



## Summer Internships for MSc&PhD Students 2020

Company	Project
Amazon	<a href="#">Applied Science Intern in Alexa Shopping Science</a>
IBM	<a href="#">Project Debater - NLP Research</a>
IBM	<a href="#">Clarification Questions Recommendation for Customer Support Agent Assistance</a>
IBM	<a href="#">Procedural Text Summarization</a>
IBM	<a href="#">Topic-based Multi-table Summarization</a>
IBM	<a href="#">Utilizing the forefront of NLP for conversational systems</a>
IBM	<a href="#">Speaking style prediction and control for Sequence-to-sequence Speech synthesis</a>
IBM	<a href="#">Deep-learning based voice cloning from publicly available noisy audio</a>
IBM	<a href="#">Deep-learning based spoofing detection</a>
IBM	<a href="#">Advanced deep speaker embedding</a>
IBM	<a href="#">Intern for the Deep Learning team in Computer Vision &amp; Augmented Reality (CVAR)</a>
IBM	<a href="#">Intern for Audiovisual Video Analytics with Deep Learning</a>
IBM	<a href="#">Blockchain- Summer Intern</a>
IBM	<a href="#">Consistent Replicated Data Types</a>
IBM	<a href="#">Data Skipping Applications</a>
IBM	<a href="#">AIOps for Cloud Infrastructure</a>
IBM	<a href="#">Address space separation inside Linux Kernel</a>
Rafael	<a href="#">Research Intern</a>
Yahoo	<a href="#">Ad tech/NLP/distributed systems/User modeling/mail</a>
Biosense Webster	<a href="#">3D geometrical algorithms for enhancing heart chambers reconstruction in medical devices</a>
Bosch	<a href="#">Learning to Look</a>
Bosch	<a href="#">Interaction Recognition in Manufacturing</a>
Bosch	<a href="#">Simulation for Connectors</a>
Bosch	<a href="#">Simulation to Reality in Manipulation Robotics</a>

# Amazon

## Applied Science Intern in Alexa Shopping Science

**Job description:** As an intern in the Alexa Shopping Research team, you will work with top researchers and engineers to explore and devise new AI technologies for voice shopping. Your work will combine deep learning, data mining, exploration of new domains, as well as submission of your work to a top scientific conference. Ideally, you are enrolled in a PhD program, have strong CS foundations, solid programming skills, and have already published at a peer-reviewed conference. Especially relevant, if your field of expertise is Web search, Web data mining, Applied/Theoretical Machine Learning, Natural Language Processing, Computer Vision, Speech, or Artificial Intelligence.

### **Requirements:**

Basic qualifications:

- Second year MSc in Computer Science, or related field.
- Submitted a research paper to a top conference.
- Strong CS foundations (data structures and algorithms).
- Knowledge of programming languages such as C/C++, Java, or Python.
- Good writing and verbal English skills.

Preferred qualifications:

- PhD candidate in Computer Science, or related field
- Knowledge of AI-related technologies (e.g., Deep Learning, Machine Learning, Natural Language Processing, Information Retrieval, Computer Vision) and cloud technologies (e.g., AWS)
- Good communication and collaboration skills.

**Contact details:** Volkman, Julia ([jvolkman@amazon.de](mailto:jvolkman@amazon.de))

# IBM

## Project Debater – NLP Research

**Job description:** [Project Debater](#) is the first AI system to successfully compete with a human in a live debate. The cumulated work on Project Debater led to [over 40 papers](#) in top NLP conferences. The IBM Debating Technologies team continues the research on various areas, ranging from further advancement in computational argumentation to novel algorithms that allow learning with little data. The exact research area and scope of the internship will be determined together with the accepted applicant. The goal will be a paper submitted to a leading NLP conference, such as ACL 2021.

