![Alchera Technologies logo]

At Alchera, we use artificial intelligence to automate infrastructure and smart cities.

We exist to help our clients build responsive, human-scale intelligence into their cities, transport systems and public and private spaces. Founded by researchers from the University of Cambridge & UCL, Alchera Technologies has a strong and rich pedigree of world-leading machine learning and computer vision sensing technologies.

At Alchera we design, develop and deploy a real-time data platform for the automation of smart infrastructure. With a strong core of computer vision leveraging existing video infrastructure, we fuse a number of data sources to provide real-time and predictive insights into the current state of a range of infrastructure and mobility assets.

Alchera is now looking to further develop the existing team. We are looking for people with a proactive attitude towards solving problems. We are a team of active and engaged individuals, interested in constantly developing and improving our platform. We are looking to hire for a number of full-time roles and internships.

To apply, please get in touch at careers@alcheratechnologies.com with a 300 word cover letter and CV, subject line: Internship position.

Full Time positions

Computer Vision Engineer

Automated situation analysis from urban surveillance cameras is a fast-emerging field. This position allows you to explore cutting-edge computer vision techniques on a rich and diverse set of vehicle and pedestrian traffic videos.

We are looking for candidates with a background in Engineering or Computer Science and at least 1-2+ years' commercial experience in computer vision and data generation or a PhD in a related field. Solid experience in developing CV algorithms and implementing them in frameworks such as OpenCV. Preferably a good understanding of video and "real time" stream analytics. Any additional programming experience or machine learning awareness is a plus. Will consider motivated graduates.

You will work on CCTV feed analysis and on furthering our current capabilities using ML models for object detection (e.g. pedestrian detection capabilities) or further the traffic capabilities (deep scene understanding and contextualization). You will be exploring interesting problems in the areas of:

- Camera to camera matching and tracking.
- Multiple view geometry.
- Using established methods and exploring new ones in the area of object detection and tracking.

Software Engineer

We are looking for candidates with a background in Engineering or Computer Science and at least 2 years commercial experience in web applications and systems integration, working in multidisciplinary teams. In addition, you will need to have a suitable awareness of machine learning and computer vision concepts as well as having a solid experience in developing complex applications linked directly to cloud based technologies. You will design and develop high quality software, working in an Agile team, as well as review documents, designs and code done by others and provide constructive feedback. Proficiency in one or more of Java, Python, C#, C++, Javascript (Node.js) is required. Any experience with GPU programming (preferable using CUDA) would be beneficial. Will consider motivated graduates.

You will be working on the full-stack development of our real-time data platform. You will be working closely with our existing team on extending our current capability and building out new functionality. This will include work on building APIs, implementing analysis by other departments of the technical group, architecture design iteration and the overall monitoring and deployment of

the platform. Candidates will be flexible to pick up new frameworks, think outside of the box and have some strong foundations in core programming.

Machine Learning & Data Fusion Developer

We are looking for candidates with a background in software engineering or Machine Learning with at least 3 years practical experience. Deep knowledge of a programming language (Python, C++, Java, C#), and a strong grasp of both machine learning and software engineering fundamentals. Experience with libraries like pytorch, tensorflow and scikit-learn would be beneficial. You will continuously develop your own Machine Learning and engineering skills and help others to improve theirs.

You will be working on our data fusion models, working closely with timeseries data. You will be involved in the implementation and training of new pipelines of functionality tacking complex data science problems with machine learning techniques, with a focus on simulation and modelling. You will also spend time on the optimisation of core vision models implemented across other departments in the technical team.

Internship positions

We have a number of projects available for paid summer internships in our offices in Cambridge and are flexible about duration of placement from 6-12 weeks. Your time at Alchera will be spent on working with our developers on parts of our existing stack as well as on your own dedicated project.

Computer Vision (CV)

Automated traffic analysis from urban surveillance cameras is a fast-emerging field. This internship allows you to explore cutting-edge computer vision techniques on a rich and diverse set of traffic videos. You will be exploring interesting problems in the areas of:

- Camera to camera matching and tracking.
- Multiple view geometry.
- Using established methods and exploring new ones in the area of object detection and tracking.

Additionally, the internship will allow you to get experience with using cutting edge hardware (NVIDIA Jetson TX2, latest GPUs) and software frameworks (NVIDIA DeepStream etc.)

Experience with Python and/or C++ and computer vision and ML libraries like OpenCV and Tensorflow would be beneficial.

Deep Learning (DL):

Deep Learning (DL) has added a huge boost to the already rapidly developing field of machine learning and computer vision. At Alchera, you will have the opportunity to apply DL on a variety of interesting problems, for example:

- Explore cutting edge developments in the DL field like capsule networks and ascertain whether they can help with complex classification tasks.
- Use transfer learning, for example in the context of vehicle classification.
- Work on fun projects like detecting vacant parking spaces in still images and videos.
- Use pretrained models like VNET and YOLO and either apply them on traffic datasets or modify/retrain them for particular problems.

During the internship you will gain valuable experience in the area of DL which is a skill in high demand in industry and academia alike.

Any exposure to deep learning and frameworks like mxNet, Torch, Tensorflow would be highly advantageous. Experience with Python would be useful.

Dataset Fusion:

With the variety and ubiquity of IoT connected sensors, multiple information sources can contribute to classification and decision-making models. At Alchera we work on feeding and integrating different data sources into a single platform that can create a unified view of the world. As part of this you will get the opportunity to:

- Investigate ways of synchronizing data sources
- Build visualisations to help understand and debug the data flows and
- Explore ways of delivering high frequency data to multiple consumers
- Simulate multimodal synthetic datasets and real-world scenarios to augment and analyze the performance of algorithms.

Experience with programming, scripting or general data analysis would be helpful. This intern will have a love for hacking stuff together, just to make it work.