Jobbnorge ID: 201591
Deadline: 3/23/2021
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Temporary

The Department of Electronic Systems has a vacancy for

2 PhD Positions in Conversational Speech Recognition and Dialect Modelling

This is NTNU

At NTNU, creating knowledge for a better world is the vision that unites our 7 400 employees and 42 000 students.

We are looking for dedicated employees to join us.

You will find more information about working at NTNU and the application process here.

Video: https://www.youtube.com/watch?v=clgKd1SwGLI

About the position

Within the newly funded project SCRIBE, we have vacancies for two PhD Research Fellow positions at the Department of Electronic Systems (IES). The PhD positions are for up to 4 years with 25% work assignments for NTNU IES/IDI

You will report to head of the position.

Duties of the position

The successful candidates will work with different aspects of modelling conversations:

1) **Modelling conversational speech**

Conversational, multi-party speech contains false starts; repeats; incomplete and/or ungrammatical sentences; non-verbal sounds; overlapping speech; interruptions; etc. Such phenomena greatly impact both acoustic and language models in a speech recognizer. The lack of (rich) transcriptions of conversational speech cause language models also for conversational ASR to be trained on large corpora of written text, with a resulting mismatch to the task domain. The introduction of attention mechanisms, in particular “transformers”, has pushed the state-of-the-art in many natural language processing (NLP) areas. Lately, ASR models have also incorporated transformer techniques both in acoustic and language models with excellent results.

This PhD project will address the modeling of conversational speech from small amounts of relevant training data. Issues like transfer learning, transformers, context modeling and semantically meaningful performance measures will be central.

2) **Characterization and handling of dialects**

Conversational speech exhibits pronunciation variations due to its spontaneous nature; different degrees of formality; varying emotional state and speaking rate; as well as variants in dialects and accents. These variations pose challenges to speech recognition in most languages. Transcriptions reflecting dialect use are sparse in most languages, including Norwegian. Spoken dialect corpora with corresponding transcriptions are even less available. This is a severe hindrance to adequate modeling of dialects.

This PhD project will use recent machine learning techniques to automatically separate linguistic content from dialect variation jointly on the spoken and written utterances. This model will allow recognition of dialectal speech, but will also be interpretable, providing better insights in relevant acoustic-phonetic and linguistic characteristics of Norwegian dialects. From the latent representations learned by the model it will also be possible to perform dialect identification given the spoken utterance. The performance of this novel modeling will be compared to two more standard paradigms, namely end-to-end modeling (powerful but non-interpretable) and explicit dialect modeling (inefficient at using scarce data resources).

This work will be carried out in collaboration with researchers at Telenor Research, and from the Computer Science department at NTNU. The candidates will also contribute to the definition of meaningful metrics to evaluate conversational speech recognition systems and the improvement of linguistic resources at the Norwegian National Library (NB) and the Norwegian Broadcasting Corporation (NRK) that are project partners. They may also work in collaboration with parallel research projects in the domain of machine learning and speech technology already running at NTNU.

Required selection criteria

We seek a highly-motivated individual who has

- strong background in machine learning, signal processing and mathematics with research-oriented master thesis in a related field, e.g., statistical machine learning, artificial intelligence, statistical signal processing, speech technology, information theory, applied mathematics, or optimization.
- experience with programming.
- good written and oral English language skills.

Publication activities in the aforementioned disciplines will be considered an advantage but is not a requirement. Knowledge of a Scandinavian language is considered as a plus.

The PhD-position's main objective is to qualify for work in research positions. The qualification requirement is that you have completed a master's degree or second degree (equivalent to 120 credits) with a strong academic background in machine learning, and signal processing or equivalent education with a grade of B or better in terms of NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you are unable to meet these criteria you may be considered only if you can document that you are particularly suitable for education leading to a PhD degree.

Personal characteristics

- Challenges the status quo and promotes new initiatives.
- Is good at anticipating problems and identifying logical solutions as well as contradictions and inconsistencies.
- Acquires new knowledge quickly, and is able to use existing knowledge in new ways.
- Works together with others across established reporting lines.

We offer

- exciting and stimulating tasks in a strong international academic environment
- an open and inclusive work environment with dedicated colleagues
- favourable terms in the Norwegian Public Service Pension Fund
- employee benefits

Salary and conditions

PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 482 200 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 4 years with 25% work assignments for NTNU IES.

Appointment to a PhD position requires that you are admitted to the PhD programme in [subject area] (Link to website, if applicable) within three months of employment, and that you participate in an organized PhD programme during the employment period.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachment are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU. After the appointment you must assume that there may be changes in the area of work.

The position is subject to external funding.

It is a prerequisite you can be present at and accessible to the institution on a daily basis.

About the application

The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must follow the application. Please note that applications are only evaluated based on the information available on the application deadline. You should ensure that your application shows clearly how your skills and experience meet the criteria which are set out above.

The application must include:

- CV, certificates and diplomas
- Academic works - published or unpublished - that you would like to be considered in the assessment.
- Name and address of three referees

Joint works will be considered. If it is difficult to identify your contribution to joint works, you must attach a brief description of your participation.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability.

NTNU is committed to following evaluation criteria for research quality according to The San Francisco Declaration on Research Assessment - DORA.

General information

Working at NTNU

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the innovation capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

Information Act (Offentleglova), your name, age, position and municipality may be made public even if you have requested not to have your name entered on the list of applicants.

If you have any questions about the position, please contact Prof Giampiero Salv, telephone 73559757, email giampiero.salvi@ntnu.no. If you have any questions about the recruitment process, please contact Randi Hostad, e-mail: randi.hostad@ntnu.no

Please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates. Applications submitted elsewhere will not be considered. Diploma Supplement is required to attach for European Master Diplomas outside Norway. Chinese applicants are required to provide confirmation of Master Diploma from China Credentials Verification (CHSI).

If you are invited for interview you must include certified copies of transcripts and reference letters. Please refer to the application number 2021/12516 when applying.

Application deadline: 23.03.2021

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Electronic Systems

The digitalization of Norway is impossible without electronic systems. We are Norway’s leading academic environment in this field, and contribute with our expertise in areas ranging from nanoelectronics, phototonics, signal processing, radio technology and acoustics to satellite technology and autonomous systems. Knowledge of electronic systems is also vital for addressing important challenges in transport, energy, the environment, and health. The Department of Electronic Systems is one of seven departments in the Faculty of Information Technology and Electrical Engineering .

Additional information

Place of service:

Campus Gløshaugen 7491 Trondheim (Trondheim Municipality)