### **Requirements:**

- Knowledge and experience in NLP and Deep Learning
- Outstanding Msc/Phd students

**Location:** (both are possible)

Haifa Research Lab (in the Haifa University Campus)

IBM Site in Hashahar Tower , Givataim (Near Tel Aviv Arlozorov train station)

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Clarification Questions Recommendation for Customer Support Agent Assistance

**Job description:** Many customer-care and technical support sessions involve human agents in the loop (e.g., LivePerson). To allow better understanding of the customer's problem, a human agent should be able to ask the right questions so to quickly pin-point the potential solution to be offered to the customer.

The goal of this summer internship is to develop an automatic clarification questions recommendation solution in an agent assist environment. Clarification questions can be either extracted (i.e., retrieval-based) from previous related conversations or be generated based on relevant content retrieved for a given session.

A successful outcome of this internship is expected to result in a research paper in one of the leading AI/NLP conferences (with ACL 2021 as the preferred target).

### **Requirements:**

- Basic prior knowledge in AI/NLP, good python and deep-learning programming skills (e.g., torch), with advantage to candidates with prior knowledge in text generation and/or dialogue (conversational search).
- Preference to MSc/PhD. BSc candidates with strong relevant background are also encouraged to submit.

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# IBM

## Proceural Text Summarization

**Job description:** Automatic text summarization is an AI/NLP task that involves the “compression” of an input text (usually long and topic-driven) into a shorter, human readable summary. In many real-life settings, such as customer-care and technical support, summaries are driven by user intents that require to be answered in a sequential, logically sound, order. One form of such summaries are procedural summaries which instruct users how to perform operations to solve some problem (e.g., install a driver on a MAC machine).

In this internship, we shall explore novel extractive (retrieval-based) and abstractive (generation-based) procedural summarization techniques for the domain of customer care (with applications in other domains, e.g., WikiHow).

A successful outcome of this internship is expected to result in a research paper in one of the leading AI/NLP conferences (with ACL 2021 as the preferred target).

### **Requirements:**

- Basic prior knowledge in AI/NLP, good python and deep-learning programming skills (e.g., torch), with advantage to candidates with prior knowledge in text generation.
- Preference to MSc/PhD. BSc candidates with strong relevant background are also encouraged to submit.

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# IBM

## Topic-based Multi-table Summarization

**Job description:** Table retrieval allows to answer user natural language queries with tables as answers. Yet, not all table contents should be relevant to the user's query, whereas there are cases where user's query may be better answered using information obtained in multiple tables.

One way to make tables more accessible to end-users is to provide table answers in a summarized form. In this internship, we shall explore novel topic-sensitive techniques for summarizing user queries using content extracted from multiple tables. Table summary should include all relevant information in a concise manner yet removing redundancy.

A successful outcome of this internship is expected to result in a research paper in one of the leading AI/NLP conferences (with ACL 2021 as the preferred target).

### **Requirements:**

- Basic prior knowledge in AI/NLP, good python and deep-learning programming skills (e.g., torch), with advantage to candidates with prior knowledge in text generation and/or knowledge representation.
- Preference to MSc/PhD. BSc candidates with strong relevant background are also encouraged to submit.

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Utilizing the forefront of NLP for conversational systems

**Job description:** We are looking for a star in the domains of machine learning/data science and deep-learning, who is passionate about solving natural language understanding problems, to help us craft the future of conversational systems. As an intern, you will be an integral part of a dynamic team, working on the most advanced problems in the domains of natural language processing and understanding. You will be paired with mentors committed to guiding you to advance your research skills and qualifications. Your work with us will ideally lead to a paper submission to a top-tier conference.

We are suggesting two topics as potential projects:

1. We are interested in ways humans in a Customer Care setting can collaborate with and contribute to the AI system. Towards this goal, we employ techniques from the domains of machine teaching, active learning, and weak labeling.
2. We lately achieved very exciting results in sentence generation from using pretrained language models. We now look at new ways to get better understanding of the traits of the generation process as well as to develop algorithms for filtering and choosing sentences from a generated corpus.

