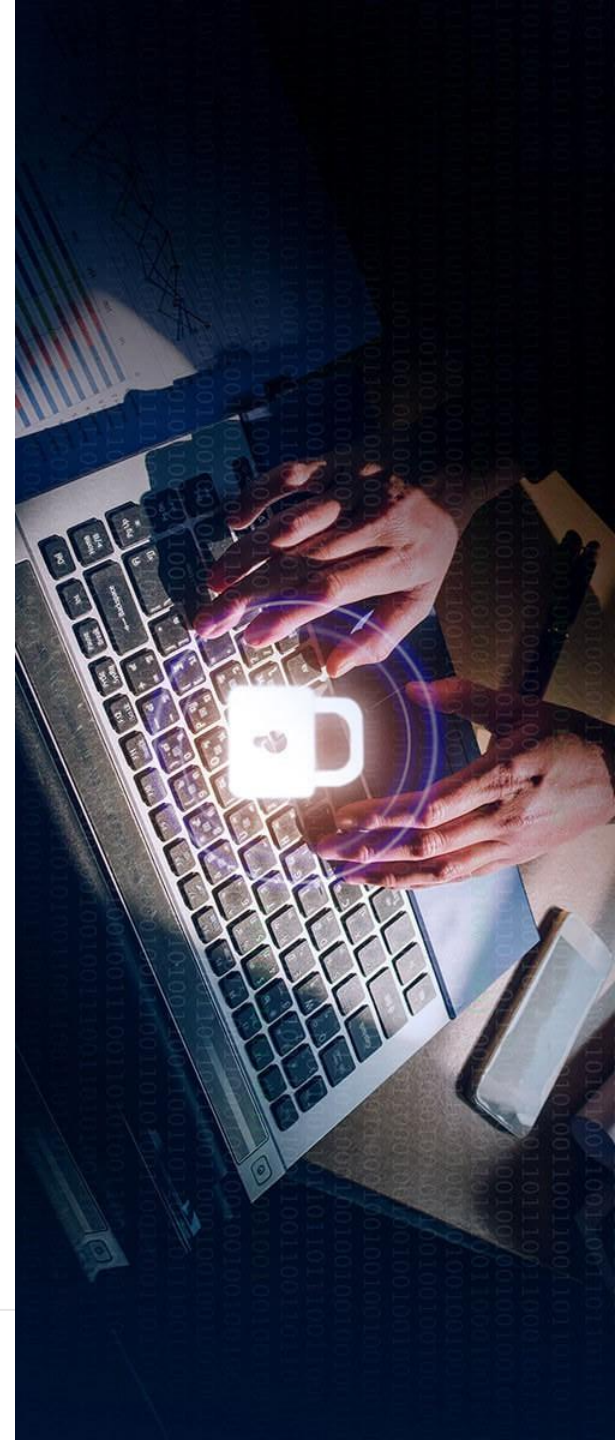
- AI-powered research
- AI theory and practice





