

Deep Learning towards Label Generation and Object Detection in a Kitchen Environment

Kitchen of the Future

We believe that tomorrow's kitchens will be safe and stress-free. Thanks to technology.

Fewer people than ever want to work in gastronomy kitchens. Our robotic kitchen assistant *Fred* gives kitchen staff a helping hand, making their work more efficient and enjoyable at the same time. Empowered with a state-of-the-art vision system and a sleek food-grade appearance, *Fred's* favorite pastime is grilling hamburger patties autonomously, but he is eager to learn many more tasks.

Why join us

You will be at the heart of a young company. Right from the start you will take responsibility and self-direction. You'll profit from a direct and open working culture with a focus on learning and growth. You will have flexible working hours at our office at TUM Incubator on Garching University Campus. Prepare to become a part of the vibrant Munich Tech Startup community and establish valuable contacts.

Your opportunity

- Devise a reinforcement/active learning scheme that suggests bounding boxes and labels for kitchen utensils and ingredients in video clips [1] [2]
- Implement additional tools to speed up the labelling process [3] [4]
- Implement transfer learning in Keras on a state of the art multi-object detector (SSD) [5] using the newly labeled data
- At the end you have a system that can swiftly learn to recognize new ingredients with high accuracy and minimal effort from humans

Your skills

- Bachelor or Master Student in Informatics or related fields
- Experience with Neural Networks (Keras / Tensorflow etc)
- Seek responsibility actively
- Hold yourself to a high standard
- Motivated to work in a startup environment
- Fluent in English or German

Do you want to make *Fred's* fantastic journey come true? If you think you are a good fit, we strongly encourage you to reach out to us.

Contact:

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Literature

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- [2] D. P. Papadopoulos, J. R. R. Uijlings, F. Keller and V. Ferrari, "We don't need no bounding-boxes: Training object class detectors using only human verification," *arXiv preprint arXiv:1602.08405*, 2016.
- [3] K. Konyushkova, J. R. R. Uijlings, C. Lampert and V. Ferrari, "Learning Intelligent Dialogs for Bounding Box Annotation," *arXiv preprint arXiv:1712.08087*, 2017.
- [4] D. P. Papadopoulos, J. R. R. Uijlings, F. Keller and V. Ferrari, "Extreme clicking for efficient object annotation," in *2017 IEEE International Conference on Computer Vision (ICCV)*, pp. 4940-4949, 2017.
- [5] W. Liu, D. Anguelov, D. Erhan, C. Szegedy, S. Reed, C.-Y. Fu and A. C. Berg, "Ssd: Single shot multibox detector," in *European conference on computer vision*, pp. 21-37, 2016.