So, if you are an enthusiastic student in the areas of AI, machine learning or NLP who loves to create innovative algorithms, is passionate about applying technology to real-life problems, thinks out-of-the-box and is interested in joining a group of top researchers solving challenging text analytics problems – your place is with us!

### **Requirements:**

- PhD (preferred) /MSc student in one of the relevant fields – AI, Machine Learning, NLP
- Hands on experience in writing code in Java and/or Python
- Innovative thinking, creativity, and self-learning
- Preferred: Publications in leading venues in the above areas

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# IBM

## Speaking style prediction and control for Sequence-to-sequence Speech synthesis

**Job description:** Current Text-To-Speech (TTS) systems can generate near-natural sounding human speech from any given textual input. As such, introducing speaking styles (positive, apologetic, empathetic, etc.) to the generated speech is of great value, especially in a spoken dialog setting. Speaking styles are commonly represented as embeddings, obtained by either self-supervised or unsupervised manner (e.g., see our paper "[Sequence to Sequence Neural Speech Synthesis with Prosody Modification](#)", with the sample page at <http://ibm.biz/Bdz2Jm>).

The goal of the proposed project is to generate expressive speaking styles in a spoken dialogue setting. We will use a large annotated multi-speaker dialog dataset (e.g. Switchboard with dialog act labels <https://github.com/cgpotts/swda>) for learning several speaker-agnostic speaking-style embeddings, based on the dialog context and labels.

We offer an opportunity to conduct a high-quality multi-disciplinary research, exploiting a large-scale GPU computation cluster, being a part of a leading IBM research group, on a topic that is on the cutting edge of research and technology.

### **Requirements:**

- Strong research and self-learning skills, significant hands-on background in deep learning (knowledge of Pytorch) is an advantage
- MSc or DSc/PhD student of CS/EE/IE

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Deep-learning based voice cloning from publicly available noisy audio

**Job description:** Text-to-speech audio synthesized using modern adaptable DNN-based systems approaches natural human voice quality and can be adapted to a target speaker with high similarity given only a few minutes of speech data. See our recent paper [High quality, lightweight and adaptable TTS using LPCNet, Interspeech 2019](#), and sample page at <http://ibm.biz/IS2019TTS>. To reach high quality speech synthesis, the voice models need to be trained on clean audio data containing only speech sounds recorded in a quiet environment. This limits our ability to synthesize speech from publicly available sources such as TV shows, where the audio contains background sounds such as laughter, applause and music. Keeping in mind entertainment applications, such as a conversational agent speaking in the voices of a TV show or movie characters, the goal of this project is deep learning-based modeling of clean, high quality, voices from noisy data.

We offer an opportunity to work and conduct high-quality research with a leading research group in the area of multimedia analytics, on a topic that is on the cutting edge of research and technology.

### **Requirements:**

- Strong research and self-learning skills, as well as with a significant hands-on background in deep learning.
- MSc or DSc/PhD student of CS/EE/IE

**Position location:** Haifa

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# IBM

## Deep-learning based spoofing detection

**Job description:** Creating “fake” data has become a pressing concern with the rise of algorithms, such as DeepFake, that are able to produce video, images and speech which are perceived as genuine by an individual or by an authentication system. We aim to explore methods to distinguish “fake” data from genuine one, specifically in the speech domain where Text-to-speech (TTS) system are able mimic an individual from only a few minutes of data (see example <http://ibm.biz/IS2019TTS>), easily spoofing speaker authentication systems. The methods developed could then be used for both spoofing detection and ensuring a TTS system is not used maliciously.

We Offer an opportunity to work and conduct high-quality research with a leading research group in the area of multimedia analytics, on a topic that is on the cutting edge of research and technology.