# Research

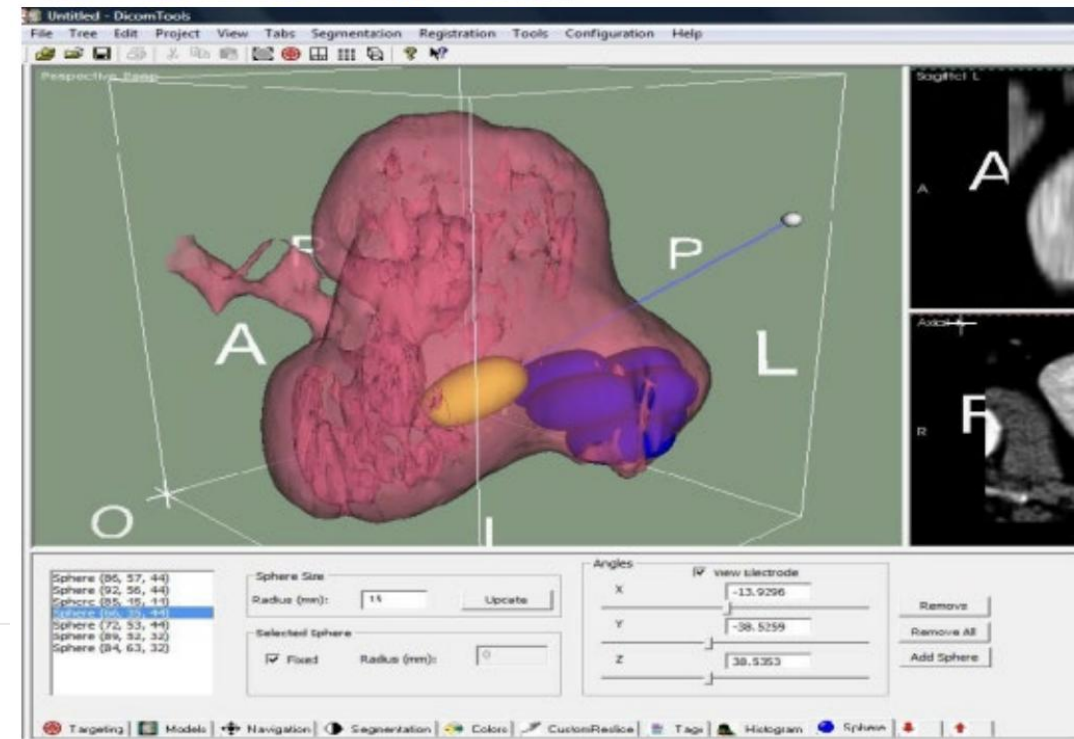
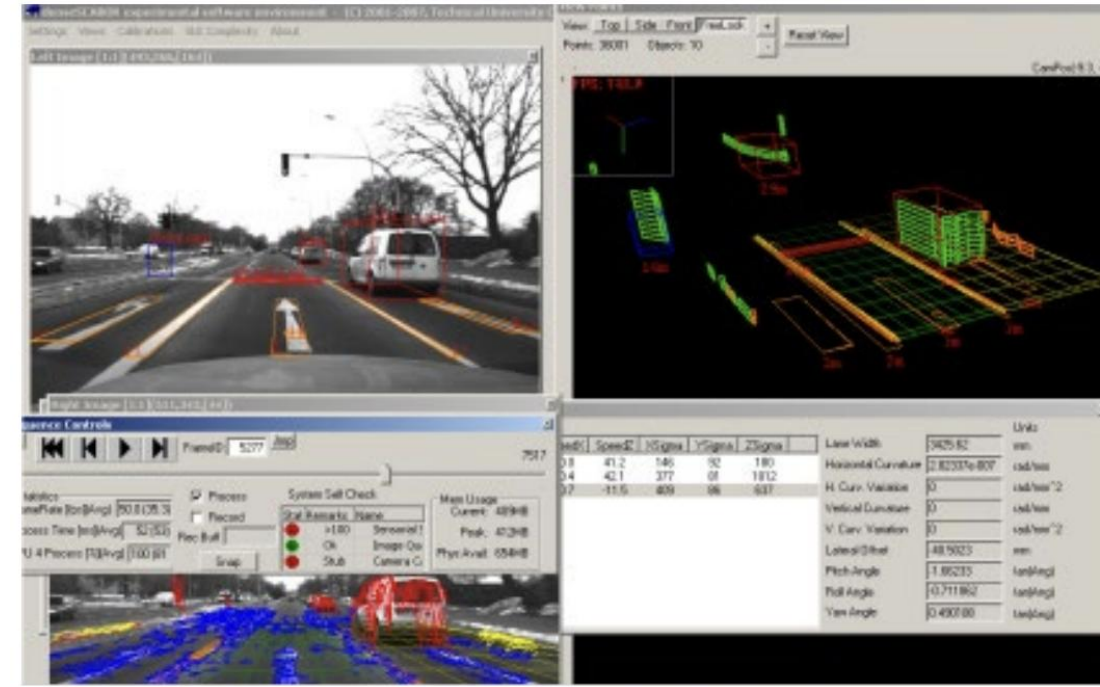
- **Research Activity** and a **Dissertation Project Work** in our research groups:
- 
- Knowledge Engineering Group
  - Intelligent Systems Group
  - Image Processing and Pattern Recognition Research Center
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# Opportunities for Students

- Build **strong theoretical foundations** (AI, vision, agents) along with **practical research skills**
- Opportunity to work on **research projects** — useful for publications or continuation to PhD
  - European research projects
- Well-aligned with **industry demand**
  - Joint projects with Volkswagen, Robert Bosch GmbH, Continental etc



# Career






Career

# Career Opportunities, Employers and Internships



and more 

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# Data Science

## *Master Programme*

**University & industry cooperation**

Research oriented

- PhD
- Industry (R&D)



## Focuses on cutting-edge fields

- Machine Learning & AI
- Statistical & Mathematical Foundations
- Data Engineering & Analytics Pipelines
- Big Data Technologies
- Databases & Business Intelligence
- Information Systems Architecture
  - and more

## Prepares students both for

- **research** careers (e.g., PhD)
- high-level roles in **industry** (R&D, Data/AI engineering)

Cybersecurity

# Vision & Contents

## Curricula is based on

- ACM/IEEE curricula
- Industry requirements

# Curriculum

- Compulsory courses
  - Big Data
  - Algorithms
  - Database Systems
  - Machine Learning
  - Mathematical Models for ML
  - Information Theory and Statistics
  - Data Warehouse and Business Intelligence
  - Image Processing and Computer Vision
  - Blockchain
  - Neuroscience
- Elective courses