### **Requirements:**

MSc or DSc/PhD student of CS/EE/IE or equivalent knowledge with strong research and self-learning skills, as well as with a significant hands-on background in deep learning

**Position location:** Haifa

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Advanced deep speaker embedding

**Job description:** Deep learning has been successfully used for several years to embed whole segments of speech into feature vectors for the sake of speaker recognition, as is done in face recognition (such as FaceNet embedding). However, contrary to face recognition where the whole face is captured in a single photo, short speech segments are highly dependent on the phonetic content. The goal of the research is to explore methods for modeling and handling the effect of variable phonetic content in the context of deep speaker embedding. Improved modeling could potentially impact the tasks of speaker recognition, text dependent speaker recognition, and speaker diarization (segmentation).

We offer an opportunity to work and conduct high-quality research with a leading research group in the area of multimedia analytics, on a topic that is on the cutting edge of research and technology.

### **Requirements:**

- Strong research and self-learning skills, as well as with a significant hands-on background in deep learning.
- MSc or DSc/PhD student of CS/EE/IE

**Position location:** Tel Aviv (Haifa might also be possible)

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Intern for the Deep Learning team in Computer Vision & Augmented Reality (CVAR)

**Job description:** We offer an internship position for a graduate student who is excited to push the state-of-the-art boundaries of the modern (DL based) computer vision. The right candidate will work in a world class computer vision and deep learning team consisted of experienced researchers and graduate students that are highly focused on academic research, with a solid publication record (more than 9 papers on the leading conferences during the last two years), and will aim towards publishing the results of the work at top-tier peer reviewed conferences such as CVPR, ICCV, ECCV, or NeurIPS. Most of our past internships ended up with strong papers accepted as oral and poster presentations to these leading venues and counted towards the graduate degree of the interns.

The internship involves solving real world challenges in the area of computer vision, machine learning and deep learning, while focusing on the limited data and supervision setting, such as self-/semi-/active-/weakly-supervised and few-shot learning.

The work will involve hands-on DL research using powerful GPU clusters and an array of modern DL techniques such as meta-learning (learning-to-learn), metric learning, transfer learning, generative models and data synthesis, augmentation learning, and other techniques that can cope with the lack of training data or supervision.

### **Requirements:**

- MS or PhD student in either computer vision, machine learning, signal processing, or a related field
- Hands-on experience in Python and DL frameworks (Pytorch advantage)
- Knowledge of and experience with deep learning are an advantage
- Publication(s) at top-tier peer-reviewed conference or journal are an advantage

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Intern for Audiovisual Video Analytics with Deep Learning

**Job description:** The Video-AI group at the IBM Research lab (located at Haifa and at Givatayim) is looking for an outstanding research intern in the field of computer vision and machine learning, preferably with strong background in deep learning.

As videos are the richest media incorporating visual, sound and speech, you will have the chance to work on video analysis and understanding with experienced researchers. You will develop new deep learning models for cutting edge technologies in video, such as video classification, temporal action detection and event retrieval in long videos, to name a few. Applying deep learning to videos is an emerging domain and highly challenging due to the inherently complex structures of video data containing the modeling of temporal information, high computation demand, and the multimodal nature of video streams. As an intern in the lab you'll further have a chance to publish your work at top-tier peer reviewed conferences and journals.

### **Requirements:**

- MS or PhD student in either computer vision, machine learning, or a related field
- Experience in Python or other programming languages
- Knowledge of and experience with deep learning
- Publication/s at top-tier peer-reviewed conference or journal are an advantage

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# IBM

## Blockchain- Summer Intern

**Job description:** Blockchain is an emerging technology at the heart of crypto currency exchange world, it is powerful and decentralized technology that is revolutionizing the way applications could establish trust, accountability and transparency. We offer an opportunity to work on blockchain cutting edge technical problems, explore research which promises to have significant impact and may lead to a peer-reviewed publication in a top-tier conferences and contribute to Hyperledger Fabric open source community.

IBM Haifa Research Lab is looking for a high-end experienced researcher to join the Blockchain team. Technical candidate with innovation skills to bring technical novel ideas and solution for the next generations of IBM's Blockchain.

Our team is working with the strategic IBM customers and business partners to bring cutting edge technologies and innovations to the market and embed them in next generation platforms and solutions.

The position entails working as part of a leading team on cutting-edge technologies in the area of blockchain.

The position entails research, design and implementation of state-of-the-art Blockchain technologies.

We offer: An opportunity to work and conduct high-quality research and development with a leading research group in the area of Blockchain; and a nice view from our office location. Key aspects of our work are aimed to be published and patented.

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# IBM

## Consistent Replicated Data Types

**Background:** Consistent Replicated Data Types (CRDTs) [1] are distributed data types that make eventual consistency of a distributed object possible, where the participants act autonomously, and without the need of online coordination. Specifically, state-based CRDTs ensure convergence through disseminating the entire state, that may be large, and merging it to other replicas; whereas operation-based CRDTs disseminate operations (i.e., small states) assuming an exactly-once reliable dissemination layer.  $\delta$ -CRDTs (Delta CRDTs) [2] were designed to achieve the best of both worlds: small messages with an incremental nature (i.e. deltas), as in operation-based CRDTs, disseminated over unreliable communication channels, as in traditional state-based CRDTs. However, it appears that naïve deltas tend to be large and inefficient. Enes et al [3] suggested a way to build efficient deltas, but it's not clear how to use that method and still ensure causal consistency structures.

We are exploring how to build efficient distributed data structures for distributed JSON data stores. Kleppmann and Beresford [4] suggested a way to construct distributed JSON, but our evaluations suggested the metadata usage would be inefficient. Specifically, we are exploring how to build JSON as a delta-based CRDT. This implies support CRDTa for primitive types such as Boolean, Integer, etc. Moreover, it requires supporting also types that allows embedding of other types, specifically Map and List. Building the primitive types is relatively easy, and previous publications have developed a Map as a delta based CRDT with observed-remove semantics (a.k.a ORMap).

However, a working design for List which support observed-remove semantics is not available. Unfortunately, the naïve solution of representing a List as a Map with the position of the items as their keys doesn't satisfy the requirements, as it doesn't allow concurrent modification (i.e. in different replicas) of the position and the value of a specific item.

**Job description:** This internship aims at addressing the gaps for enabling a CRDT implementation of JSON. One direction is to create an efficient CRDT for List which support remove-wins semantics (i.e. when concurrently an item is being changed and removed, the remove wins). We expect a development of a CRDT that would enable JSON data type, including proofs and benchmarks to demonstrate efficient implementation for a real-world data store.

**Required skills:** distributed computing and algorithms, programming skills

**References:**

[1] Nuno M. Preguiça, Carlos Baquero, Marc Shapiro, Conflict-free Replicated Data Types (CRDTs), arXiv, May 2018

[2] Paulo Sérgio Almeida, Ali Shoker, Carlos Baquero, Delta State Replicated Data Types, Journal of Parallel and Distributed Computing, Volume 111, January 2018.

[3] Vitor Enes, Paulo Sérgio Almeida, Carlos Baquero João Leitão, Efficient Synchronization of State-based CRDTs, arXiv, March 2019

[4] Martin Kleppmann and Alastair R. Beresford , A Conflict-Free Replicated JSON Datatype, arXiv, August 2017

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Data Skipping Applications

**Job description:** In this project you will work on performance optimizations for big data analytics using Apache Spark SQL on file systems and object storage.

Data skipping is an optimization where metadata is stored for each file and irrelevant files are skipped when processing SQL queries.

The project will apply data skipping to new applications such as similarity search for AI based analytics.