## Highly relevant in modern technology:

- Data Analytics, Big Data, AI & Machine Learning, Cloud Computing, Cybersecurity





# Infrastructure

- **AI Research Institute (AIRi)**
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- Research Labs



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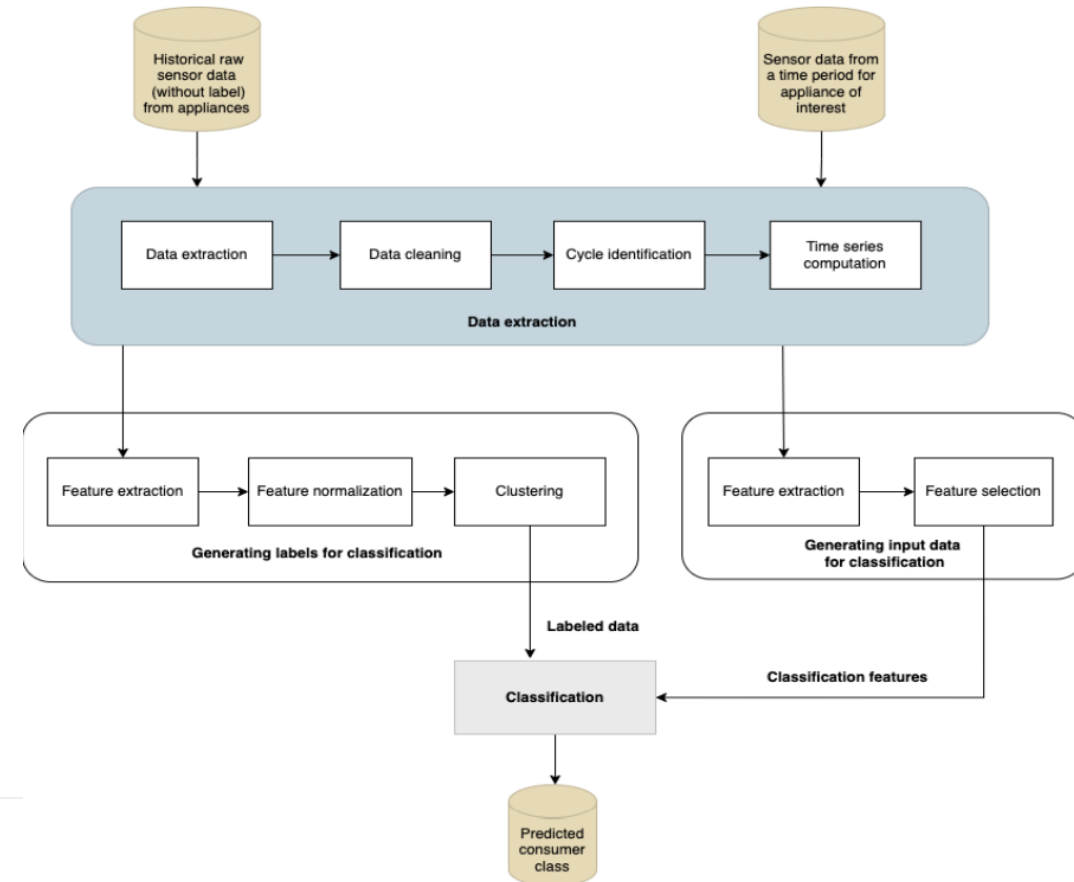
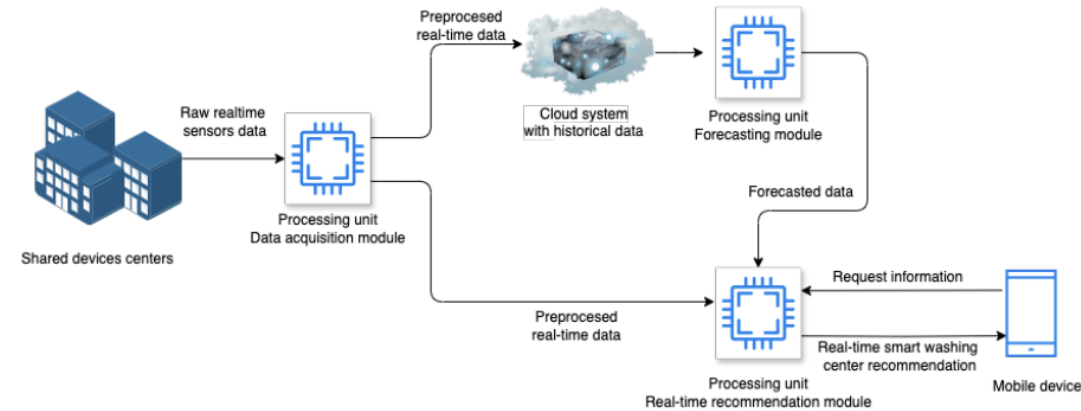
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# Career




Career

# Career Opportunities, Employers and Internships
































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