**References:**

Apache Spark - <https://spark.apache.org/>

Data Skipping - <https://dl.acm.org/doi/10.1145/3319647.3325854>

Spark Summit talk - <https://databricks.com/session/using-pluggable-apache-spark-sql-filters-to-help-gridpocket-users-keep-up-with-the-jones-and-save-the-planet>

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## AIOps for Cloud Infrastructure

**Job Description:** In this project you will work on applying AI to the big data of operations (logs, metrics, tickets, etc.) to automate the operations of the cloud infrastructure. This is an opportunity to develop AI techniques using the huge amount of operations data coming from IBM's cloud. A candidate topic is improving our multi-variate anomaly detector and root cause analysis tool by exploring additional/alternative deep learning and machine learning techniques. Another candidate topic is applying AI towards efficient and flexible telemetry -- applying analytics and AI techniques to control the amount of telemetry collected through a feedback loop.

### References:

Skydive -- <https://github.com/skydive-project/skydive>

Posters -- <https://dl.acm.org/doi/10.1145/3319647.3325850>

<https://dl.acm.org/doi/10.1145/3078468.3078495>

Paper -- <https://ieeexplore.ieee.org/document/8818188>

**Contact details:** [michalsh@il.ibm.com](mailto:michalsh@il.ibm.com)

# IBM

## Address space separation inside Linux Kernel

**Job description:** Since the invention of the virtual memory, programs are protected from each other through address space isolation. As kernel exploits and speculation vulnerabilities are inevitable, it's worth to add kernel space isolation to minimize damage that these exploits can cause. IBM leads Linux kernel community discussion to explore and realize these ideas. Initial set of patches have been posted to mailing lists and presented in several developer conferences in 2019. As part of this internship, a student will have an opportunity to take part in this forward-looking exploration, validating the existing and generating new approaches for full stack secure isolation between Linux workloads, e.g. VMs, containers, or processes.

**Requirements:** MSc student with a good grasp of C programming language and OS internals, interested to take part in OS memory related research with a potential for upstream contribution under guidance of a seasoned Linux developer.

**References:**

<https://lsseu2019.sched.com/event/TynJ>

<https://osseu19.sched.com/event/TPGq/address-space-separation-inside-the-linux-kernel-mike-rapoport-ibm?iframe=no&w=100%25&sidebar=yes&bg=no>

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# Rafael

## Research Intern

**Company:** NEWCIRC – National Electronic Warfare, Cyber and Intelligence Research Center, Rafael – Advanced Defense Systems.

**Location:** David Campus, Haifa area (cyber research internship positions are also available at Tel-Aviv and Be'er Sheva).

**Job description:** NEWCIRC (SAMLA – in Hebrew) is one of the largest national research labs in Israel. We research and develop a broad range of technologies to meet critical national security needs. NEWCIRC is at the forefront of many of Israel's national security-related research efforts. Our researchers have exceptional technical abilities and creativity, working in cross-disciplinary teams that tackle hard research challenges.

Our focus spans over these main research areas:

- Cyber
- Signal processing algorithms
- Machine learning
- Electro-optics
- Satellite navigation
- Communications
- RF systems
- Navigation, control and estimation theory

NEWCIRC is offering research internship positions in all of the above research areas tackling diverse challenges. You will have the opportunity of work side-by-side with senior researchers.

We can shape your research tasks here at NEWCIRC to align with your PhD/MSc research. Have an idea for a research internship project that may be of relevance to national security? Try us out – we might just say yes.

### **Requirements:**

- PhD or MSc student in the above research fields (exceptionally excellent undergrads can be considered).
- Passion to tackle extremely hard research challenges
- Suitable candidates will be asked to undergo a security clearance

**Contact:** [sharonmr@rafael.co.il](mailto:sharonmr@rafael.co.il)

# Yahoo

## Ad tech/NLP/distributed systems/User modeling/mail

**Job description:** 3-month research work, hopefully culminating in a publication.

**Requirements:** Pass a day of interviews.

**Contact details:** Omri Perek ([omrip@verizonmedia.com](mailto:omrip@verizonmedia.com))

# Biosense Webster

## 3D geometrical algorithms for enhancing heart chambers reconstruction in medical devices

**Job description:** The job includes enhancing geometrical models for approximating/reconstructing chambers of the heart by implementing and improving several mesh processing algorithms such as:

- Multidimensional scaling (MDS) for feature extraction.
- Automatic rigid registration of CT scan meshes.
- Enhancing reconstructions from point cloud.
- Laplacian mesh editing.

### **Requirements:**

- MSc (second year)/PhD student. Advantage for PhD students.
- Knowledge in 3D mesh geometry processing.
- Research experience in 3D geometry.
- Experience in C++ programming.

**Contact details:** Fady Massarwi ([Fmassar@its.jni.com](mailto:Fmassar@its.jni.com))

# Bosch

## Learning to Look

**Company description:** Do you care about impact on people?

Do you want to publish your work in top tier-1 conferences?

[Bosch Center for Artificial Intelligence](#) in Israel is a unique place that researches and implements cutting edge technologies for manufacturing, automotive, robotics, and industrial applications.

**Position type:** Research Internship (4-6 months during 2020)

**Location:** Bosch Israel offices in Matam, Haifa, Israel

**Job Description:** We would like to learn efficient strategies for a robotic arm with a wrist camera for learning environment and reduce uncertainty of its world model. Robotic manipulation relies on perception sensors, e.g. depth cameras, to identify and localize the items to be operated on, obstacles, etc. In practice the perception models are susceptible to data acquisition issues, especially in an industrial context where typically the objects and workstations are metallic and highly reflective. These data distortions can be overcome by multi-view fusion, and the challenge we focus on is how to automate this process using robots in a robust yet efficient way. For this end we will apply reinforcement learning techniques, in combination with existing computer vision tools.



**Goal:** Publish the internship results in tier-1 conference.

### **Qualifications:**

- PhD or MSc student in CS, EE, IE, ME, AE faculties.
- Acquaintance with **Machine Learning** in general and **Computer Vision** in particular.

- Strong in **Python** and **Deep Learning** frameworks.
- Like to work in an interdisciplinary as well as international team.
- Advantage: acquaintance with **Reinforcement Learning**.

**Contact details:** Dr. Dotan Di Castro, [dotan.dicastro@bosch.com](mailto:dotan.dicastro@bosch.com), +972-52-8312220

# Bosch

## Interaction Recognition in Manufacturing

**Company description:** Do you care about impact on people?

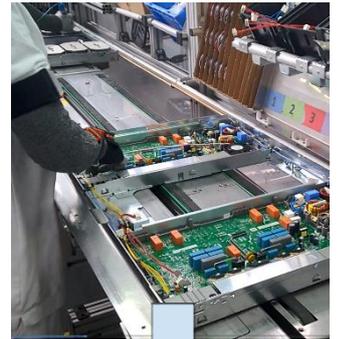
Do you want to publish your work in top tier-1 conferences?

[Bosch Center for Artificial Intelligence](#) in Israel is a unique place that researches and implements cutting edge technologies for manufacturing, automotive, robotics, and industrial applications.

**Position type:** Research Internship (4-6 months during 2020)

**Location:** Bosch Israel offices in Matam, Haifa, Israel

**Job description:** Today, vision systems in factories are becoming quite sophisticated. For many applications, one needs the capability of understanding what the workers in the assembly line are semantically doing. For example: “The worker connected the adapter to the socket” (see the picture on the right).



“The worker connected the cable to the socket”

In this project, we will apply new methods for the industrial use case of understanding the interaction between humans, robots, and objects (also known as visual relation detection; VRD). Specifically, we will translate images scenes from real data of factories to a free text describing them.

This internship is based on the following source: <https://arxiv.org/abs/1910.12324>.

**Goal:** Publish the internship results in tier-1 conference.

### **Qualifications:**

- PhD or MsC student in CS, EE, IE, ME, AE faculties.
- Knowledge **Computer Vision**.
- Strong in **Python** and **Deep Learning** frameworks.
- Like to work in an interdisciplinary as well as international team.

- Nice to have: some knowledge Information Retrieval or Natural Language Processing

**Contact details:** Dr. Dotan Di Castro, [dotan.dicastro@bosch.com](mailto:dotan.dicastro@bosch.com), +972-52-8312220

# Bosch

## Simulation for Connectors

**Company description:** Do you care about impact on people?

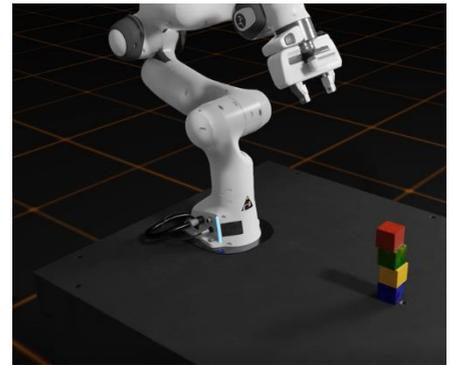
Do you want to publish your work in top tier-1 conferences?

[Bosch Center for Artificial Intelligence](#) in Israel is a unique place that researches and implements cutting edge technologies for manufacturing, automotive, robotics, and industrial applications.

**Position type:** Research Internship (4-6 months during 2020)

**Location:** Bosch Israel offices in Matam, Haifa, Israel

**Job description:** Physics simulation is a critical component today in Manipulation Robotics. In this internship we will investigate MuJoCo and NVidia platforms for manipulation robotics ([MuJoCo/IsaacSim](#)). Specifically, we will solve the problem of how to simulate efficiently insertion of adapter into socket, and devise an algorithm to learn the correct model in simulation.



**Goal:** Publish the internship results in tier-1 conference.

**Qualifications:**

- PhD or MSc student in CS, EE, IE, ME, AE faculties.
- Strong in **Python** and **Deep Learning** frameworks.
- Like to work in an interdisciplinary as well as international team.
- Nice to have: some knowledge Information Retrieval or Natural Language Processing.

**Contact details:** Dr. Dotan Di Castro, [dotan.dicastro@bosch.com](mailto:dotan.dicastro@bosch.com), +972-52-8312220

# Bosch

## Simulation to Reality in Manipulation Robotics

**Company description:** Do you care about impact on people?

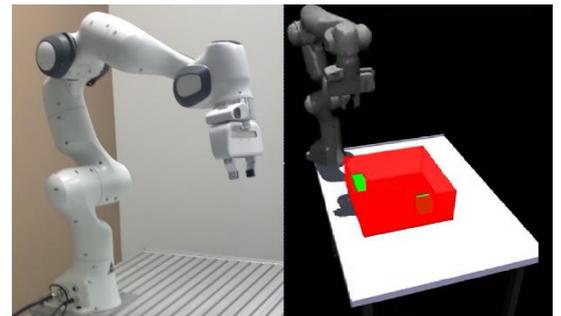
Do you want to publish your work in top tier-1 conferences?

[Bosch Center for Artificial Intelligence](#) in Israel is a unique place that researches and implements cutting edge technologies for manufacturing, automotive, robotics, and industrial applications.

**Position type:** Research Internship (4-6 months during 2020)

**Location:** Bosch Israel offices in Matam, Haifa, Israel

**Job description:** Learning robotic tasks from direct interaction with a robot is a slow and expensive process. Simulation can facilitate the process by providing fast and cheap samples of the real environment, but often at the expense of decreased fidelity. We wish to learn policies that achieve the desirable task in the real world with minimal or limited sampling budget



**Goal:** Publish the internship results in tier-1 conference.

**Qualifications:**

- PhD or MsC student in CS, EE, IE, ME, AE faculties.
- The intern should have good familiarity and experience in Reinforcement Learning, Manipulation Robotics and Simulation as well as development skills in linux environment.
- Like to work in an interdisciplinary as well as international team.
- Nice to have: some knowledge Information Retrieval or Natural Language Processing.

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